41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1162
Scientific abstract: Acute pain

The Impact of a Multimodal Analgesic Protocol on Anesthesia Provider Attitudes and Perceived Practices in an Academic Institution

Alberto Ardon, Song Pak
University of Florida

Introduction

Opioid analgesia is associated with multiple side effects and potential complications. The use of multimodal analgesia with acetaminophen, COX2 inhibitors, and gabapentinoids has been shown to improve patient analgesia and decrease such side effects. However, little is known about the underlying biases and perceptions of anesthesia staff regarding the use of these medications. The primary aim of this study is to assess the impact of a multimodal analgesia protocol on attitudes and perceived practices of anesthesia providers toward non-opioid analgesics. A secondary aim was to investigate the self-perceived frequency with which anesthesia providers assessed baseline pain scores, preoperative analgesic use, and pain expectations.

Materials and methods (NA for case report)

An institutional review board approved this study. A 6-item baseline survey was sent to 28 anesthesia faculty, 25 CRNA's, and 12 anesthesia residents. 8 weeks after the implementation of the hospital's first perioperative multimodal analgesic protocol, a 9-item follow-up survey was sent to the same group of providers. The introduction of the protocol included an educational session emphasizing preoperative pain evaluation of patients. Survey questions asked respondents to self-report the frequency with which they asked patients about baseline pain scores, preoperative analgesic use, and postoperative pain expectations, as well as the frequency with which respondents contemplated and actually used non-opioids. Reasons for avoiding non-opioids were also explored. On the follow-up survey, respondents were asked about the influence of the protocol on their overall practice.

Results/Case report

Baseline and follow-up survey response rates were 49.3% and 41.3%, respectively. There was no statistically significant difference in the percentage of survey responses categorized as at least "most of the time" or "greater than 50% of patients" for assessment of preoperative pain (56.76% vs 48.39%, p=0.92), preoperative analgesic use (83.79% vs 83.88%, p=0.99), or pain expectation counseling (86.49% vs 93.55%, p=0.34). Contemplated (86.49% and 93.55%, p=0.34) and self-reported use (70.27% vs 70.97%, p=0.26) of non-opioids was also not significantly different. Before and after protocol implementation, the most commonly cited reason for avoiding non-opioid analgesics was patient clinical criteria (33% vs 42%, respectively). 51.7% of respondents strongly agreed that the protocol enhanced their knowledge of non-opioid analgesics and comfort with using these medications. 46.4% of respondents strongly agreed that the introduction of the protocol increased their overall use of non-opioid analgesics.

Discussion

Self-reported evaluations of baseline pain, preoperative analgesic use, and patient pain expectations were fairly frequent at baseline and did not differ significantly after introduction of the protocol. Contemplated and self-reported use of non-opioids were also high at baseline and not statistically different after protocol initiation. Although the most commonly cited reason for avoiding non-opioids was patient clinical status, preferential use of opioid analgesia and surgeon preference were still cited as common reasons for avoiding non-opioids. A majority of respondents believed the protocol had positively influenced their knowledge and use of non-opioid analgesics, as well as the use of these analgesics in practice. Further investigations could compare these findings to rates of actual use.

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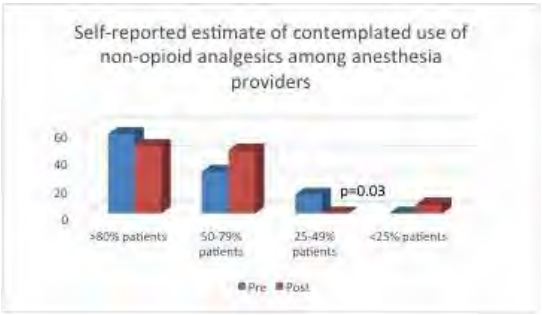
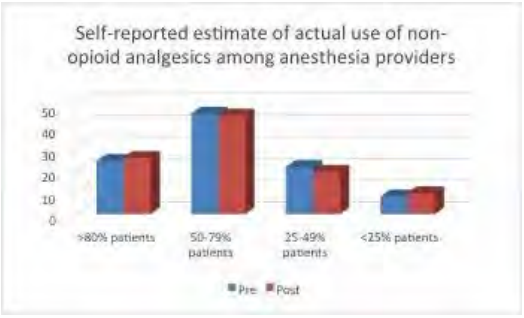
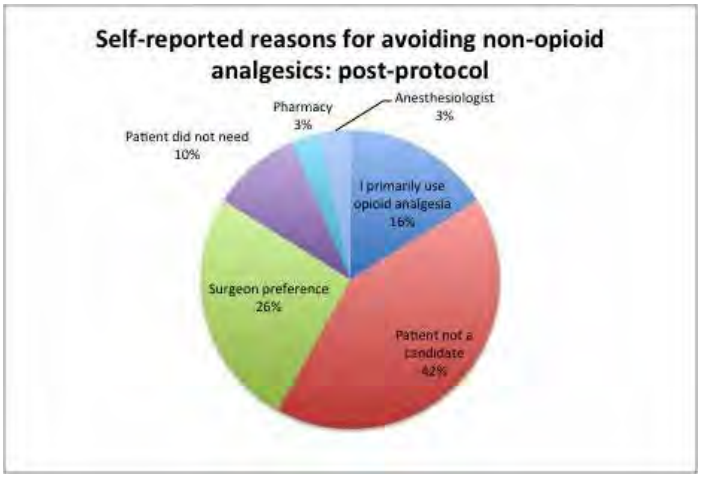
Tables/images



Self-reported estimate of contemplated use of non-opioid analgesia among anesthesia providers



Self-reported estimate of actual use of non-opioid analgesics among anesthesia providers



Self-reported reasons for avoiding non-opioids - Post Protocol

Survey Responses categorized as at least "Most of the Time" or "Greater than 50% of patients"			
	Pre	Post	P-value
Ask patients about preop pain?	56.76%	48.39	0.92
Ask patients about preop analgesic?	83.79%	83.88%	0.99
Counsel about pain expectations?	64.86%	77.42%	0.26
Contemplated using non-opioids?	86.49%	93.55%	0.34
Have used non-opioids?	70.27%	70.97%	0.26

Survey responses preoperative evaluation

Survey Responses to potential impact of multimodal protocol			
	Strongly agree	Somewhat agree	Either strongly or somewhat agree
Multimodal protocol increased knowledge of non-opioids?	51.7%	32.3%	84%
Multimodal protocol increased comfort with non-opioids?	51.7%	19.4%	71.1%
Multimodal protocol increased use of non-opioids overall?	46.4%	25.8%	72.2%

Survey Responses protocol impact on practice

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
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Abstract: 1173
Medically Challenging Cases (report of up to 4 cases)

SYMPTOMATIC PHRENIC NERVE BLOCKADE FOLLOWING INTERSCALENE BLOCK IN A HEALTHY WOMAN

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University Hospitals/CWRU

Introduction

Ipsilateral phrenic nerve block invariably occurs after interscalene blockade due to the proximity of the phrenic nerve to the interscalene space. Thus, it is generally recommended that patients with poor respiratory mechanics or with severe pulmonary disease should not undergo interscalene blockade, as the resulting hemidiaphram will further compromise their ability to effectively oxygenate and ventilate. However, no such recommendations have been made for patients without preexisting pulmonary disease who appear to have normal respiratory mechanics.

Results/Case report

A 52 year old woman with past medical history of hypertension and shoulder pain underwent right interscalene block for arthroscopic subacromial decompression, biopsy of bursa, and bursectomy, using 20ml of 0.25% bupivicaine with 1:600,000 epinephrine. She subsequently underwent general anesthesia without complications; however, she awoke dyspneic and described a "tightness" in her chest making it difficult to take deep breaths. In the post-anesthesia care unit, she was able to be weaned to 2L nasal cannula but when attempting to wean to room air, she desaturated to <90%. A chest x-ray showed elevated right hemidiaphragm and a diagnosis of right phrenic nerve blockade was made. Due to her ongoing oxygen requirement, she was admitted for overnight observation. On post-operative day 1, she reported no issues with breathing until the afternoon when she attempted to walk for the first time. A repeat chest x-ray demonstrated continued right diaphragm elevation. Walking pulse-oximetry was performed revealing continued hypoxemia to 87% with symptoms of dyspnea. On post-operative day 2, she was able to ambulate without desaturation. She was given aggressive pulmonary toileting with albuterol, acapella and incentive spirometry. She reported improved ability to take deep breaths. She was discharged home.

Discussion

Symptomatic hemidiaphragmatic paresis is discussed in the literature as frequently occurring in patients after intersclene block. However, in these patients, preexisting pulmonary disease such as severe chronic obstructive pulmonary disease or poor respiratory mechanics, including atelectasis or supine positioning, among others, contribute to their symptoms. In this patient, neither lung disease nor readily apparent impaired respiratory mechanics contributed to her dyspnea. She did not initially improve with position changes or aggressive pulmonary toilet, warranting a previously unanticipated observation period in the hospital. For this patient, the mainstay of therapy included close monitoring, prevention of contributing respiratory depressants, aggressive pulmonary toilet, early ambulation and incentive spirometry, and watchful waiting for her interscalene blockade to resolve. This case highlights the importance of anticipating the possibility of problematic phrenic nerve blockade, even in healthy patients.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1193
Scientific abstract: Acute pain

Does Duloxetine Reduce Sub-Acute Pain after Knee Arthroplasty? A Randomized Controlled Trial.

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Hospital for Special Surgery

Introduction

Pain after Total Knee Arthroplasty (TKA) can be severe and persistent. Duloxetine is effective for chronic musculoskeletal and neuropathic pain (1). A review of antidepressants for postoperative pain found insufficient data to recommend use (3). However, in a previous trial Duloxetine (two perioperative doses) reduced morphine requirements in the first 48 hours after TKA, but without differences in the pain scores or adverse effects (2). We hypothesized that administration of duloxetine for 15 days would reduce Pain Numerical Rating Scale (NRS) score with ambulation at 2 weeks after TKA.

Materials and methods (NA for case report)

Patients were eligible for this IRB-approved randomized controlled trial if they were scheduled for elective TKA under regional anesthesia. Participants were randomized to either Duloxetine or placebo for 15 days, starting the day of surgery (Table 1). Patients also received neuraxial anesthesia, epidural analgesia, an adductor canal block, meloxicam, and oxycodone/acetaminophen on demand. Participating patients, anesthesiologists, research assistants and the statistician were blinded to group assignment. The primary outcome was the NRS pain score with ambulation on Postoperative Day 14 (POD14).

Table 1. Demographic Data.

Group	Number of Patients	Age, years (mean(SD))	Gender % Female	BMI (mean(SD))	ASA 1 N (%) pts	ASA2 N(%) pts	ASA3 N(%) pts
Duloxetine	**53**	**66(7)**	**47%**	**32(7)**	**3(5.7%)**	**37(69.8%)**	**13(24.5%)**
Control	**53**	**61(9)**	**51%**	**31(5)**	**3(5.7%)**	**44(83%)**	**6(11.3%)**

Results/Case report

Fifty-three patients per group gave written informed consent and were randomized to one of two groups. On POD14, Duloxetine produced a decreased NRS pain score with knee bending (Figure 1)(Table 2).This effect was independent of its antidepressant activity There was no difference in pain with ambulation. Duloxetine had an opioid sparing effect, with a concomitant reduction in nausea. Symptoms attributable to discontinuation syndrome occurred in both groups.

Table 2. Outcomes. *OME=Oral Morphine Equivalents. Median (Q1, Q3) values for skewed data.

Group	Opioid Dose POD1 [in mg*OME] (mean(SD)) 95%CI	Opioid Dose POD14 [in mg*OME] (mean(SD)) 95%CI	NRS(0-10) Ambulation POD14 (mean(SD)) 95%CI	NRS(0-10) Bending POD14 (mean(SD)) 95%CI	Nausea (0-5)POD14 (mean(SD)) 95%CI	KSS 6wk (Knee/ Function) (median (Q1,Q3)) 95%CI	Discontinuation Syndrome POD(18-20) N pts (%)
Duloxetine	**57(28)**	**32(22)**	**3.5(2.1)**	**4.5(2.1)**	**0.5 (1.3)**	**89 (60,95)/72 (60,90)**	**9(17%)**
Control	**72(34)**	**48(34)**	**3.8(2.3)**	**5.6(2.2)**	**1.3 (2.7)**	**88(72,93)/70(55,80)**	**5(9.4%)**
p value	**0.015**	**0.07**	**0.386**	**0.02**	**0.04**	**0.899/0.607**	**0.247**

Discussion

The effect of Duloxetine on sub-acute pain after TKA may improve recovery. The analgesic effects of Duloxetine are independent of depression and anxiety scores, consistent with previous studies. The results may not be generalizable for different surgeries, age groups, or non-surgical patients. The optimal duration of treatment with Duloxetine to address sub-acute, and prevent potential chronic pain and opioid dependence, has yet to be defined.

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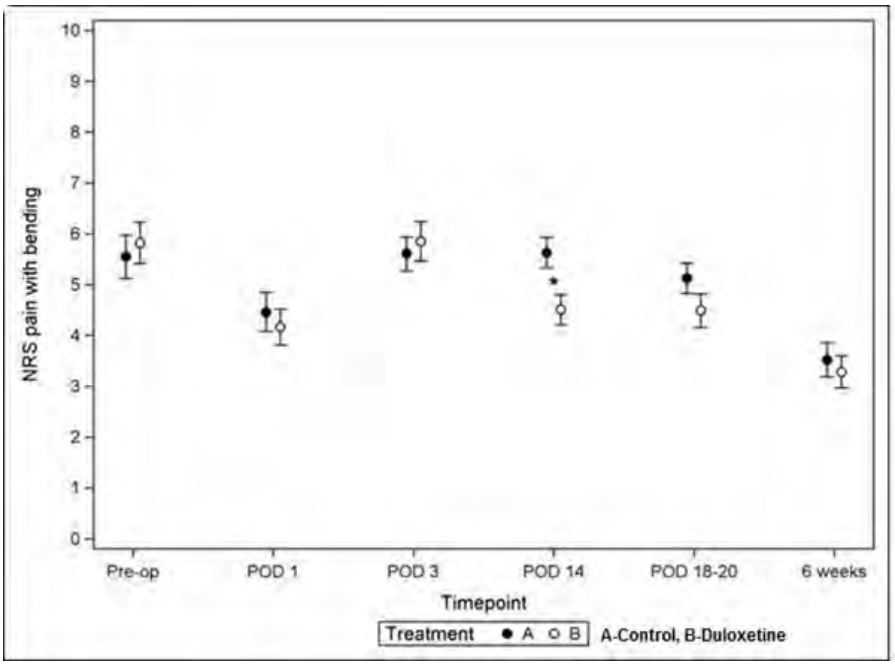
Tables/images



NRS Pain Score With Knee Bending

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
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Abstract: 1194
Scientific abstract: Chronic pain

Cost effective analysis of epidural and regional block trays in Pain clinic – Role of a Physician in reduction of health care cost.

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University of Mississippi Medical center

Introduction

With the advancements made in health care, the health care costs have increased at the work sites in the past two decades. The purpose of this study was to evaluate the role of pain physicians in the reduction of health care costs based on reducing waste of products in the pain clinic.

Materials and methods (NA for case report)

First objective was to analyze the contents of the epidural and regional block trays used in the pain clinic. Second objective is to remove the contents that are not used during the pain procedures and evaluate the economic savings for the hospital health care system. This study was undertaken as a part of pain fellowship quality improvement project with the help of program director of Pain medicine fellowship, nurse manager of pain clinic, and purchasing department of the Hospital.

Setting: Henry Ford Hospital Pain Clinics, Detroit, Michigan.

Results/Case report

After analysis and removal of contents from the old trays and the addition of contents needed for the procedures in the pain clinic, the total cost of the block tray decreased. With the final outcome of the project, the expected savings to the pain clinic, with the newly designed block trays, totaled $10,248.75 for each 6 months period. (Table1,2&3)

Discussion

The result of this study is a rough estimate of the potential wastage in the health care system, which includes the proportion of contents in surgical equipment and other health services that were in the equivocal categories. If circumstances demanded, the definition of waste could be expanded to any service that was not in the necessary category. The physician is the one who needs to identify the waste and aid in reducing the cost and waste, which would lower health care spending.

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Tables/images

Table 1

Current kit	Each Box contains	Boxes Purchased (Jan-June 2014)	Total units Purchased	Box Price ($)	Each Unit Price ($)	Spend (Jan through June) ($)
Nerve Block Tray	10 units	209.0000	2090.0000	138.33	13.83	28,910.97
Single Shot Epidural Tray	10 units	94	940.0000	157.52	15.75	14,806.88
Totals						43,717.85

Table 2

Current kit	Chlorprep EA Price (if pulled separately)	Total Price of current kit if pulling Chlorprep Separately	Proposed 6 Month spend if pulling Chlorprep Separately
Nerve Block Tray	($) 3.48	$ 17.31	$ 36,184.17
Single Shot Epidural Tray	($) 3.48	$ 19.23	$ 18,078.08
Total			$ 54,262.25

Table 1&2

Table 3

Company 1 Proposed each unit price ($) (with chlorprep)	Company 1 Proposed 6 month Spend ($)	Company 2 proposed each unit price ($)	Company 2 proposed 6 month Spend ($)	Proposed 6 month Savings with company 1 ($)
13.71	28,653.90	22.33	46,670.75	10,248.75
16.34	15,359.60	23.96	22,523.81	
	44,013.50		69,194.56	

Table 3

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1207
Medically Challenging Cases (report of up to 4 cases)

Differential Diagnosis for New Onset Peripheral Neuropathy: An Unexpected Case of Ascending Paralysis Progressing to Central Pontine Myelinolysis

Alopi Patel, ROBERT BOWERS, JUNG KIM
MOUNT SINAI ST. LUKES ROOSEVELT

Introduction

Peripheral neuropathy is a pathologic condition that causes impaired sensation, motor function, autonomic dysfunction and/or other nerve related functional deficits. The etiology of peripheral neuropathy include but are not limited to inflammatory diseases, autoimmune diseases, metabolic disturbances, medications, physical injury or even idiopathic origin. Further classifications of peripheral neuropathy include acute versus chronic, motor versus sensory versus autonomic and mononeuropathy versus polyneuropathy. Manifestation of peripheral neuropathy can vary depending on the etiology which can complicate diagnosis and treatment of peripheral neuropathy. We present a case which presented atypically for acute onset peripheral neuropathy.

Results/Case report

A 31 year old female with a past medical history of psoriasis, cyclical vomiting, and poor nutritional status presents to the hospital with a complaint of one month of progressive burning pain on the plantar surface of both feet. Per the patient, the pain had been increasing in severity since developing a recent upper respiratory infection, and progressed to the anterior distal legs, as well the bilateral hands. The primary medical team placed the patient on hydrocodone/acetaminophen for analgesia and requested a pain management consultation. During pain service history, review of systems was significant for frequent falls and recent self-induced vomiting. Physical exam confirmed stocking-glove distribution peripheral neuropathy, and also revealed atrophic bilateral distal extremities, however upper extremity motor function was largely unaffected. Cranial nerves were intact. Deep tendon reflexes were 1+ in bilateral lower extremities and Babinski was downgoing. On examination, gait was

unsteady, however proprioception was intact. Laboratory results were unremarkable except for a slightly increased MCV (101FL) and Mg (1.4mg/dl). Initially, the pain service recommended anti-neuropathic pain medications, including amitriptyline and gabapentin, as well as continuing hydrocodone/acetaminophen. The differential diagnosis included autoimmune disorders given history of psoriasis, post-infectious causes such as Guillain Barre Syndrome, and metabolic disturbances, including B12 and folate deficiency. Recommendations were given to supplement these vitamins. Neurology service was also consulted and electromyography performed, which was unremarkable. The patient subsequently developed a hoarse voice as the hospitalization proceeded, and nasopharyngoscopy revealed palsy of the left vocal cord. MRI of the central nervous system revealed demyelination of the central pons of the midbrain. Other concomitant vitamin deficiencies, including hyponatremia, were diagnosed and eventually vitamins were repleted. As ascending paralysis ceased progression, the patient was eventually discharged home with home services and close neurologist follow up.

Discussion

Central pontine myelinosis can be caused during treatment of hyponatremia. This patient was at risk for metabolic disturbances secondary to bulimia, which was like the cause of her hyponatremia. Furthermore, this may have also contributed to her neuropathic pain syndrome presentation. The involvement of the pain service is critical in working up neuropathic etiologies that may have contributed or exacerbated the presentation of limb dysfunction and neuropathic pain. The pain service can also facilitate the symptomatic treatment of the patients discomfort and disability. Lastly, non-iatrogenic central pontine myelinosis is rare and diagnosis can be complicated when presenting with vague symptoms such as distal extremity pain.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1210
Scientific abstract: Emerging technology

Objective Epidural Space Identification Utilizing Needle-Tip Pressure Measurement is Equivalent to Fluoroscopy/LOR

Ralf Gebhard, Tobias Moeller-Bertram, Douglas Dobecki, Michael Walker, Sanja Ilic
University of Miami

Introduction

Introduction:

Successful and safe performance of epidural anesthesia or epidural injections relies on correct identification of the epidural space (ES). While methods for simple and objective identification of the ES have been proposed, most anesthesiologists and/or pain physicians still utilize either the subjective manual feeling of a loss of resistance (LOR) or objective but relatively invasive radiological confirmation via fluoroscopy (1). Pressure measurement at the tip of the epidural needle and real-time graphic and numeric display of such pressures via a computerized injection pump has previously been demonstrated to successfully identify ES (2). The aim of this investigation is to evaluate this simple, objective, and non-invasive technology when compared to LOR and/or fluoroscopy.

Materials and methods (NA for case report)

Methods:

After IRB approval, a total of 316 patients scheduled to receive epidural needle placement, as part of their medical management, will be enrolled in this prospective controlled multi-center trial. Patients will be randomized to either have the ES identified by standard of care methods utilizing either LOR and/or fluoroscopy (SC Group) or by utilizing real-time pressure measurement at the epidural needle tip via a computerized injection pump (EP Group). A blinded independent observer will evaluate correct identification of the ES. Successful identification of the ES is defined by either loss of sensation in at least 2 dermatomes bilaterally after local anesthetic injection, or correct spread of dye as demonstrated by fluoroscopy.

Results/Case report

Results:

This is a preliminary report of the first 204 patients enrolled in this investigation. Groups were similar in terms of demographics. All patients in Group SC received epidural needle placement utilizing a combination of fluoroscopy and LOR. Identification of the ES in Group EP resulted in equal success rates and number of required attempts as in Group SC (Table 1). No evidence of clinically significant adverse events was seen in any patient.

Discussion

Conclusion:

Our preliminary data suggest that identification of the ES by utilizing a computerized injection pump technology and obtaining real-time pressure measurements from the needle tip, results in non-inferior success rate and equivalent safety when compared to the current standard of care. This simple, compact, and mobile technology may have the potential to avoid exposure of the patient to radiation and also allow for greater flexibility and cost savings.

References

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Tables/images

	Group EP	Group SC	stats
N =204	106	98	
Mean Age	56.4	57.3	
Median	57	59	
Mod	60	63	
Age Min	26	26	
Age Max	81	88	
female	59 (55.7%)	54 (55.1%)	
N of patients with 1 attempt	101 (95.3%)	95 (96.9%)	NS
N of pts with 2 or more attempts	5	3	NS p=0.543
% agreement with the radiological confirmation	100%	100%	

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
Consultant for Milestone Scientific
Funded Research Purdue
Funded Research Merck

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1215
Scientific abstract: Regional anesthesia

The Role of The Superior Costotransverse Ligament in Thoracic Paravertebral Block: A Cadaveric Study

Ioana Costache, Colin McCartney, Christopher Ramnanan, Shannon Goodwin, Faisal Farrash, John Sinclair, Thanh Nguyen
The Ottawa Hospital

Introduction

Thoracic paravertebral block can result in unpredictable spread. Current ultrasound approaches to the paravertebral space describe a requirement of placing the needle tip anterior to the superior costotransverse ligament in order to achieve a successful block. We hypothesized that the superior costotransverse ligament may not act as a barrier to diffusion, and that an injection posterior to the superior costotransverse ligament would reach the nerve roots in the paravertebral space.

Materials and methods (NA for case report)

After institutional ethics board approval (Ottawa Health Science Network Research Ethics Board, protocol #20150439), an 82 year old, unembalmed male cadaver was used for this study. Bilateral thoracic paravertebral injections were performed with methylene blue using dynamic ultrasound. Injections were performed posterior to the superior costotransverse ligament from T2-T7 bilaterally, except T4 and T5 on the left where injections were performed anterior to the superior costotransverse ligament. The spread of dye into the paravertebral space and nerve roots, intercostal nerves, and posteriorly into the back was evaluated.

Results/Case report

Methylene blue dye was found in the paravertebral spaces from T1-T7 bilaterally. The spread of dye was similar for injections either posterior or anterior to the superior costotransverse ligament. There was extensive spread of dye into the intercostal spaces, as well as the muscles of the back.

Discussion

Our results show that the superior costotransverse ligament is not a barrier to diffusion, and the paravertebral space is not a true anatomical compartment. Injections posterior to the superior costotransverse ligament reached the nerve roots in the paravertebral space. We are describing a new ultrasound guided technique of deliberate injection posterior, rather than anterior to the superior costotransverse ligament. This technique is further distant from the pleura than conventional ultrasound techniques, and potentially could provide better patient safety. Further studies are needed to understand the spread of solution in the paravertebral space and the optimization of dynamic ultrasound guided techniques.

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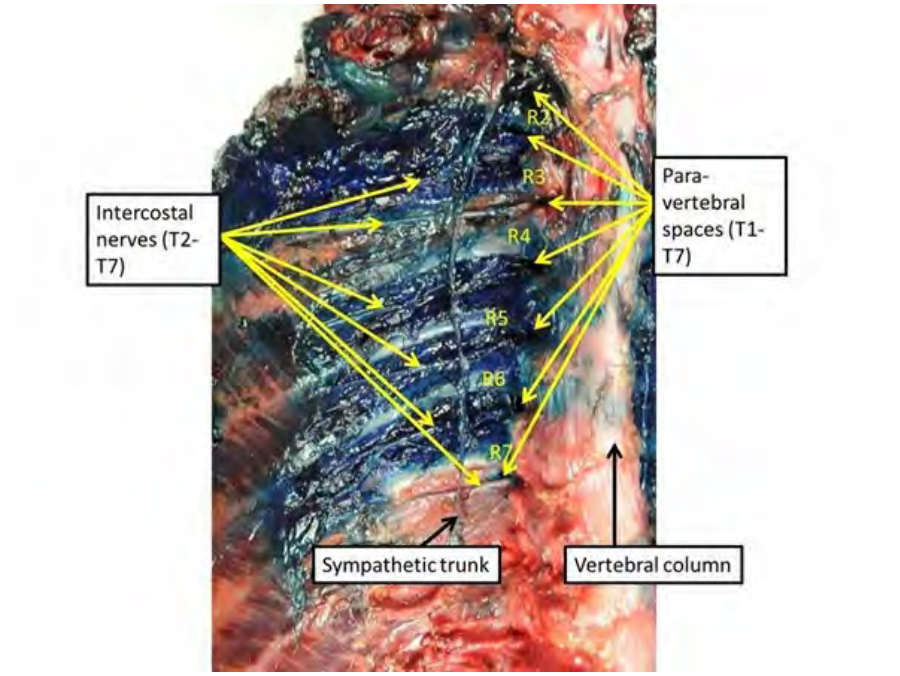
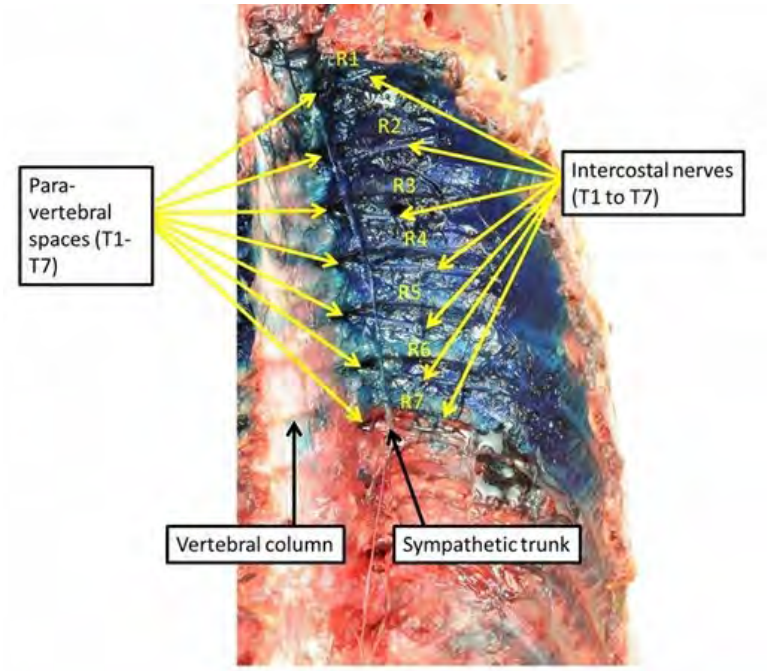


Spread of methylene blue on the right side of an unembalmed cadaver as a result of injections posterior to the SCTL. Thoracic viscera and parietal pleura have been removed in this anterior view. R2 to R7: ribs 2 to 7



Spread of methylene blue on the left side of an unembalmed cadaver as a result of injections either anterior (T4,T5) or posterior (T2,T3,T6, T7) to the SCTL. Thoracic viscera and parietal pleura have been removed.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1218
Scientific abstract: Regional anesthesia

Coventry position: Patient positioning technique to perform sciatic nerve block at popliteal fossa

sudheer Jillela, Ramesh Sadasivan
UHCW, Coventry, UK

Introduction

A sciatic nerve block at the level of popliteal fossa is one of the most useful and widely performed blocks in our practice. Sciatic nerve block results in complete anaesthesia of the entire lower limb below the knee, with the exception of a strip of skin on the medial leg and foot, which is innervated by the saphenous nerve.

Ultrasound guided sciatic nerve block at the popliteal fossa is performed with the lateral approach with patient in the supine position or with the lateral or posterior approach with patient in the prone position. Having an assistant to hold the leg, oxford position, placing the leg on the chair are some of the positioning techniques that have been described in the literature so far to perform sciatic popliteal block in a supine patient. (1) we would like to bring to your attention of our practice of using carter Braine limb support for positioning the leg in a supine position

Results/Case report

Although scanning the nerve in the popliteal fossa might be easier, positioning the patient prone can be more cumbersome. However many times, due to trauma or other considerations, it's not feasible to have the patient lie prone. If the sciatic nerve block is performed with patient in supine position, sufficient space must be made to accommodate the transducer beneath the knee and thigh. This can be accomplished either by resting the foot on an elevated footrest or flexing the knee while an assistant stabilizes the foot and ankle on the bed. Different techniques have been described in the literature to position the leg to perform popliteal block in a supine patient like having an assistant to hold the leg, oxford position, placing the leg on the chair etc.(2) Whilst the patient is supine, the leg to be operated upon is positioned on the Carter Braine support with 60 - 90 degrees flexion at hip and knee. This is to make sure that there is no undue stretch on the nerves, muscles or tendons and the patient's leg is comfortably positioned. This technique also allows room for the probe to be tilted caudally to bring the angle of incidence to 90 degrees to the nerve. With this positioning technique, both in plane, in axis and in plane, out of axis block can be performed with ease.

Discussion

The advantages of this positioning technique are that it is easy to use and easily accessible. Most importantly, there is no need for an extra person to hold the leg, thereby freeing up that person to inject the local anaesthetic. We have been using this technique for the last few years with very good success and had been extremely popular amongst the anaesthetic nurses.

In conclusion, this positioning technique using Carter Braine arm support is convenient to the patient, operator and his assistant, easy to use and aids in optimizing ergonomics to improve the outcome.(3)

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3. Preliminary Study of Ergonomic Behavior During Simulated Ultrasound- Guided Regional Anesthesia Using a Head-Mounted Display:

Ankeet D. Udani, MD, T. Kyle Harrison, MD, Steven K. Howard, MD,Edward Kim,MD, John G. Brock-Utne

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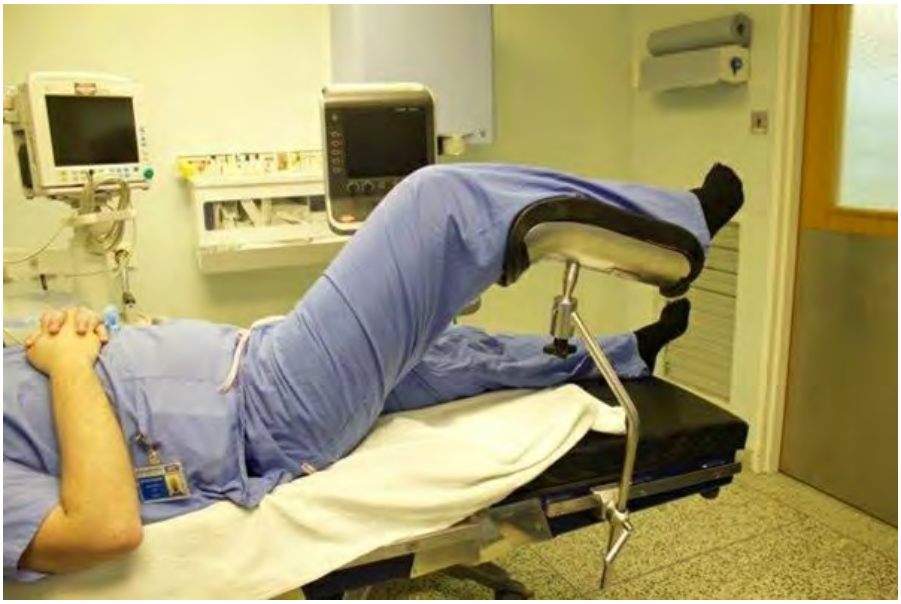
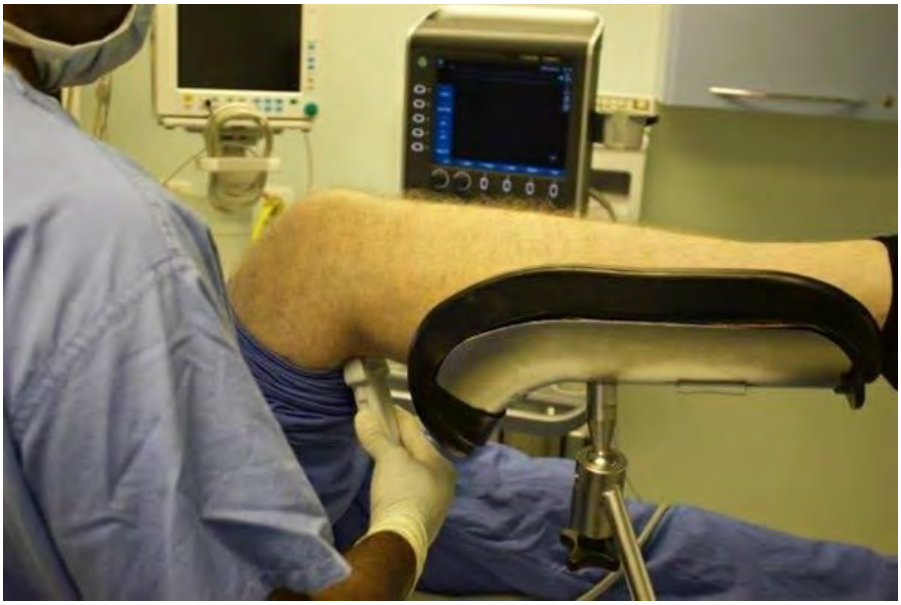


position of leg in Carter Braine limb support system(volunteer)



in plane , in axis block(volunteer)

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1220
Medically Challenging Cases (report of up to 4 cases)

Hemidiaphragmatic Paresis Associated with Brachial Plexus Blockade: Educating our Medical Colleagues on a Common Side Effect That Masquerades as Cardiopulmonary Disease

Aaron Dahl, Joseph Neal, Michael Mulroy
Virginia Mason Medical Center

Introduction

Continuous interscalene perineural catheters for shoulder surgery may be associated with concomitant ipsilateral hemidiaphragmatic paralysis (HDP), the symptomatology of which can mimic cardiopulmonary disease. We present four patients who presented to emergency departments (ED) and underwent full cardiopulmonary diagnostic evaluations for this expected side effect.

Results/Case report

Case 1: 41-year old obese (BMI 47) woman with continuous positive pressure (CPAP) dependent obstructive sleep apnea (OSA) presented to the ED with dizziness, chest pressure, dyspnea, and nausea on postoperative day 1 (POD1). She received aspirin, sublingual nitroglycerin, and antibiotics. Electrocardiogram (ECG), cardiac enzymes, and complete blood count were normal. Chest x-ray (CXR) demonstrated an elevated left hemidiaphragm. Her dyspnea and chest pressure improved 2 hrs after the anesthesiologist stopped the local anesthetic infusion that was being delivered via her interscalene catheter.

Case 2: 50-year old woman with type 2 diabetes mellitus (T2DM), hypertension (HTN), obesity, and smoking history presented to the ED on POD1 with chest pain, dyspnea, tachycardia (HR 130s), headache and Horner syndrome. Her CXR revealed elevated hemidiaphragm, negative computerized tomography pulmonary angiogram (CTPA), and normal ECG and cardiac enzymes. The patient's symptoms resolved 2 hrs after discontinuing the local anesthetic infusion.

Case 3: : 57-year old woman with T2DM, obesity, HTN, and diastolic heart failure on daily oral furosemide presented to the ED on the evening of surgery with chest pressure, mild wheezing and tachycardia. A full cardiopulmonary evaluation revealed a CXR with bilateral low lung volumes, a CTPA with mild pulmonary vascular engorgement, an ECG with sinus rhythm and left ventricular hypertrophy, and brain natriuretic peptide (BNP) slightly elevated at 159 pg/mL. Dyspnea improved after discontinuing the interscalene catheter and re-starting her diuretics.

Case 4: A 53-year old obese male with OSA on CPAP was evaluated by a hospitalist the evening after surgery for sinus tachycardia to 123 bpm, SaO2 of 93% on 2L nasal cannula, and mild dyspnea when ambulating. A full cardiopulmonary workup included normal CTPA and diaphragm elevation on CXR. The patient was discharged on POD3 with the ISC in place, which was removed subsequently at home with resolution of his mild dyspnea on exertion.

Discussion

HDP is a common side effect of interscalene nerve block affecting almost all patients at 24 hrs[1,2]. Although well recognized by anesthesiologists, HDP is only briefly addressed in the emergency medicine literature and may not be a component of the emergency physician's differential diagnosis[3]. As such this may result in unnecessary ancillary evaluations. Anesthesiologists should embrace the opportunity to educate our medical colleagues regarding the expected side effects of these procedures.

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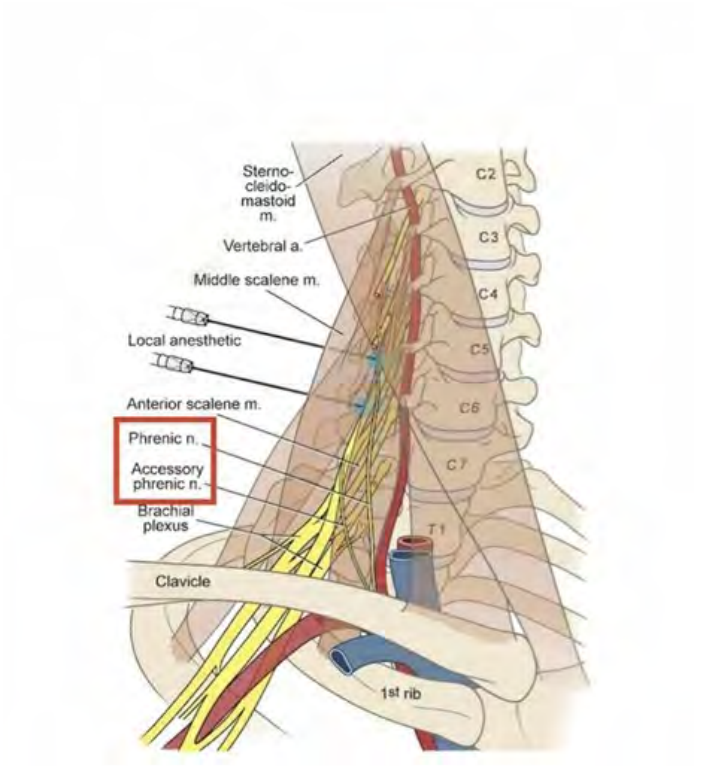

Brachial Plexus Anatomy and Needling Techniques of the Interscalene Groove. Used with permission from Neal and Rathmell: Complications in Regional Anesthesia and Pain Medicine. 2nd ed. 2013.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1222
Scientific abstract: Regional anesthesia

Regional Anesthesia in Patient with Severe Guillain-Barré Syndrome: A Case of Successful Use of Popliteal and Femoral Nerve Blocks

Alopi Patel, Sanjana Vig, Ali Shariat
Mount Sinai, St. Luke's-Roosevelt Hospital Center

Results/Case report

A 36-year-old male with a BMI of 21.86 and a past medical history significant for GBS, HIV, bipolar disorder, hypertension, and non-insulin dependent diabetes mellitus, was scheduled to undergo an open reduction and internal fixation of a left trimalleolar ankle fracture. Symptoms of GBS started about one year ago, at which time his treatment for GBS was complicated by seizures leading to status epilepticus and a prolonged intubation and an ICU stay. He complained of residual respiratory weakness and difficulty phonating. In order to minimize the risk of both aspiration and prolonged intubation, it was decided to perform a one-shot popliteal and femoral blocks as the primary anesthetic.

An ultrasound-guided left popliteal block was performed. A nerve stimulator was simultaneously used and an evoked motor response was achieved with a minimal nerve stimulation current of 0.4 mAmps. An injection manometer was used to ensure injection pressures less than 15 psi. A total of 20cc of 0.5% ropivicaine was injected.

A left femoral block was then performed under ultrasound guidance. Evoked motor response was achieved with a minimal nerve stimulation current of 0.4 mAmp, and an injection manometer was used to maintain injection pressures at less than 15 psi. A total of 20cc of 0.5% ropivicaine was injected.

Postoperatively in the evening, the patient had stinging pain at the surgical site, which increased gradually to 10/10 in intensity. The pain was controlled throughout the night by oxycodone PO. On POD 1, the patient reported a full recovery of sensation and mobility in his lower extremity.

Discussion

GBS refers to a group of acute onset, immunologically mediated demyelinating disorders of the peripheral nervous system. It is often preceded by an infection 10-14 days prior to its onset and is a known complication of HIV infection. GBS typically results from the demyelination of both peripheral nerves and spinal nerve roots. Patients present with progressive motor weakness, facial and bulbar weakness, as well as, autonomic dysfunction.

There are no case reports of peripheral nerve blocks used in patients with GBS. Although they are not contraindicated in patients with GBS, the potential for a double-crush injury causing a worsening of symptoms dissuades most practitioners from administering.

This is the first case report of successful peripheral nerve blocks in a patient with severe GBS. Although there are risks of worsening the inflammatory process and a double crush phenomenon which makes the routine performance of PNBs in patients with GBS unattractive, regional techniques should be considered when there is a high risk for complications from GA.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1226
Medically Challenging Cases (report of up to 4 cases)

Double Trouble: A Case of Subglottic Stenosis and Thrombocytopenia

Jennifer Wu, Joy Hawkins, Rachel Kacmar
University of Colorado

Introduction

We present a case of a parturient with thrombocytopenia and subglottic stenosis. Patient consent obtained.

Materials and methods (NA for case report)

NA

Results/Case report

A 39 y/o G2P1 at 30 wks EGA with history of subglottic stenosis and immune thrombocytopenic purpura (ITP) presented for antepartum consultation. ENT examination revealed decreased vocal cord abduction, mild posterior glottic stenosis, and an anterior glottis web, all presumed secondary to prolonged intubation as an infant. During the antepartum visit, she was hoarse with dyspnea and had a Mallampati I with good mouth opening and jaw protrusion

After multidisciplinary discussion, a scheduled cesarean delivery at 39 weeks was planned with regional anesthetic if platelet levels were adequate and ENT on hand as airway backup. At presentation for cesarean delivery, patient's platelet level was 44k necessitating general anesthesia. She was adequately NPO with aspiration prophylaxis and received dexamethasone in anticipation of a difficult airway. A C-MAC provided a Grade I view, but a 5.0 MLT would not pass. ENT attempted passage of 4.5 ETT over flexible laryngoscope but could not maneuver the scope anteriorly through the vocal folds. Ultimately, ENT performed direct laryngoscopy, and successfully placed a 4.5 ETT with mild difficulty. Throughout, she was easy to mask with saturations greater than 85%. The case proceeded uneventfully with extubation at conclusion. Apgars of the infant were 4 and 8.

Mild stridor and hoarse voice were noted POD #0, but the patient remained stable postoperatively and was weaned to RA by POD #3. Approximately four months postpartum ENT saw the patient and determined her stable.

Discussion

Tracheal stenosis is rare during pregnancy, with fewer than 20 cases documented. Patients can present with difficulty breathing or wheezing that is often misdiagnosed as asthma that does not respond to bronchodilators. Tracheal stenosis has multiple causes including congenital and acquired etiologies including trauma, prolonged intubation, GERD, and Wegener's granulomatosis. Physiologic changes of pregnancy with decreased FRC, increased oxygen consumption, airway mucosal swelling and weight gain can exacerbate tracheal stenosis symptoms in parturients.

There is no consensus on the optimal management of pregnant patients with tracheal stenosis. Some suggest that the safest method is insertion of tracheostomy tube under local anesthesia. Others describe successful bronchoscopic dilations during pregnancy.

On the other hand, thrombocytopenia is the second most common hematologic abnormality encountered during pregnancy after anemia. However, fewer than 1% of parturients present with platelets <100k.

American Hematology Society guidelines for ITP during pregnancy recommend no treatment for women with platelets greater than 30k and no bleeding until 6 weeks, then IVIG or oral corticosteroids to maintain platelet count greater than 50k prior to onset of labor and delivery.

Minimums on platelet counts for neuraxial anesthesia depend on provider comfort level.

The combination of thrombocytopenia and tracheal stenosis during pregnancy is exceedingly rare, with no documented cases. For our patient, we

weighed the risks of instrumenting a stenotic airway versus a neuraxial anesthetic with 44k platelets. Ultimately, we felt the safest course of action was to avoid neuraxial anesthesia and to plan a controlled general anesthetic with ENT.

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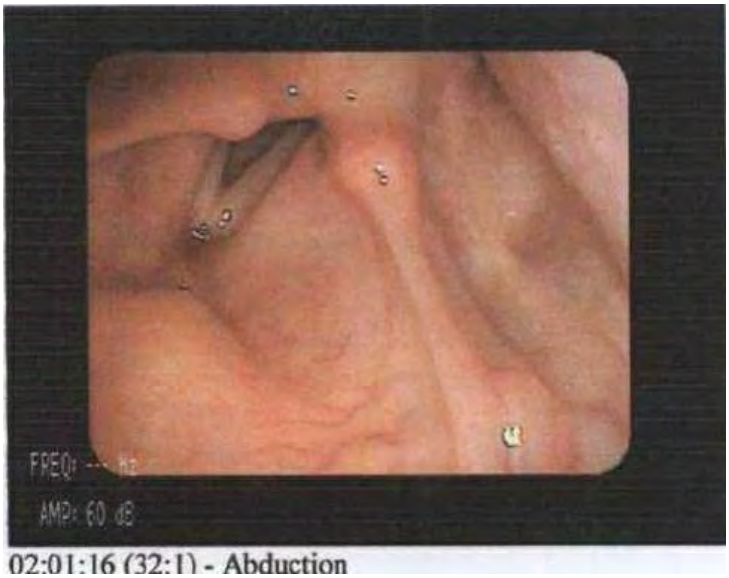
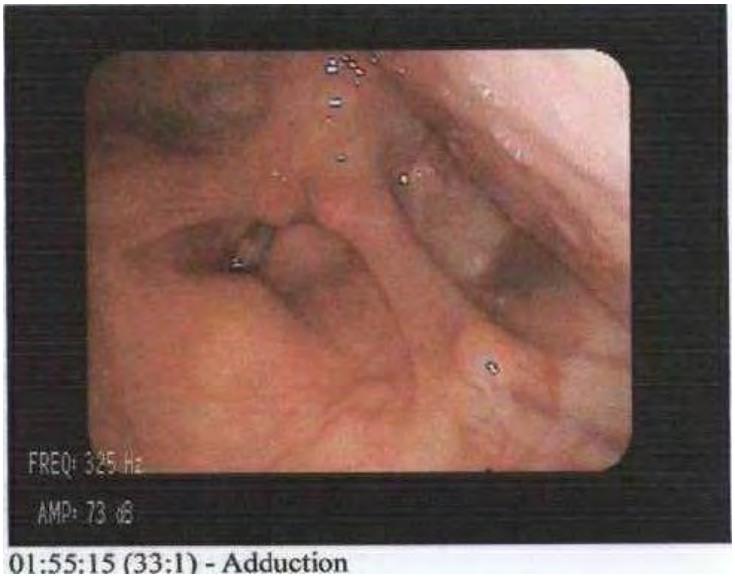


Abduction on antepartum ENT exam



Adduction on antepartum ENT exam

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1227
Scientific abstract: Education

The cantaloupe study: A novel method for teaching epidural placement

Elizabeth Rossmann Beel, Connie Tran, Quisqueya Palacios, Uma Munnur, James Schlotman
Baylor College of Medicine

Introduction

Epidural placement is an important skill for anesthesiologists, yet is a difficult procedure to teach trainees. Loss of resistance (LOR) to air or saline is a commonly used method for finding the epidural space, and is a subjective skill that can be difficult to demonstrate. We investigate the use of a novel model for teaching “feel” for LOR to anesthesia trainees using a cantaloupe as a simulator. Cantaloupes have a unique anatomy, with a thick exocarp (rind), dense and edible mesocarp interior, and a central endocarp containing seeds. The average distance from the exocarp to the endocarp is 5cm. Upon inserting an epidural needle into a cantaloupe, the mesocarp provides an excellent model for needle engagement in the midline ligaments of the back. When the endocarp is reached, the operator experiences a LOR that is similar to that encountered in the epidural space.

Materials and methods (NA for case report)

Eligible subjects included rotating anesthesiology resident physicians and student nurse anesthetists on their initial obstetric anesthesia rotation at a major training hospital. Trainees who had already placed 20 or more epidurals were excluded. Study subjects were randomized into an intervention and control groups and were given an orientation on epidural placement. The interventional group was offered unlimited practice with the cantaloupe model; the control group was not allowed to use the cantaloupe model. Surveys were filled out by each participant after their initial three epidural placements and at the conclusion of the two month rotation.

Results/Case report

Fifty-eight trainees were enrolled in the study from January 2014 through October 2015; 28 were randomized to the control group and 30 were randomized to the cantaloupe intervention group. The majority (n=55, 94.8%) had placed fewer than five epidurals at the time of their initial rotation; none had placed more than ten. Across the first three epidurals placed by each of the 58 participants, a total of 9 unintentional dural punctures (wet taps) occurred with no significant difference in wet taps between the two groups (p=0.235). All subjects were asked to practice on the cantaloupe and rate the effectiveness of the cantaloupe as a training tool for epidural placement. Twenty-eight of the 30 participants in the intervention group rated the cantaloupe model as helpful in teaching LOR technique for epidural placement. More trainees rated the cantaloupe model as effective for LOR to air (88.2%) than for LOR to saline (74.5%). No significant difference was found in the overall number of wet taps between the control and intervention groups (p=0.98).

Discussion

The cantaloupe model is an economical and easy to implement method for teaching trainees the LOR technique for epidural placement. The model was rated as helpful by a large majority of participants, and was a useful simulation of LOR to both air and saline. Using models during the early part of learning a new skill can be an effective teaching method, and cultivating the ability to sense a sudden change in pressure can speed up the learning process and potentially decrease the risk of unintentional dural puncture.

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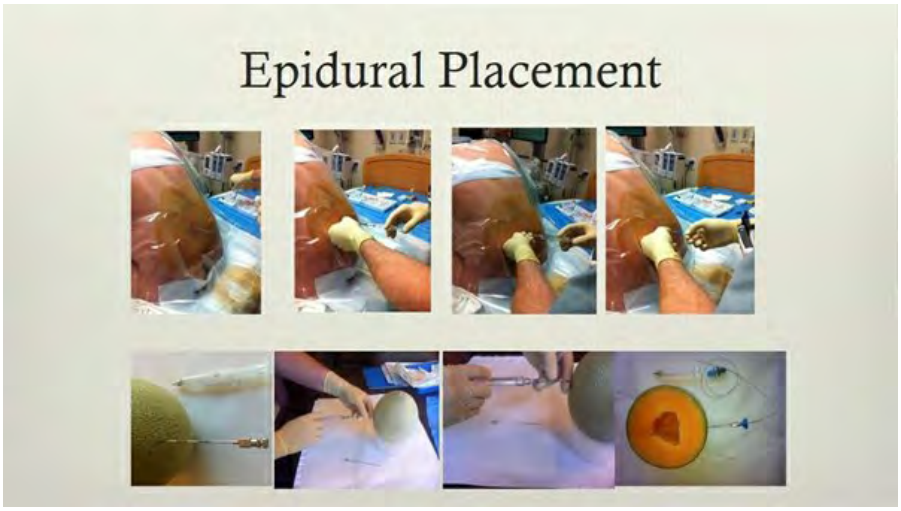

Using the cantaloupe as a model for epidural placement.

	Control Group	Cantaloupe Intervention Group
Number of participants	28	30
Rated cantaloupe as helpful	--	28/30 (93.33%)
Effective for LOR air	20/24 (83.33%)	25/27 (92.59%)
Effective for LOR saline	17/24 (70.83%)	21/27 (77.78%)

Survey data.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1229
Scientific abstract: Regional anesthesia

Prospective, Double-blind, Randomized Clinical Trial to evaluate Adductor Canal Nerve Block versus Femoral Nerve Block: Early Postoperative Period Functional Outcomes after Total Knee Arthroplasty

George Macrinici, Steven Jiotis, Sreenivasa Dharmavaram, Maen Martini, Mohammad Almachnouk, Fritz-Jose Chandler, Gloria Diab, Denis Jones, Rosemary Zangas, Ruslan Turcanu
American Anesthesiology Associates of Illinois, Presence Saint Joseph Medical Center

Introduction

With the availability of different types of nerve blocks for total knee arthroplasty (TKA), there is an ongoing discussion on their respective benefits. Adductor Canal Block (ACB) is gaining terrain from Femoral Nerve Block (FNB) to become more prevalent for TKA use. Despite multiple clinical trials, none was extensive enough in duration and scope. The clinical trial we present looked at the aforementioned nerve blocks from early functional results to up to 6 months after the surgery (Clinicaltrials.gov identifier NCT02218814).

Materials and methods (NA for case report)

We included 98 patients that were randomized by the pharmacy to receive 30 ml of local anesthetic/30 ml of saline and both ACB and FNB were done by the anesthesiologist. We compared the effect of the ACB versus FNB on the quadriceps muscle strength at 6, 24, 48 hours relative to the preoperative baseline value. Secondary end points included Time Up and Go (TUG), Range of Motion (ROM), 6-minute walking, pain score in relation to the physical therapy, pain medications use during the postoperative stay. All the physical therapy was done by trained physical therapist team.

Results/Case report

The groups were similar for demographics and perioperative data. MVIC quadriceps percent of baseline retained was significantly higher in the ACB group at 6 and 24 hours compare with the FNB group. The ACB group at 6 hours had a least square (LS) mean percent of quadriceps baseline force retained of 75.52% (95% CI; 66.71, 84.34) versus the FNB group LS mean percent of baseline force retained of 25.45% (95% CI; 16.64, 34.26) ($p<0.0001$ for difference in LS means). At 24 hours, ACB group had a LS means percent of baseline force retained of 78.12% (95% CI; 69.06, 87.18) and FNB had a LS means percent of baseline force retained of 35.19% (95% CI; 26.16, 44.21) ($p<0.0001$ for difference in LS means). At 48 hours, ACB group had a LS means of 52.22% (95% CI; 44.37, 60.06) and FNB had a LS means of 45.71% (95% CI; 38.06, 53.35). Although we don't see a statistically significant difference between the ACB versus FNB groups at 48 hours with a LS means difference of 6.51% (95% CI; -4.45, 17.48) with the two-sided value = 0.2414, the reality is much more complicated, confounded by the pain-induced effects of the stop of ACB functioning at 32 hours. TUG test results showed a difference between the ACB and FNB groups, with overall LS means difference between treatment groups in the change from baseline results of -18.52 seconds (95% CI; -30.11, -6.93) with the two-sided p-value = 0.0020. The VAS pain scores, pain medications intake, duration of the nerve block performance and duration of the nerve block functioning were not statistically significantly different between the two treatment groups.

Discussion

The goal of this study was to defend the concept of ACB being non-inferior to FNB in pain control while better preserving the quadriceps muscle strength. Improving functional outcome will lead to a speedier recovery and patient discharge home, all of which is incentivized by the newly implemented bundle payment system.

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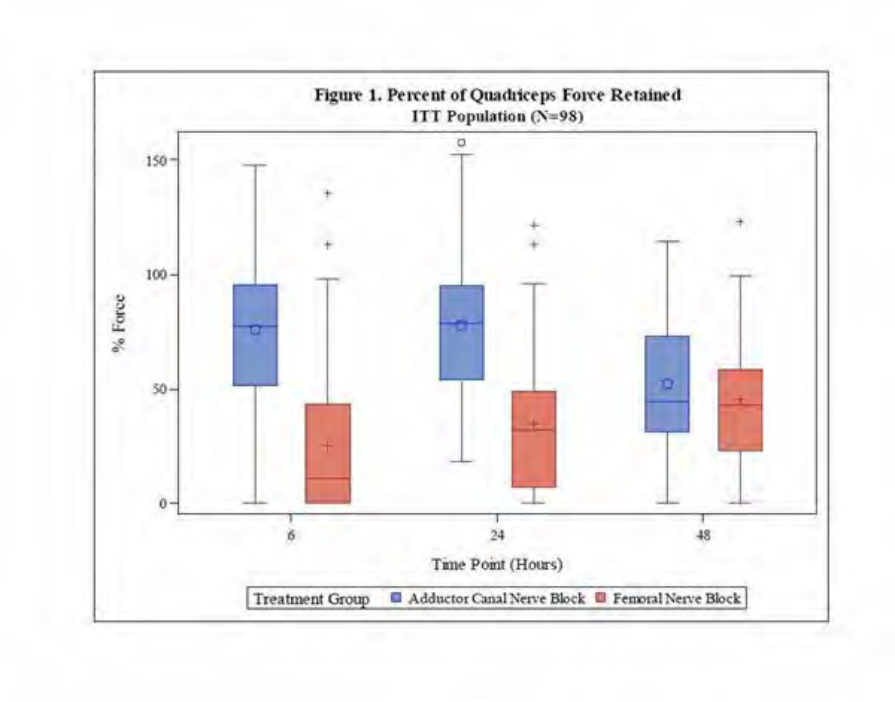
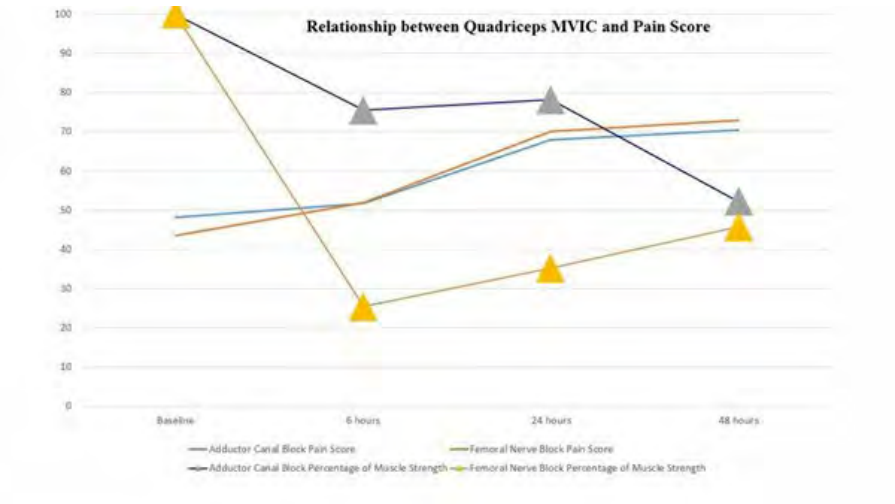


Percent of Quadriceps Force Retained



Relationship between the Quadriceps MVIC and Pain Score

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
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Abstract: 1230
Medically Challenging Cases (report of up to 4 cases)

Anesthetic Management of Term Pregnant Patient Undergoing a Non-Abdominal Surgery.

Marc Cohen, Melinda Aquino
Montefiore Hospital

Introduction

Literature regarding anesthetic management of the term-pregnant patient is only described in intra-abdominal surgery. There remains a paucity of literature describing anesthetic management of non-abdominal surgery in the setting of term-pregnancy.

In one meta-analysis by Cohen-Karem, it was found that deliveries induced by non-obstetric surgical procedures was 8%. Of 54 studies reviewed, only 3 did not limit their sample population to only intra-abdominal procedures. Within this subset, the majority of cases were still intra-abdominal.

The goal of this paper is to introduce a case report that helps guide management in this scenario.

Results/Case report

33 y/o F (G9P2A5) presents to the ER 36 weeks pregnant after tripping and falling on the left ankle started on fetal monitoring and found to have a distal fibula oblique fracture requiring ORIF.

The decision was made to go forward with spinal anesthesia given the potential for the patient to go into labor in which case she would have anesthesia for an emergent c-section if required.

Given CSE using 2.7mL of .05% bupivacaine (1.35mg), 10mcg fentanyl, and 100mcg morphine for the initial spinal.

Lowest BP 112/66, and HR 51 occurred right after placement of spinal, .4mg atropine 5mg of ephedrine used.

Patient started contracting and gave birth on POD 6.

Discussion

The main problem is to perform a technique that would not increase risk to the fetus while still addressing an emergent surgical issue.

Place a fem-sciatic block and perform ORIF

- General anesthesia and neuraxial anesthesia may cause hypotension and thus increase decelerations as compared with regional alone.
- While the procedure is minimally invasive, and low risk to the fetus, if the patient does begin to deliver, management may become complex.

Use epidural or other neuraxial technique for ORIF

- Spinal would be less ideal, it lasts for less time, and causes hypotension and fetal acidosis**.**

Put in an epidural and leave it in without loading it, place fem-sciatic block and perform ORIF

- An epidural would allow management of a patient going into labor if needed while still addressing the emergent need for an ORIF with regional anesthesia, thus lowering the risk to the fetus as compared with general anesthesia (6).

In one case study, a term-pregnant female who fractured her ankle had spinal anesthesia, the fetus experienced decelerations, and crash C-section was initiated. Post-partum, epidural was placed to repair the ankle.

While there are many paths one can take in this scenario, and given the general lack of literature on the topic, our conclusions are limited to

addressing the known pros/cons of each technique.

- We would recommend that fetal monitoring is advised given the high risk nature of the procedure.
- We believe it would have been safest to place an epidural without loading, and then insert a femoral-sciatic block.
- Hypotension would only be an issue if the patient required an epidural in the case of fetal distress
- Avoid general anesthesia and minimize exposure to fetus
- Ideally this would allow pt to have ORIF. If pt started going into labor, epidural is already in place.

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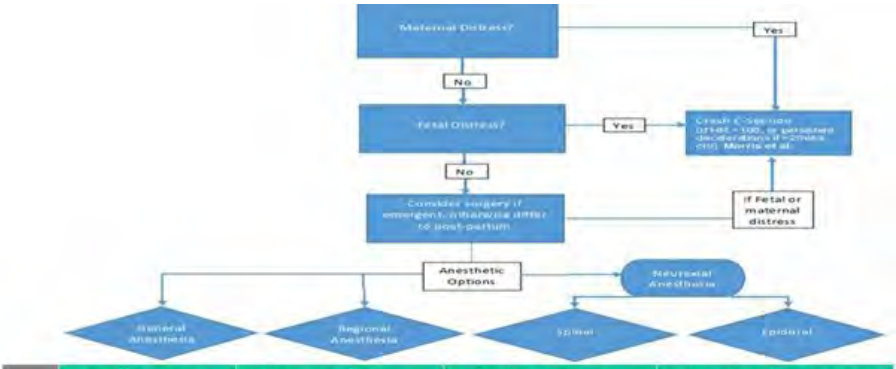

PRO	• Fast Technique	• Low risk of hypotension and thus minimizing risk of inducing labor and fetal complications • Local anesthesia limited to area	• Fast Technique • Can manage labor if it occurs	• Less hypotension than spinal • Less fetal acidosis than spinal • Can manage both labor if it occurs, and non-obstetric procedure
CON	• Risk of hypotension • Theoretical risk of pre-term delivery • Theoretical higher anesthetic related complication rate • Exposure of agents to fetus	• Management of emergent C-Section becomes complex without GA.	• More hypotension than epidural • More fetal acidosis than epidural (8). • Theoretical risk of preterm delivery • Will not give adequate anesthesia for non-obstetric surgery (i.e. ORIF).	• Potential for hypotension however less than spinal

Anesthetic Decision Tree

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1231
Scientific abstract: Regional anesthesia

Intentional bilateral diaphragmatic paralysis: a novel indication for bilateral interscalene blocks

Nihal Eisa
Mayo Clinic Jacksonville

Introduction

Traditionally, placing bilateral interscalene catheters has been thought to be contraindicated in most patients as a consequence of it is bilateral paralysis of the diaphragm. There have only been a handful of case reports that have demonstrated the successful placement of bilateral catheters for pain control without affecting the diaphragm significantly[B,C]. We would like to propose a novel indication for bilateral interscalene catheters, not for pain control, but for the known secondary effect of diaphragmatic paralysis in order to transiently bridge a critically ill patient without worsening respiratory mechanics.

Materials and methods (NA for case report)

NA

Results/Case report

51 year old female with a history of idiopathic pulmonary fibrosis status post bilateral lung transplant four years ago was admitted with increased dyspnea. She was eventually transferred to the ICU for elective percutaneous tracheostomy with mechanical ventilation for impending respiratory failure. She remained on and off mechanical ventilation for a month and a half before her work of breathing increased substantially and she was started on a paralytic infusion. Eventually, the surgical team decided that she needed to be taken off the transplant list if the critical care team could not turn off paralytics as she was becoming increasingly deconditioned and would not rehabilitate well post- repeat lung transplant. We were consulted to perform phrenic nerve blocks so that the paralytic could be turned off. Bilateral high interscalene catheters were placed under ultrasound guidance, bolused with roughly 10ml of 0.5% ropivacaine, and maintained with a continuous infusion of 5ml of 0.2% ropivacaine each. Both blocks were successful and paralytic was able to be turned off while maintaining selective paralysis of the diaphragm bilaterally. The patient was able to remain on the transplant list because of the nerve blocks but unfortunately wasn't able to receive a lung transplant due to availability. Palliative care was initiated for her after five days.

Discussion

Although our patient was not able to benefit in the long term, we believe that this case provides a novel indication for bilateral interscalene catheters, a procedure initially thought to be an absolute contraindication. Our extensive literature review has not demonstrated any other case reports such as this. We believe that intentional total diaphragmatic paralysis may be adopted to transiently bridge a critically ill patient without worsening respiratory mechanics.

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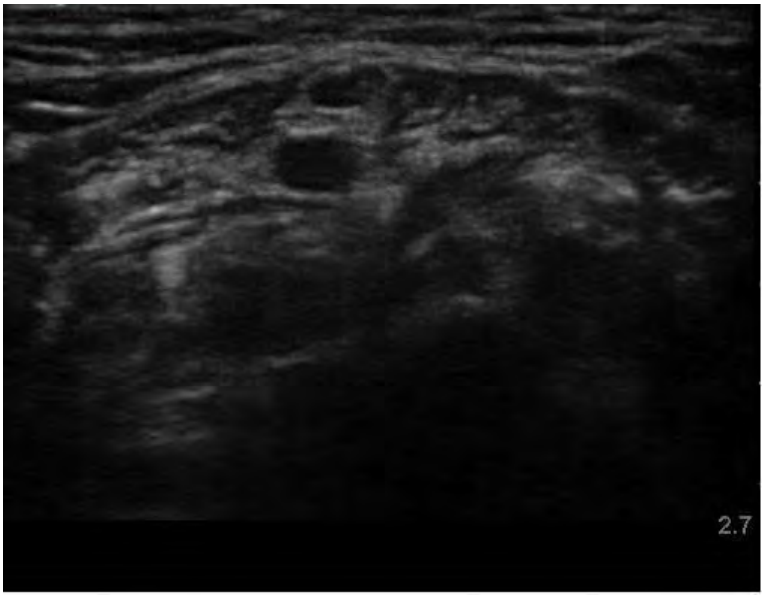
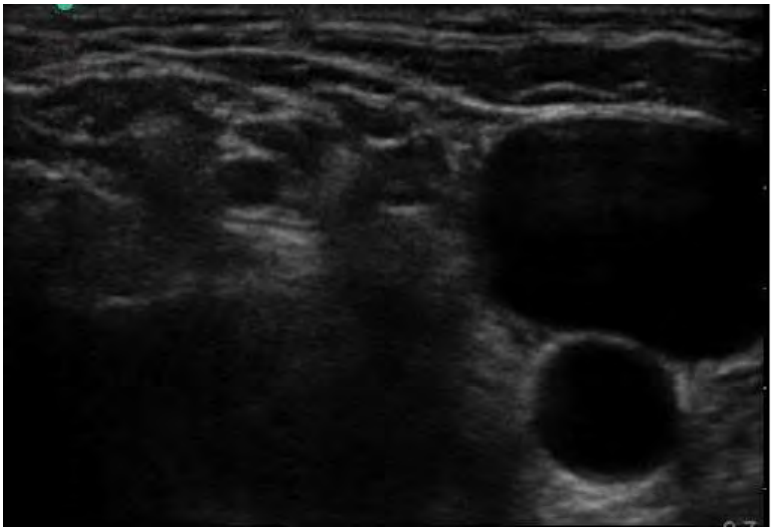


Left Interscalene


Right Interscalene

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
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Abstract: 1233
Medically Challenging Cases (report of up to 4 cases)

To block or not to block: Should patients with vocal cord lesions receive an interscalene block for shoulder surgery?

Seema Kamisetti, Clifford Bowens
Vanderbilt University

Introduction

This case discusses a patient with known vocal cord lesions and interscalene block safety in regard to recurrent laryngeal nerve paralysis.

Results/Case report

A 71 y.o. M with a history of IBD associated vocal cord granulomas, inflammatory tracheal stenosis, and HTN presented for left shoulder arthroscopy and biceps tenodesis. He had multiple ENT surgeries including CO2 laser excision and steroid injection of granulomas and had mild hoarseness. Given his multiple airway surgeries and vocal cord lesions, there was concern that an interscalene block could potentially affect the ipsilateral recurrent laryngeal nerve, and cause airway compromise if the contralateral cord was previously damaged from the granulomas. After discussion with the patient's ENT and photographs reviewed of vocal cords, an ISB was placed for postoperative analgesia. The patient was lightly sedated prior to the procedure. A 2 inch stimuplex needle was inserted under ultrasound guidance, in plane, and 20cc of 0.5% ropivicaine injected in 5cc increments. Post-block vital signs were stable, he was breathing regularly without complaints with sufficient onset of the block. The patient was taken to the OR, induced under general anesthesia, intubated and the surgery was undertaken. Post-op, the patient was extubated, breathing spontaneously and discharged the same day without complication, saturating 97% and pain adequately controlled by the block.

Discussion

Recurrent laryngeal nerve (RLN) block is a rare complication associated with ISB. It was first published in 1977 discussing injection into the interscalene groove, resulting in blockade of the stellate ganglion and hoarseness.[7] Although rare, it commonly prevents anesthesiologists from performing this block on patients with airway disease. It generally results in uncomplicated hoarseness, but with known contralateral recurrent laryngeal nerve injury, it should not be performed, to avoid respiratory distress and an unprotected airway.[1] For patients with vocal cord lesions and polyps, an interscalene block is controversial.

In the past, the rate of RLN block associated with ISB has been cited between 1.5-3%.[2] In 2007, ultrasound guided ISB presented with 1 RLN injury out of 1,677 peripheral nerve block claims, 0.06%.[5] More recently, Riazi found a lower volume of local anesthetic used in ultrasound-guided ISB is associated with improved respiratory function while providing effective analgesia.[7] Additionally, ultrasound has afforded a decrease in volume of local anesthetic compared to nerve stimulation, further decreasing the complication rates and providing similar pain control.[4]

With ultrasound guided blocks, patients with vocal cord lesions deserve further consideration prior to dismissing block candidacy including: 1. Assessing if the patient is symptomatic or has baseline respiratory problems 2. Obtaining available information from patient's medical records, which may include documentation of airway lesion(s). 3. Taking an appropriate history and finding out the nature of airway lesion(s) 4. Safe practices, including visualization of the brachial plexus, injecting slowly and continually assessing the patient for paresthesias.[3] 5. Maintaining full monitors and available equipment for the possibility of respiratory compromise.

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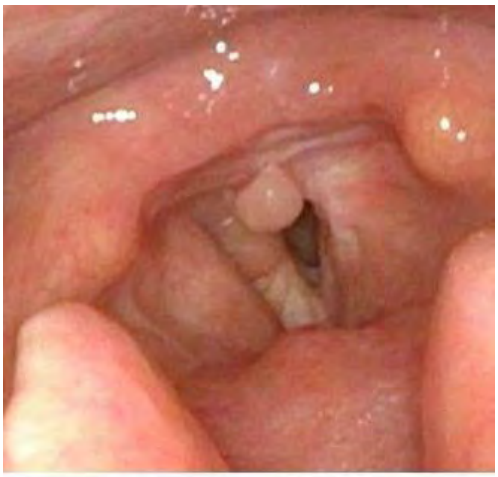

Vocal Cords with Granuloma

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1236
Medically Challenging Cases (report of up to 4 cases)

Pulse Radiofrequency Ablation for a Case of Postherpetic Neuralgia

Brent Yeung, Netsere Tesfayohannes
Georgetown University Hospital

Introduction

Postherpetic Neuralgia (PHN) is a neuropathic pain syndrome associated with infection by the Herpes Zoster Virus. The acute eruptive phase of the disease can cause neurologic damage extending from the dorsal root ganglion to epidermal nerve fibers, which has been observed in pathologic studies. (4, 5) PHN is defined as pain persisting beyond the acute eruptive phase of the infection after the disappearance of classic dermatomal herpes zoster lesions. (2, 3) In severe cases the pain is debilitating. Standard treatment aimed at shortening the duration of the acute phase includes the initiation of antiviral and corticosteroid medication within 72 hours of the appearance of herpes zoster lesions. However, this treatment has not been shown to prevent the onset of PHN. (3) Although an evidence-based cure for PHN remains elusive, a multimodal pain management strategy has shown some efficacy. The combined use of anticonvulsants, tricyclic antidepressants, opioids, topical agents, and regional nerve blocks are often utilized. (6) We present a patient with PHN refractory to conservative management who demonstrated a significant reduction of pain following pulse radiofrequency ablation of the T7-T8 dorsal root ganglion.

Results/Case report

A 58-year-old woman who was four months status post the resolution of an acute eruptive episode of classic herpes zoster lesions presented to our clinic with right anterior chest and flank pain. The pain was characterized as severe 9 out of 10 burning pain and allodynia in the T7 dermatomal distribution persisting since the healing of her lesions. Prior to referral to our pain management clinic she had exhausted conservative management, which included a trial of multiple opioids, corticosteroid taper, gabapentin/pregabalin, duloxetine, amytriptyline, multi compound pain creams, and lidocaine patch with no effective relief. Her pain had been interfering with activities of daily living, limiting sleep, and reducing her ability to work as an office assistant resulting in frustration and depression. As our initial treatment strategy, we performed thoracic transforaminal blocks with lidocaine and dexamethasone to the affected level with incomplete relief of the patient's symptoms. We then performed a pulse radiofrequency ablation trial of the dorsal root ganglion with treatments of 42 degrees for 120 seconds at the T7 and T8 level, which resulted in considerable relief. At 2 week follow-up, the patient reported a greater than 80% reduction in pain score and all her pain medications were able to be weaned. Her depression resolved and she regained employment in office work. At 6 month follow-up her pain remained minimal and controlled.

Discussion

PHN represents a serious condition, which can cause debilitating pain affecting essentially every aspect of one's life. On average, the incidence of PHN is approximately 20% after an acute eruptive episode of herpes zoster virus. (1) The incidence increases with age and although most research has been aimed at the prevention of PHN, little research has characterized the efficacy of interventional techniques for patients suffering from PHN. (2) For cases where conservative therapy has failed, pulse radiofrequency ablation of the dorsal root ganglion may represent an effective new intervention to reduce pain in this population.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1238
Medically Challenging Cases (report of up to 4 cases)

Intravenous Lipid Emulsion to Treat Local Anesthetic Systemic Toxicity in Term Pregnancy

Jonathan Lin, Eellan Sivanesan, Terese Horlocker, Andres Missair
University of Miami/Jackson Memorial Hospital

Introduction

Combined spinal-epidural (CSE) analgesia is a commonly used method of labor analgesia. While it is considered a safe and effective technique, CSE can be complicated by local anesthetic systemic toxicity (LAST), a potentially life-threatening condition. We present a case of LAST that developed in a young primigravid woman approximately fifty minutes after uneventful placement of a CSE. Because LAST can present in a delayed fashion after a CSE, it is important for anesthesiologists to be vigilant of the signs and symptoms of LAST to ensure prompt and effective treatment.

Materials and methods (NA for case report)

NA

Results/Case report

A 29 year old primigravida at 39 weeks and 3 days gestational age presented to our hospital for scheduled induction of labor. Fifty minutes after uneventful placement of a combined-spinal epidural, she developed central nervous system symptoms and signs of local anesthetic systemic toxicity and was promptly treated with lipid emulsion therapy, with rapid resolution of her symptoms. Two hours later, she had an arrest of active descent and underwent a repeat combined spinal-epidural in the operating room for an urgent primary low transverse cesarean section. She underwent the procedure without complications, delivered a healthy female infant, and was later discharged home uneventfully.

Discussion

Our differential diagnosis included drug allergy, pulmonary embolism, anxiety, and LAST. Given the nature of her symptoms and their subacute progression, we quickly established a working diagnosis of LAST.

We theorize that in the fifty minutes that elapsed between the placement of the CSE and the presentation of LAST, the epidural catheter either migrated or was inadvertently threaded intravascularly. Thus, the PCEA infusion of local anesthetic was entrained intravascularly and caused the patient to develop symptoms of LAST. Both the patient's prompt response to the ILE infusion and the blood-tinged appearance of the epidural catheter tip upon removal support this hypothesis.

To our knowledge, this is the second case report on the successful use of ILE to manage LAST in a parturient (Spence 2007). While the symptoms of LAST in the Spence case report involved an epidural and developed within 15 minutes of administration of local anesthetic, our presentation was considerably more delayed. Also, while our case displayed "prodromal" symptoms of LAST, Spence's case notably developed seizures and fetal bradycardia necessitating emergency cesarean delivery. These differences may be attributable to the speed and concentration of the administered local anesthetic. Our patient received 25 mg of bupivacaine in approximately 50 minutes; despite such a slow infusion, she still developed symptoms of LAST.

In conclusion, LAST is a rare and potentially devastating complication of regional anesthesia. While it is now more commonly seen with peripheral nerve blocks than neuraxial blocks, a high degree of vigilance for the signs and symptoms of LAST is recommended during any regional anesthetic procedure. In the case of a possible LAST event, the timing of ILE administration should be based on the severity and evolution of the symptoms, in accordance with the ASRA checklist on the management of LAST. In our case, the patient exhibited slowly evolving symptoms of LAST; early administration of ILE was likely critical to the outcome.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1239
Medically Challenging Cases (report of up to 4 cases)

Interscalene Block for Shoulder Arthroscopy in the Intravenous Drug Abuser with Severe Mitral Regurgitation

Matthew Hoyt, Brian Spence
Dartmouth-Hitchcock Medical Center

Introduction

We present the interesting case of a young woman with a complicated history of intravenous drug abuse who required shoulder arthroscopy for sceptic joint.

Results/Case report

A twenty one year old female presents to the operating room for shoulder arthroscopy and washout for a sceptic joint. Her medical history is significant for intravenous drug abuse (heroin) that has now been complicated by endocarditis of the mitral valve with resulting severe mitral regurgitation. In addition to new shoulder emboli, she has developed septic emboli to the liver, kidney, spleen, and brain with resulting meningitis and and a subarachnoid bleed. She also has the diagnosis of anxiety and schizoaffective disorder at baseline. Her initial vital signs prior to heading into the operating room are heart rate 110 and blood pressure 87/57. Upon proceeding to the operating room sedation is begun with 2 milligrams of midazolam and a propofol infusion of 30 micrograms per kilogram per minute. An interscalene block is performed under ultrasound guidance to provide anesthesia to the operative site. An additional 5 milligrams of midazolam is administered and the propofol infusion is increased to 90 micrograms per kilogram per minute resulting in improved anxiolysis for the patient. The patient remains consciousness and interactive throughout the procedure.

Discussion

The case highlights several important ideas in treating complex patients with intravenous drug abuse and complex patho-physiology. The patient's initial vital signs are exemplary of a patient with severe mitral regurgitation. Patients with mitral regurgitation commonly have a an elevated heart rate as this limits time for ventricular filling and hence the regurgitant volume. In caring for the patient with significant mitral regurgitation it is important to maintain and optimize systemic cardiac output. This is best achieved by maintaining heart rate and limiting increases in systemic vascular resistance (SVR). A regional technique allows minimum changes to the patient's baseline physiology, may provide small decreases in SVR, and avoids large changes in hemodynamics with induction and, particularly, emergence.

Additionally, the patient's use of heroin also makes a regional anesthetic a preferred technique. Heroin and other drugs of abuse create both tolerance and cross tolerance of many anesthetics. Thus the maintenance of general anesthesia potentially requires higher dosages of medications. This patient demonstrates this cross tolerance by requiring high levels of sedatives to treat her anxiety associated with block placement and the operative procedure. Patients with substance abuse disorder also typically have increased levels of postoperative pain from surgery with general anesthesia. A regional anesthetic therefore is a favorable technique to address this increase in pain as its mechanism is independent of the cross tolerance seen in patients with a history of substance abuse.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1243
Medically Challenging Cases (report of up to 4 cases)

Tissue plasminogen activator use in a case of postoperative embolic stroke

Ramon Go, Christina Atiya, Vibhuti Kowluru
New York Presbyterian Columbia University Medical Center

Introduction

Stroke is an important cause of morbidity and mortality in the perioperative setting, with the highest incidence being of thrombotic origin. Tissue plasminogen activator (tPA) is a useful pharmacological agent for acute thrombo-embolic stroke in the non-surgical patient, however the use of tPA in the perioperative period remains controversial due to the risk of surgical and non-surgical site bleeding. The literature on the use of tPA in the perioperative setting is therefore limited. Here, we discuss the management of perioperative embolic stroke in a patient status post total hip revision with tPA, as well as a literature review of the risk factors of perioperative stroke and the use of perioperative tPA.

Results/Case report

A 69 year-old male with a history of end-stage renal disease, chronic systolic heart failure (ejection fraction 35%), coronary artery disease, peripheral vascular disease, hepatitis C, and atrial fibrillation (AF) on warfarin presented for right total hip arthroplasty. His prior anesthetic was complicated by postoperative cognitive dysfunction (POCD) lasting several days. Despite the risks of thromboembolic phenomenon, our patient refused general anesthesia due to fear of POCD. Warfarin was discontinued prior to surgery and an INR of < 1.4 was attained prior to surgery. A combined spinal epidural was placed for anesthetic management and no complications were noted intraoperatively. On postoperative day two, the patient was noted to have an acute onset of left-sided facial droop and slurred speech. Computed tomography (CT) of the head was negative for infarct or intracranial bleeding. The patient was administered tPA by the acute stroke team and monitored in the intensive care unit. The patient's course was further complicated by surgical site bleeding with development of a large hematoma and hypotension. The patient was medically managed with blood transfusions and compressive dressings with subsequent improvement in his neurological exam. The patient was discharged to inpatient rehabilitation.

Discussion

Perioperative embolic stroke is a rare phenomenon with devastating consequences occurring in about 0.1% of patients undergoing total joint arthroplasty. Preexisting comorbidities such as previous stroke, coronary heart disease, and atrial fibrillation increases the risk for perioperative thromboembolic stroke. Our case study presents the management of thromboembolic stroke in a postoperative patient using tPA. Despite contraindication of tPA in the postoperative setting, tPA was used successfully in our patient with thromboembolic stroke status post total joint arthroplasty. Other contraindications to thrombolysis with tPA include uncontrolled hypertension, head trauma, recent stroke in three months, and coagulopathy. For these patients, anti-platelet therapy with aspirin 325mg, supportive management, and close monitoring for progression of stroke using head CT or magnetic resonance imaging (MRI) may be the prudent course.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1244
Medically Challenging Cases (report of up to 4 cases)

Complications from Ganglionic Impar Nerve Lysis with Unexpectedly Concentrated Phenol

Richard Webb, Arthur Calimaran
University of Mississippi Medical Center

Introduction

With the increase in prostate cancer survivors there is a concurrent increase in chronic rectal pain secondary to radiation induced proctitis and coccydynia. As these patients are often elderly there is a decreased tolerance for opioid use as the side effects of opioids (constipation) can often exacerbate the pain process. Ganglion Impar block as well a lysis is a known, well defined procedure to sympathetically block the pain, opioid consumption and related side effects and improving functionality in a large percentage of patients. While relatively safe, phenol nerve lysis can have serious and life threatening complications.

Results/Case report

A 67yo male with coccydynia secondary to prostate cancer resulting in radiation. Pain in the perianal area aggravated by sitting for long periods and urination. Ganglionic impar lysis with 6% phenol was without complication via a trans-sacrococcygeal disc. The patient received moderate relief. A second dose of phenol at 10% concentration was completed via a bent needle through the anococcygeal ligament. Medication was checked by two nurses and two physicians as being 10% phenol. Placement confirmed with injection of contrast prior to injection of 10ml of 10% phenol. Three hours after the patient was discharged home the pharmacy informed the ordering physician that the phenol was mislabeled and was in fact 30% phenol. Immediate contact with poison control did not result in any answers to the potential side effects of phenol injection other than that double the lethal dose was given. The patient was informed of the error and informed to return to the hospital for re-evaluation without lasting complications.

Discussion

There are no reported phenol complications reported with ganglion impar lysis. Phenol (carbolic acid) is listed by the CDC as a toxic substance. Phenol is a flammable, highly corrosive chemical and is well absorbed by all feasible routes of exposure and any route can cause systemic effects. Absorption on the skin is equivalent to absorption by inhalation and reported deaths after 30 min of moderate skin exposure. 1-2% Phenol can cause severe burns with prolonged contact. Ingestion can cause death with as little as 50mg in infants, and as low a 1g in adults. Phenol acts as a denaturant of proteins causing a demylentaiton of axons giving it its intended effect. This effect extends to surrounding tissues as well. Side effects include CNS excitation (seizures, nausea, sweating) then CNS depression (respiratory depression, coma, death) rapidly occurs resulting in the main cause of deaths reported. Phenol causes an initial BP elevation quickly resulting in bradycardia and shock. Respiratory, metabolic, GI, renal, hematologic, ocular and dermal effects can occur. Initial management relies on basic BLS and ACLS guidelines as well the ABC's of crisis management. There is no antidote to phenol and is not dialyzable. Phenol is rapidly transformed in the body and acute CNS symptoms are typically rapid in onset. Tissue injury due to misplacement or error in concentrations should be followed by serial exam or imaging due to the later onset of tissue destruction.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1246
Medically Challenging Cases (report of up to 4 cases)

The Proximal Approach to Placement of Ultrasound Guided Infraclavicular Peripheral Nerve Catheters: A Novel Technique Used On an Orthopedic Trauma Patient

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University of Florida - College of Medicine

Introduction

Continuous brachial plexus catheters are commonly used for analgesia for surgery of the upper extremity. They represent a useful form of treatment of perioperative pain; resulting in improved pain scores, increased patient satisfaction, and decreased opioid related side effects[1-2]. Although the interscalene catheter is widely accepted as the preferred technique for shoulder surgery, there is no consensus for surgery distal to the mid humerus [3-5]. Both supraclavicular and infraclavicular catheters have been used in the past with mixed success[6-7]. Due to the superficial nature of the supraclavicular fossa, it may be associated with more catheter dislodgements and leaks[9]. The infraclavicular catheter approach may provide added protection due to the pectoral muscles[7, 10]. However, it is difficult place the catheter in such a manner where all three cords are adequately covered[11-12]. We propose a more proximal approach to the infraclavicular technique, where all three cords lie in close proximity to each other, immediately after they pass below the clavicle. In our experience, a catheter placed here, using ultrasound guidance, provides excellent analgesia and complete coverage of the brachial plexus.

Results/Case report

A 53 y/o female with PMH of CAD and hypothyroidism sustained a comminuted proximal right ulna fracture following a dirt bike accident. Prior to surgery, the patient was sedated in our block area, and positioned lateral with the head of bed elevated 30 degrees, and the right shoulder elevated and externally rotated (in order to “shift clavicle cephalad”)[15]. A sterile high frequency ultrasound probe was placed parallel and caudad to middle third of the clavicle, with the ultrasound beam aiming cephalad. At this point, the three cords could be seen grouped together, lateral to the subclavian artery, and deep to the pectoral muscles. Patient’s skin was anesthetized and a 17 gauge Tuohy needle was advanced in-plane in real-time to the confluence of the three cords. A peripheral nerve stimulator was also used to confirm proper placement, and a strong triceps twitch was elicited. At that point, an Arrow StimuCath stimulating catheter was advanced 5 cm passed the needle tip while maintaining triceps twitch. After a negative test dose, patient’s catheter was bolused with 20 mL 0.5% Ropivacaine under direct visualization, with spread surrounding all three cords. Subsequently, it was connected to an infusion pump of 0.2% Ropivacaine (with basal 10 ml/h and bolus 10 ml as needed per hour). She had the catheter in place for 4 days and reported minimal to no pain during that time.

Discussion

This technique may be more advantageous in terms of: less catheter dislodgements, catheter leaks, and phrenic nerve paralysis, when compared to the supraclavicular catheter. Drawbacks include increased technical difficulty and potential for lung or vasculature damage, which can be mitigated by good in-plane ultrasound technique. Overall, we propose that our variation to the infraclavicular catheter is novel, and has the potential to become the preferred technique for surgery of the distal upper extremity, analogous to what the interscalene catheter has become for shoulder surgery.

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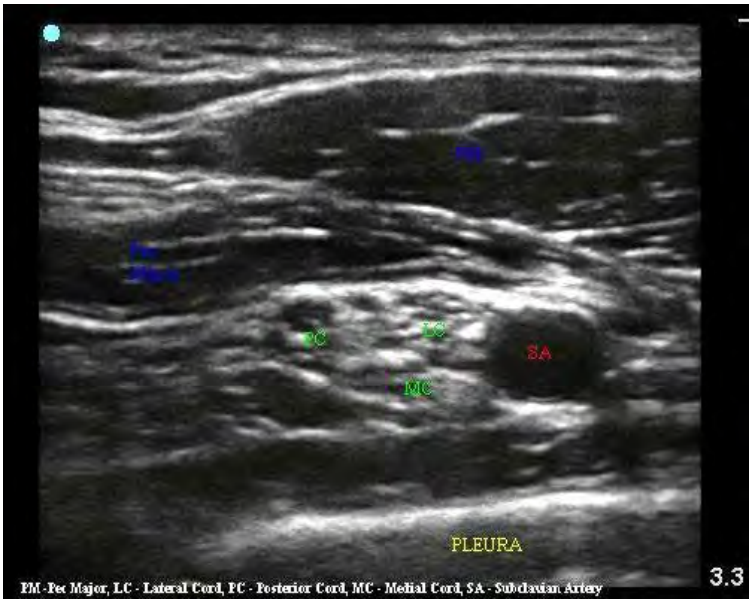
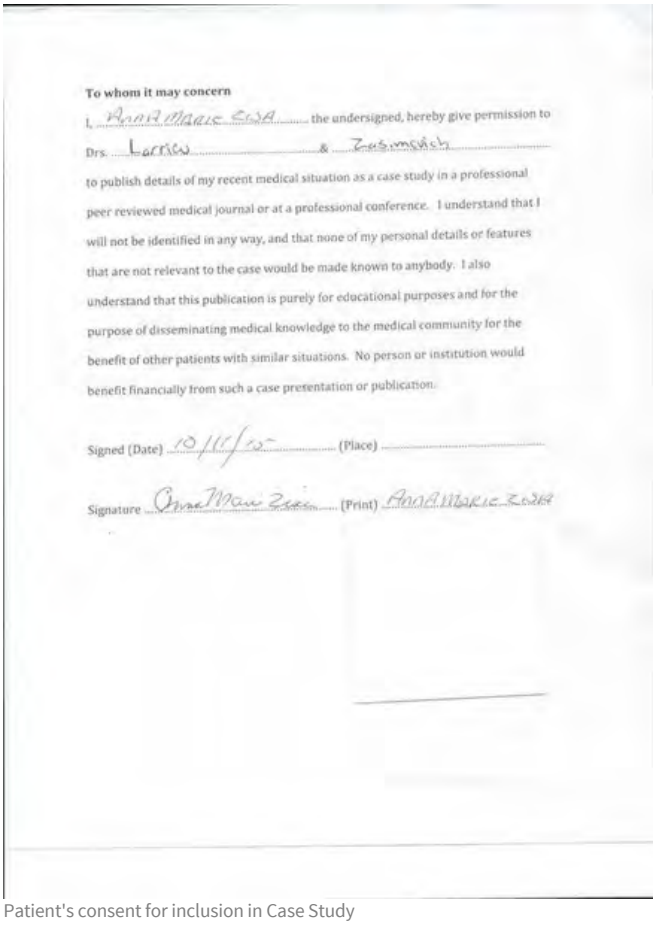
Tables/images

Positioning and General Set Up



Proximal Infraclavicular Ultrasound View


To whom it may concern

I, Anna Marie Zoia the undersigned, hereby give permission to Drs. Larkin & Zasimovich to publish details of my recent medical situation as a case study in a professional peer reviewed medical journal or at a professional conference. I understand that I will not be identified in any way, and that none of my personal details or features that are not relevant to the case would be made known to anybody. I also understand that this publication is purely for educational purposes and for the purpose of disseminating medical knowledge to the medical community for the benefit of other patients with similar situations. No person or institution would benefit financially from such a case presentation or publication.

Signed (Date) 10/11/15 (Place)

Signature Anne Marie Zoia (Print) Anna Marie Zoia

Patient's consent for inclusion in Case Study

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1249
Scientific abstract: Regional anesthesia

Does Preoperative Patient Education Affect Anesthetic Choice For Total Knee Arthroplasty?

Daniel Abraham, Nabil Elkassabany, Jiabin Liu, Eric Hume, Finnah Pio, Brandon Kase
University of Pennsylvania

Introduction

There is a growing interest in identifying clinical pathways for perioperative care and variables associated with better outcomes in patients undergoing Total Knee Arthroplasty (TKA). Regional anesthesia has been shown to be associated with better perioperative outcomes in patients undergoing TKA. Nevertheless the practice in the US has been slow to conform. While the selection of anesthesia for a TKA can be influenced by multiple factors, no research has explored whether preoperative patient education might affect a patient's decision regarding which anesthetic they receive on the day of surgery. The aim of this study is to test the hypothesis that proper preoperative education about the advantage of regional spinal anesthesia over general anesthesia in the setting of TKA is associated with a higher number of patients receiving a regional anesthetic.

Materials and methods (NA for case report)

This study was approved by the University of Pennsylvania IRB. A total of 1,521 patients were retrospectively identified who had a total knee arthroplasty between 4/1/2013 and 12/31/2014 at Penn Presbyterian Medical Center. For each patient, type of anesthesia (general or regional) performed during TKA was recorded as a dependent variable. Additionally, explanatory variables were collected for each patient from their medical records. These variables included patient demographics (age in years, sex, race, BMI), ASA status, observed length of hospital stay, observed hospital costs, primary insurance carrier, anticoagulation status, history of diagnosis of back problems, and attendance of the preoperative joint class education. Regression analysis was used to assess the association between dependent variables and explanatory variables. Final regression model was built based on the statistical and clinical significance of each variable as it pertains to the endpoint measured.

Results/Case report

1,010 patients were identified to have unilateral primary total knee arthroplasty (511 patients excluded from original total of 1,521 patients for bilateral or revision surgery). 31% of patients attended the preoperative joint class. 48% of patients received regional spinal anesthesia for their TKA, while the remaining 52% received general anesthesia. Patients who attended the preoperative joint class had higher odds of receiving regional spinal anesthesia when compared to those who did not attend the class (OR=1.7, CI: 1.2-2.5, P=0.004) after adjusting for other independent variables. Patients attending the joint class were significantly older than those who did not attend (p=0.002). Attendance of the class was different among patients based on the attending surgeon (p=0.001). Within our patient's cohort, there was no difference between patients who received regional spinal anesthesia and those who received general anesthesia in terms of intensive care unit admission, length of hospital stay, and overall observed cost per admission.

Discussion

Our study demonstrates that preoperative patient education may influence the patients' choice of the anesthetic technique for TKA. We believe that routine preoperative education can lead to an increase in the number of regional spinal anesthetics performed for TKA, and therefore may lead to more favorable perioperative outcomes. Further investigation is needed to prospectively confirm our results and to better design future patient education courses as part of a TKA clinical pathway.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1251
Scientific abstract: Chronic pain

Pre-Surgical Psychological Assessments as Correlates of Effectiveness of Spinal Cord Stimulation for Chronic Pain Reduction

David Blackburn, Cinamon Romers, Laurel Copeland, Windrik Lynch, David Nguyen, John Zeber, Michael Hoffman
Baylor Scott & White Healthcare, Temple, TX

Introduction

Spinal Cord Stimulator (SCS) is a surgically implanted device for patients with chronic back pain, for whom other treatment approaches have failed. Little information exists about perceived SCS effectiveness and impact across multiple life domains. This single-site study identified factors associated with SCS success incorporating psychological assessments (e.g., Millon Behavioral Medicine Diagnostic), beliefs regarding SCS efficacy, self-reported pain and quality of life (QOL) among patients approved for SCS.

Materials and methods (NA for case report)

Potential SCS candidates (*N*=200) were contacted 3-7 years after initial psychological and medical clearance for SCS, of which 59 consented to a structured telephone interview. Thirty-four of the 59 received SCS; 25 did not receive SCS. Of the 34 that received SCS, 22 were approved by routine psychological evaluation while 12 went through formal psychological testing.

Results/Case report

The majority of respondents (62%) reported effective pain reduction, with slightly over half noting at least 50% reduction. QOL after SCS was rated as good by 64%. Factors positively associated with preoperative pain included younger age and participants saying they would have the procedure again. Recollection of pain levels correlated with pain levels reported prior to surgery. For a small subset, functional deficits (e.g., difficulty conducting daily living activities) positively correlated with reported pre-SCS pain while preoperative alcohol problem correlated negatively with both post-SCS pain and current SPAASMS score.

Discussion

A primary predictor of patient satisfaction is achieved pain relief or reduction. Predictors of pain relief and QOL following SCS may depend on expectations and interpretation of pain, psychosocial health, or other factors. Psychological testing and patient characteristics could be helpful in identifying what psychological measures are most useful for pre-operative evaluation and what cut-off scores could help validate exclusionary decisions regarding SCS implantation. Results from our sample would underscore the importance of considering an alcohol abuse screening tool.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1253
Medically Challenging Cases (report of up to 4 cases)

Case report: Intrathecal morphine and continuous thoracic paravertebral blockade for post-esophagectomy analgesia

Patricia Pang, Angela Selzer, Tiffany Tedore
Weill Cornell Medical College

Introduction

Goals of care for post-esophagectomy analgesia include minimizing side effects of narcotics, optimizing respiratory mechanics, and promoting early mobilization in order to reduce cardiopulmonary complications. Thoracic epidural analgesia (TEA) is the standard of care in many institutions for this patient population. Although rare, failed placements do occur and alternatives to parenteral opioids should be considered, especially in this patient population with a relatively high perioperative morbidity rate. We present a case where intrathecal morphine and paravertebral catheters were utilized for effective postoperative analgesia in a patient with failed TEA. Patient approval for case report was obtained.

Results/Case report

The patient was a 56 year old male who underwent a minimally invasive Ivor Lewis esophagectomy. After unsuccessful attempts at epidural placement, alternative analgesic regimens were considered with the decision to proceed with intrathecal morphine. With a 27g Whitacre needle at the L3-4 interspace, 300mcg of preservative-free morphine were injected intrathecally.
Intra-operatively, the patient received 600mcg fentanyl and 0.9mg hydromorphone. He was extubated uneventfully following the eight-hour procedure and prescribed ketorolac 15mg IV q6hr and hydromorphone PCA 0/0.2mg/q10min. Pain scores were 0/10 for the first 12 post-operative hours on this regimen. At hour 12, the patient reported a pain score of 4/10. He described the discomfort as “intermittent right-sided pressure that is acceptable.” At post-operative hour 15, the patient reported increased frequency and intensity of the discomfort. Opioid usage increased correspondingly. At this time, the Acute Pain Service performed bilateral paravertebral blocks at T7 under ultrasound guidance, with catheter placements for continuous infusion of 0.2% ropivicaine at 5mL/hr per side. This resulted in an improvement in pain scores and a decrease in opioid requirements. The catheters were removed on post-operative day 4.

Discussion

Intrathecal opioids bind to mu receptors in the substantia gelatinosa of the dorsal horn of the spinal cord, providing analgesia without sensory, motor, or sympathetic disruptions. The hydrophilicity and potent receptor affinity of morphine results in profound analgesia, which can last for up to 24 hours. Delayed respiratory depression is a potential complication, necessitating monitoring in these patients.
As this case illustrates, intrathecal morphine may provide effective analgesia for the first 24 hours following administration in the post-esophagectomy population. However, incisional and chest tube-associated pain typically lasts for multiple days and additional analgesia will be necessary. The placement of paravertebral catheters can adequately provide analgesia until the chest tubes are removed and the patient is able to tolerate enteral analgesics.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1254
Scientific abstract: Chronic pain

Does addition of a continuous thoracic paravertebral infusion improve pain following latissimus dorsi flap reconstruction after failed implant/expanders?

Jennifer Padwal, Jonathan Unkart, Brian Ilfeld, Anne Wallace
University of California, San Diego

Introduction

The addition of a perioperative continuous paravertebral nerve block (cPVB) to a single-injection paravertebral nerve block has demonstrated improved analgesia in the immediate postoperative period that continued to one year following mastectomy. However, its use following post-mastectomy reconstruction using a latissimus dorsi flap remains unexamined. The latissimus dorsi flap is reserved for patients who fail expander/implant reconstruction or those presenting with significant postmastectomy deformity. We conducted a retrospective pilot study to determine whether a subsequent randomized, controlled trial is warranted and to help power such a study.

Materials and methods (NA for case report)

With IRB approval, we searched the hospital electronic medical records system for patients who underwent salvage post-mastectomy breast reconstruction with a unilateral myocutaneous island latissimus dorsi flap procedure with a single surgeon between 2013 and 2015. Perioperatively, all patients received a single-injection thoracic paravertebral block with 15 ml 0.5% ropivacaine. Additionally, patients had the option for catheter placement to receive a continuous 0.2% ropivacaine infusion 6-8 ml/hr with 4 mL patient-controlled bolus doses available every 30 min. Infusions commenced in the PACU and the catheters were removed on the morning of the day of discharge. The primary endpoint was the pain score as recorded using the numeric rating scale (NRS) for the 24-hour period beginning at 7:00 on post-operative day (POD) 1. Mean pain scores were compared with t-test. A p-value < 0.05 was considered statistically significant.

Results/Case report

A total of 22 patients were included in this study (11 cPVB and 11 single-injection PVB). The two treatment group characteristics were similar (see Table 1). The mean age of cPVB patients was slightly older (55±11) than single-injection PVB patients (54±9), but this was not statistically significant (p=0.94). The mean NRS pain score of cPVB patients (3.5±1.8) was also lower than that of the single-injection PVB patients (4.4±2.1), however this difference was not statistically significant (p=0.31).

Discussion

Patients receiving a cPVB after latissimus dorsi flap reconstruction experienced less pain than those receiving single-injection PVB. Although the differences in pain scores were not statistically significant, the absolute difference of 1.1 in mean NRS pain score suggests a benefit to using cPVB over single-injection blocks for this procedure and indicates that a larger, randomized clinical trial is warranted. The data of this study may be used to help power any subsequent trial.

Tables/images

	cPVB	Single Shot	P-value
Number of patients (#)	11	11	
Age (years)	55 (11)	54 (9)	0.94
Weight (kg)	74 (16)	68 (15)	0.35
Morphine (mg eqivalents/kg)	0.3 (0.3)	0.3 (0.2)	0.81
Number of times during POD1 that patient received Antiemetic Drugs (#)	0.7 (0.8)	0.6 (1.2)	0.84
Mean pain score postoperative day 1 (NRS)	3.5 (1.8)	4.4 (2.1)	0.31
Postoperative day of discharge	2.7 (0.5)	2.5 (0.7)	0.29

Table 1

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1256
Medically Challenging Cases (report of up to 4 cases)

Thoracic Paravertebral Blocks for Breast Lumpectomy in a Patient with Facioscapulohumeral Muscular Dystrophy

Jacob Jackson, Angela Selzer, Stephanie Cheng
New York-Presbyterian Hospital, Weill Cornell Medical Center

Introduction

A 59-year-old woman with facioscapulohumeral muscular dystrophy and chronic respiratory insufficiency presented for left breast lumpectomy and sentinel lymph node biopsy. She required oxygen while at rest at home and had been hospitalized and intubated in the past for acute hypercapneic respiratory failure and pneumonia. Pulmonary function tests showed severe restrictive lung disease and severely reduced diffusion capacity. The patient had marked dysarthria and could not lie flat secondary to shortness of breath and gastroesophageal reflux disease. In addition, the patient had a history of asthma and temporomandibular joint disorder that had been surgically corrected. A preoperative pulmonology consult recommended leaving the patient intubated if she were to undergo general anesthesia, with postoperative recovery and monitoring in an intensive care unit.

Results/Case report

After preoperative anesthesia evaluation and consent, the patient was taken to the ambulatory operating room and placed in a sitting position. Standard monitors were applied and 5 liters of oxygen administered via nasal cannula. After palpating surface landmarks, the skin of the back was cleaned with an antiseptic solution, and the subcutaneous tissue infiltrated with 15 mL of 1.5% mepivicaine for local anesthesia prior to performing the paravertebral blocks. The patient received 2 mg of midazolam and 20 mg of ketamine to achieve light sedation. Using ultrasound guidance, the transverse processes were located and paravertebral injections of 5 mL per level of 0.5% bupivacaine with 1:200,000 epinephrine and preservative-free dexamethasone were performed at T2-T6 on the left side. Sedation was maintained with small boluses of ketamine, and 0.2 mg of glycopyrrolate was administered to reduce secretions. The patient was hemodynamically stable throughout the case, and the end-tidal carbon dioxide remained within 30-40 mm Hg. The patient recovered without complication in the post-anesthesia care unit. She was discharged home after approximately 2.5 hours with adequate analgesia from the paravertebral blocks.

Discussion

FSHD, a dominantly inherited disorder, is the third most common dystrophy after Duchenne and myotonic muscular dystrophy. It is characterized by progressive skeletal muscle weakness across facial, back, and upper arm muscles that often affects muscle groups asymmetrically. A lack of publications exists describing the anesthetic management of patients with FSHD. Patients with this type of muscular dystrophy who undergo general anesthesia, even for ambulatory surgical cases, may require prolonged intubation and postoperative care in the ICU until they can be safely extubated. Anesthesia was provided with long-acting paravertebral blocks combined with light IV sedation. The patient was discharged home the same day of surgery with adequate analgesia and stable respiratory function.

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Tables/images

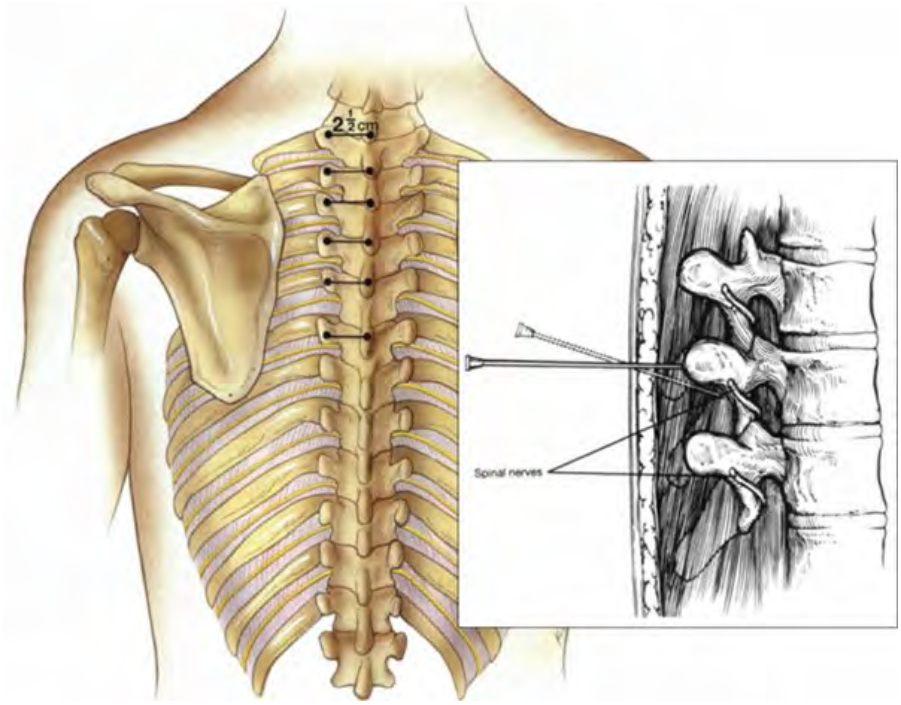

Fig1a: Superficial markings for left breast lumpectomy. Fig 1b: Needle "walked off" transverse process into paravertebral space.

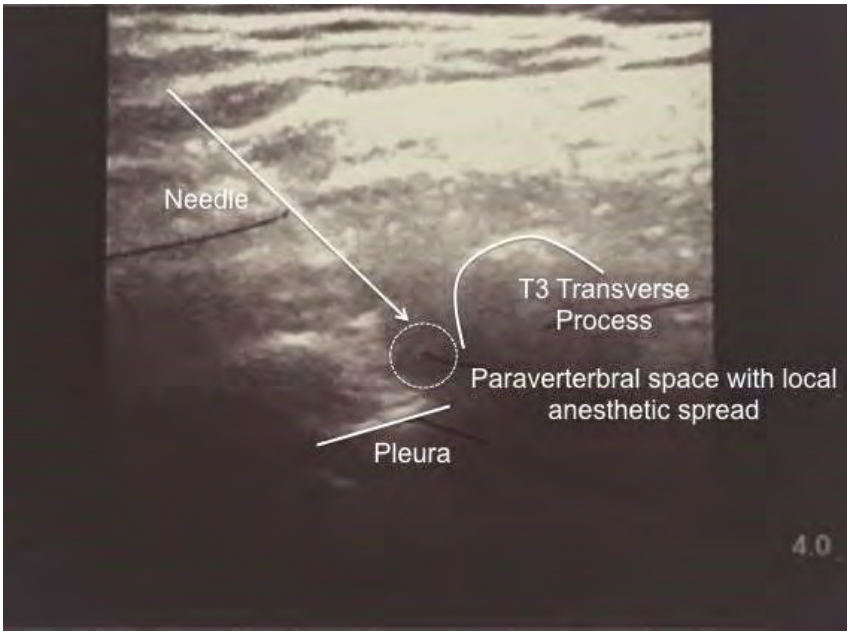

Fig 2: Ultrasound image of local anesthetic injection into the left T3 paravertebral space.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1257
Medically Challenging Cases (report of up to 4 cases)

Use of Bilateral Thoracic Paravertebral Nerve Blocks as Sole Anesthetic for Open Gastrostomy in Patients with Amyotrophic Lateral Sclerosis

Arun Kalava, Jenna Forlini
Tampa General Hospital

Introduction

Amyotrophic lateral sclerosis (ALS) is a highly progressive neurodegenerative disorder that involves upper and lower motor neurons in multiple segments. ALS leads to rapidly advancing muscle weakness, atrophy, fasciculation, and eventually death. Most of these patients require enteral feeding, necessitating gastrostomy tube (G-tube) placement for progressive dysphagia. While most of these G-tubes are placed percutaneously under radiological guidance, at times open surgery is needed. Careful consideration is incredibly important when planning the anesthetic care of ALS patients. This case report discusses the use of bilateral thoracic paravertebral nerve blocks (TPVB) as the sole anesthetic for open G-tube placement.

Results/Case report

Two patients with ALS were scheduled to undergo open G-tube placement for progressive dysphagia. The first patient, a 68-year-old female, required open surgery after the tube was unable to be placed in interventional radiology (IR) as a result of the colon being situated between the abdominal wall and stomach. Similarly, the second patient, a 67-year-old male, needed the same open surgery after IR was unable to percutaneously insert the G-tube upon finding that the stomach was positioned entirely behind the rib cage.

In an attempt to avoid general anesthesia, bilateral TPVBs were performed preoperatively at levels T6-9, injecting 3 ml of 1% ropivacaine at each level under titrated propofol sedation. Functionality of the blocks was tested with loss of cold sensation to ice prior to surgery. Intraoperatively, the first patient received 90 mg of propofol and the second patient received 1 mg of midazolam. Postoperative pain scores in the post-anesthesia care unit (PACU) were 0/10 in both patients.

Bilateral TPVBs provided efficient surgical anesthesia, enabling open gastrostomy to be performed with minimal sedation. We believe this is the first description of the use of bilateral TPVB as the sole anesthetic to safely and efficiently perform this open procedure.

Discussion

ALS patients are often sensitive to nondepolarizing paralytics, and hyperkalemia is a major risk when succinylcholine is used. Because of this, along with the progressive weakness of the respiratory musculature, it can be difficult to wean anesthetized ALS patients from mechanical ventilation. Effective regional anesthesia allows the patient to breathe on their own, thus bypassing the risk of becoming ventilator-dependent to provide adequate ventilation, thereby preventing debilitating complications with the already fragile respiratory system.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1258
Medically Challenging Cases (report of up to 4 cases)

Spinal cord stimulation as a novel approach to the treatment of refractory neuropathic pain from sacral decubitus ulcer

Jessica Albasha, Syed Quadri
University of Illinois at Chicago

Introduction

Pain associated with healed sacral decubitus ulcer is not commonly observed. Although proper ulcer healing may occur, chronic pain may develop and prove to be difficult to treat. Moreover, pain associated with chronically damaged tissue and nerve injury may not adequately respond to NSAIDs/acetaminophen therapy and may not be advisable. Chronic opioid therapy in such a setting would likely prove to be futile in the long run. Whether the pain is nociceptive or neuropathic, it significantly affects quality of life. We report the use of spinal cord stimulation (SCS) therapy as a novel approach in the treatment of refractory sacral pain associated with a healed grade IV sacral decubitus ulcer.

Results/Case report

A 62 year old male after sustaining myocardial infarction underwent urgent coronary artery bypass graft. The patient had a complicated course following surgery requiring prolonged intubation and ICU stay. The patient ultimately developed a sacral decubitus ulcer owing to prolonged ICU stay and morbid obesity. Following recuperation from critical illness, the patient underwent extensive treatment for stage IV sacral decubitus ulcer, including debridements and antibiotics therapy for wound infections, skin grafting and wound vac. The patient's wound ultimately closed nearly 2 years after he initially developed the ulcer. He was referred to pain clinic with persistent pain in the region of the healed sacral decubitus. He characterized his pain as constant, burning, throbbing and without radiation. He stated the pain was exacerbated with exertion, which prevented him from partaking in activities he once enjoyed.

Prior to any interventional therapy, patient underwent conservative management with trials of tricyclic antidepressants, anticonvulsants and narcotics. Topical agents were used including lidocaine, capsaicin, ketamine and anti-inflammatory agents. In the context of the patient's morbid obesity, we considered the pain to be secondary to degenerative disk disease and/or facet arthropathy which was supported by radiographic evidence. The patient underwent bilateral lumbar facet joint injections, in addition to bilateral sacroiliac joint injections (SIJ). He reported a short period of pain relief about 1-2 weeks and subsequently underwent radiofrequency ablation of SIJ and medial branch nerves at L5-S1 bilaterally. However, pain was not sustainably diminished and patient reported baseline pain weeks after performing procedure. It was deemed the patient did indeed have pain primarily as a consequence of the decubitus ulcer which was now healed.

A SCS trial was undertaken. The patient reported 80% symptom relief with placement of terminal ends of bilateral leads at T7. Additionally, narcotic usage was reduced by 75% while still continuing his anti-epileptic treatment. A permanent device was then implanted. The patient continues to have pain relief from his SCS, appreciates an improved quality of life and has exhibited improved function.

Discussion

Use of SCS as a therapy for the treatment of chronic pain from sacral decubitus ulcer is a novel application. SCS may prove to be an aid in the management of chronic unremitting ulcer pain of the trunk or limbs. Further clinical studies to investigate the role SCS can play in ulcer healing and alleviation of chronic ulcer pain would be warranted.

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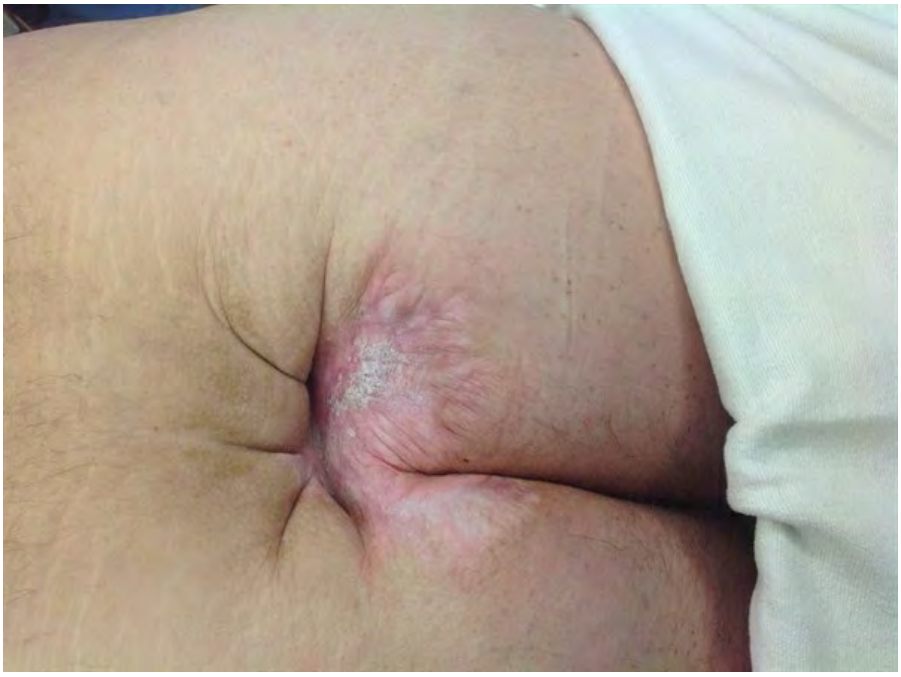
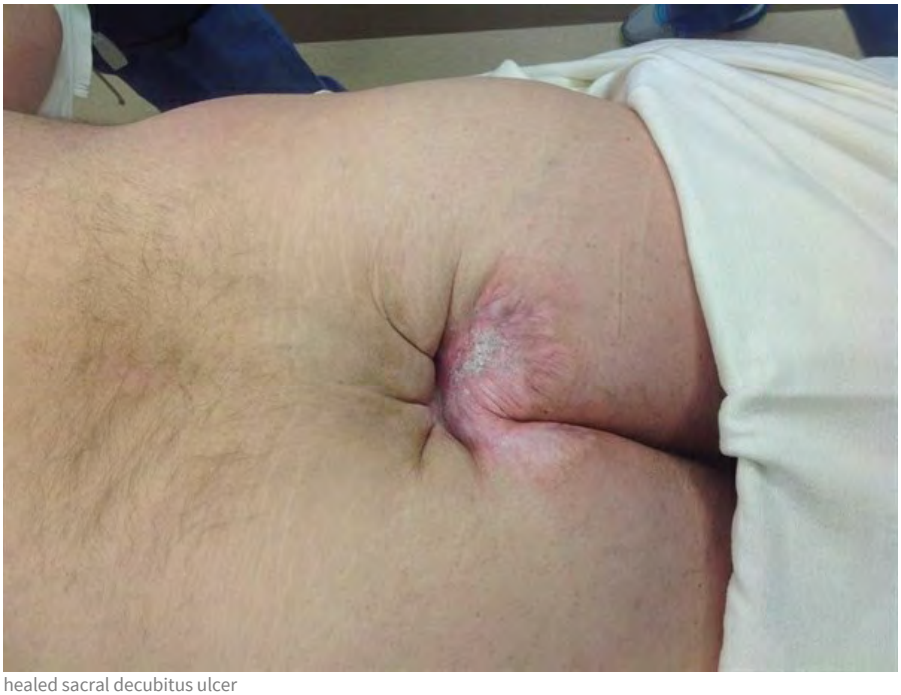
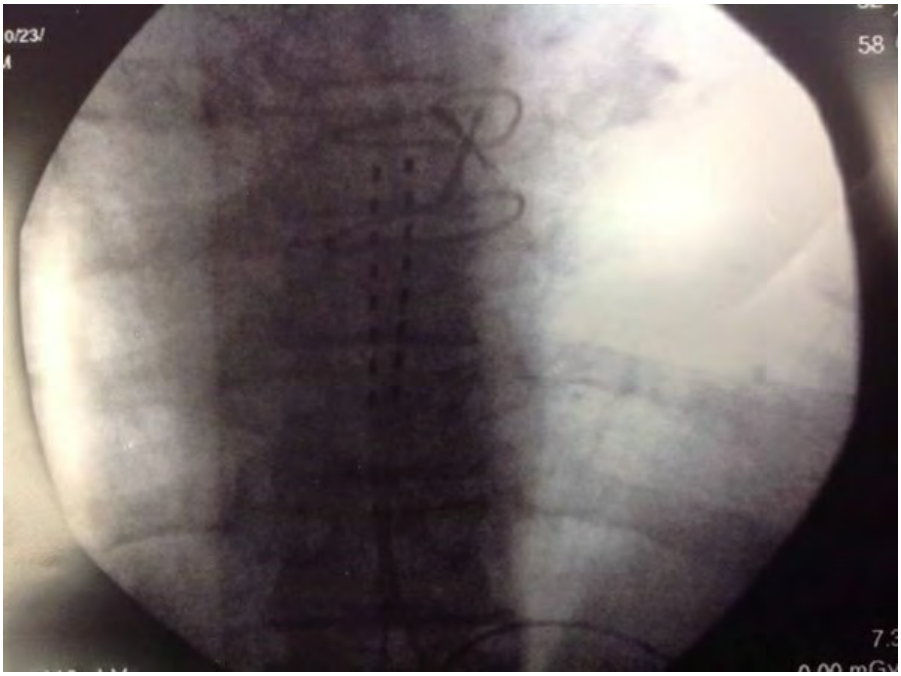


healed sacral decubitus ulcer



healed sacral decubitus ulcer



bilateral T7 spinal cord stimulator leads under fluoroscopy

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1259
Medically Challenging Cases (report of up to 4 cases)

Regional Anesthesia in Acquired Hemophilia A (Factor VIII Inhibitor Positive)

Minh Chu, Husong Li
University of Texas Medical Branch

Introduction

Hemophilia A is classically caused by a congenital deficiency of factor VIII, but an acquired form due to inhibitors to factor VIII (FVIII) typically presents later in life and may present with catastrophic bleeding episodes. In regional anesthesia, bleeding diathesis disorders such as hemophilia are relative contraindications to regional anesthesia for concerns of uncontrolled bleeding. However, patients with acquired hemophilia tend to be of advanced age with significant comorbidities and regional anesthesia may provide a safer method of surgical anesthesia than general anesthesia. Given the rarity of acquired hemophilia, perioperative management of such patients can pose a challenge for anesthesiologists. Risks and benefits must be stratified in forming an anesthetic plan.

Results/Case report

A 52 yo female with history significant for systolic CHF EF 5-10%, severe pulmonary HTN RVSP >60, ESRD, and acquired Hemophilia A presented with an expanding pseudoaneurysm of the LUE AVF. Pt was brought to the OR for an emergent repair. Pt has a known history of acquired hemophilia A, inhibitor positive, with deficiency of Factor VII, XI, XII; and lupus anticoagulant positive. The decision was made to do the case under regional anesthesia instead of general anesthesia given her comorbidities. Slow intravenous infusion of FEIBA at 50U/kg (2489U) was started in holding 20-30 minutes prior to the block. A left supraclavicular block was performed under ultrasound guidance using in-plane view and with neuromuscular monitor. Pt was observed afterwards and no bleeding issues were encountered after the block nor during the surgery. The case proceeded uneventfully and patient expressed satisfaction with her anesthesia afterwards.

Discussion

Acquired hemophilia does not necessarily preclude regional anesthesia if proper preventative strategies are used. In our case, given the patient's comorbidities, the risk of going into general anesthesia for a vascular surgery was substantial and a properly performed regional technique can mitigate these risks. FEIBA, the only aPCC agent available in the US, have been studied in the perioperative setting for treatment of severe bleeding at high doses of > 75 units/kg and was found to have complete response rate of 86%[4]. Anecdotally, we have found that preoperative treatment with FEIBA at a lower dose of 50U/kg given 20 minutes prior to a peripheral block provides sufficient hemostasis to prevent bleeding episodes during needle manipulation for peripheral nerve block and even during vascular surgery.

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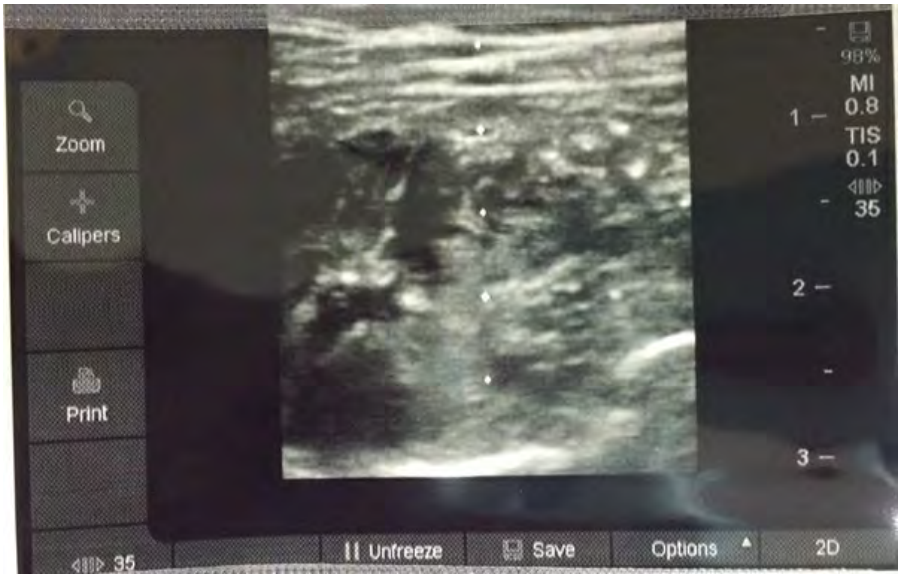

LA spread of brachial plexus for supraclavicular block

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1265
Scientific abstract: Regional anesthesia

Ultrasound-Guided Percutaneous Peripheral Nerve Stimulation For Postoperative Analgesia: A Prospective Feasibility Study

Brian Ilfeld, Christopher Gilmore, Stuart Grant, Michael Bolognesi, Daniel Del Gaizo, Amorn Wongsarnpigoon, Joseph Boggs
University of California San Diego

Introduction

Peripheral nerve stimulation has been used for decades to induce analgesia for chronic pain states, but has not been used for postoperative analgesia due to multiple limitations, beginning with invasive electrode placement. With the development of small diameter/gauge leads enabling percutaneous insertion *via* a Tuohy-type needle, ultrasound-guidance for accurate introduction, and stimulators small enough to be simply adhered to the skin, practitioners now have the ability to provide neurostimulation in a similar manner to perineural catheters and continuous peripheral nerve blocks. We now report the use of ultrasound-guided percutaneous peripheral nerve stimulation to treat postoperative pain following total knee arthroplasty.

Materials and methods (NA for case report)

This prospective feasibility study was conducted within the ethical guidelines outlined in the Declaration of Helsinki and followed Good Clinical Practice. Oversight was provided by the Institutional Review Boards at enrolling institutions. An Investigational Device Exemption was granted by the United States Food and Drug Administration for the use of this investigational device, and written, informed consent was obtained from all subjects. A convenience sample of subjects within two months following a total (*i.e.*, tricompartment) knee arthroplasty with pain insufficiently treated with oral analgesics had a small diameter electrical lead (Figure) percutaneously introduced using ultrasound guidance inferior to the inguinal crease with the tip located 0.5-3.0 cm adjacent to the femoral nerve (SmartPatch, SPR Therapeutics, Cleveland, OH). For subjects with pain in the posterior aspect of the knee, a second lead was inserted 0.5-3.0 cm adjacent to the sciatic nerve between the greater trochanter and ischial tuberosity. An external stimulator was attached to the lead(s), and stimulation parameters were optimized to produce comfortable sensations (*e.g.,* paresthesias) in the thigh/knee without discomfort or muscle contractions. End points were assessed before and after lead insertion, and the leads subsequently removed.

Results/Case report

Leads were inserted without difficulty in all subjects (n=5) 8-58 days following knee arthroplasty. Percutaneous peripheral nerve stimulation decreased pain an average of 93% (mean from 5.0 to 0.2 on a 0-10 numerical rating scale) at rest, with 4 of 5 subjects experiencing complete resolution of pain; and 27-30% during passive and active knee flexion (Table). Neither maximum passive nor active knee flexion was consistently affected.

Discussion

Ultrasound-guided percutaneous peripheral nerve stimulation may be a practical modality for the treatment of postoperative pain. Subsequent randomized, controlled studies are required to validate this technique and determine its safety both immediately following knee arthroplasty as well as following hospital discharge (up to 60 days). If successful in providing potent analgesia, this modality may facilitate rehabilitation, possibly resulting in cost savings and improved long-term outcomes. Lastly, this approach theoretically does not induce muscle weakness or proprioception deficits, possibly decreasing the risk of falling compared with continuous peripheral nerve blocks.

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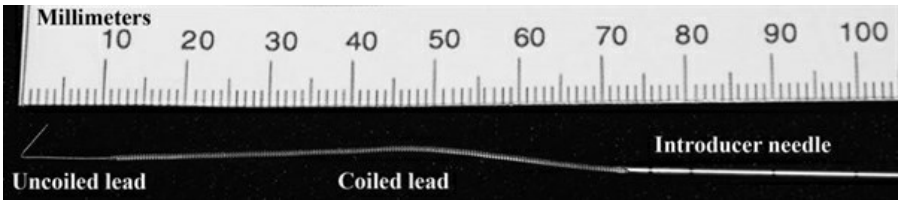

Figure

Table 3. Pain at baseline and during percutaneous peripheral nerve stimulation with electric current

Subject	Days Since Surgery	At Rest			During Passive Flexion			During Active Flexion		
		Stimulation		%	Stimulation		%	Stimulation		%
		Off	On	Change	Off	On	Change	Off	On	Change
A	8	3	1	67%	5	5	0%	5	5	0%
B	9	3	0	100%	5	2	60%	6	4	33%
C	13	7	0	100%	7	5	29%	6	4	33%
D	41	5	0	100%	9	8	11%	9	6	33%
E	58	7	0	100%	6	3	50%	6	4	33%
Mean	26	5.0	0.2	**93%**	6.4	4.6	**30%**	6.4	4.6	**27%**

Pain evaluated using a Numeric Rating Scale (0-10)

Table

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
SPR Therapeutics (Cleveland, Ohio) provided funding and the peripheral nerve electrical leads and stimulators used in this investigation.

Brian Ilfeld: Dr. Ilfeld's institution has received funding for his research from SPR Therapeutics (for studies other than the current investigation); several infusion pump manufacturers, including Baxter Healthcare, Smiths Medical, and Summit Medical; a perineural catheter manufacturer, Teleflex Medical; a manufacturer of a cryoanalgesia device, Myoscience; and, a manufacturer of a long-acting liposome bupivacaine formulation, Pacira Pharmaceuticals. In addition, Dr. Ilfeld has also acted as a consultant to Pacira Pharmaceuticals.

Christopher Gilmore: Dr. Gilmore's institution has received funding for his research from SPR Therapeutics; and, Dr. Gilmore has acted as a consultant for SPR Therapeutics.

Stuart Grant: Dr. Grant's institution has received funding for his research from SPR Therapeutics; Cara Therapeutics manufacturer of an analgesic medication; Durrect a manufacturer of a long acting bupivacaine formulation. Dr. Grant also acts as a consultant to BBraun Medical.

Michael Bolognesi: Dr. Bolognesi's institution has received funding for his research from Zimmer, Biomet, Depuy Synthes, and Exactech. In addition, Dr. Bolognesi is a consultant for Zimmer, Biomet, and Total Joint Orthopedics; and, receives royalties from Zimmer and Biomet. Lastly, Dr. Bolognesi holds stock or stock options in Total Joint Orthopedics and Amedica.

Daniel Del Gaizo: Dr. Del Gaizo has acted as a consultant to SPR Therapeutics. In addition, Dr. Del Gaizo's institution has received funding for his research from Zimmer and Stryker Instruments.

Amorn Wongsarnpigoon: Dr. Wongsarnpigoon is an employee of SPR Therapeutics.

Joseph W. Boggs: Dr. Boggs is an employee of SPR Therapeutics.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1268
Scientific abstract: Regional anesthesia

The physical relationship of the Sciatic Nerve and its Paraneural Sheath

Nicole Verdecchia, Vladyslav Melnyk, Joseph Pichamuthu, David Vorp, Steven Orebaugh
University of Pittsburgh

Introduction

The optimal location for local anesthetic injection during nerve blocks is within the paraneural sheath, but outside the epineurium of the nerve (1-3). Force required to puncture these tissues is unknown. Based on pilot data, we hypothesized that the puncture force required to enter the sciatic nerve would be greater than that for the overlying paraneural sheath. Secondarily, we evaluated whether a “tangential” approach of needle to nerve would result in lower chance of intraneural injection.

Materials and methods (NA for case report)

Seven sciatic nerves in non-preserved human cadavers, which were approved by University of Pittsburgh Committee for Oversight and Clinical Training Involving Decedents, were harvested. Needle-force evaluations were conducted on nerve segments including: nerve alone (IN); nerve with overlying sheath (NPS), paranaural sheath alone (IPS). Specimens were mounted onto a 50g (IPS) or 500g (IN & NPS) load cell and secured with sutures onto the mounting stage of an ASTM standard calibrated micro indentation system (ASTM, International, Conshocken, PA). A 21 g 50 mm block needle was driven perpendicularly towards the specimen using a stepper motor at a speed of 0.1 mm/sec (Figure 1). The needle-tip force and displacement were continuously recorded using LabVIEW software (National Instruments Corporation, Austin, TX). Maximal values on the force-time graph were recorded as the puncture force. Mean puncture force values were compared using ANOVA and pairwise analysis performed in Excel.

Prior to harvesting, two sciatic nerves were identified in situ using S-Nerve ultrasound (Sonosite Inc, Bothell, WA), after a 21g 50 mm echogenic block needle (B, Braun, Bethlehem, PA) was used to inject 0.1 ml of dilute black ink within the paraneural sheath with either a tangential or direct approach at 18 sites (Figure 2). The two nerves were examined grossly for evidence of dye in the nerve.

Results/Case report

Mean puncture force was significantly different for IN, IPS and NPS (P<0.001), Table 1. Pairwise analysis revealed that the mean puncture force for IPS (mN, n=16) was significantly lower (P<0.001) than forces for NPS (mN, n=17) or IN (mN, n=18). There was no significant difference (p=.09) between the forces required to penetrate the IN and the NPS (Table 1).

During the injection experiments, 12 tangential and 6 perpendicular subparaneural injections were performed. None of the tangential injections resulted in dye deposition within the nerve substance. In contrast, the direct approach resulted in 4 (67%) intraneural injections.

Table 1. Force measurements

	Mean (mN)	SEM	# samples
Isolated Paraneural Sheath	123	17	14
Isolated Nerve	1047	97	19
Nerve with Paraneural Sheath	1440	161	15

Discussion

The paraneural sheath offers significantly less resistance to puncture force than the sciatic nerve. However, it may be challenging to clearly

differentiate puncture of the sheath from intraneural needle-tip placement when the needle is applied directly over the nerve. This substantiates the suggestion that needle approach to a nerve with overlying fascial sheaths should be tangential (4).

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Tables/images

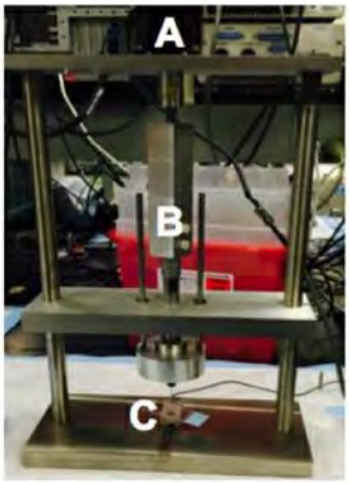

Figure 1. The micro indentation system used to measure forces. A stepper motor (A), transmits rotational impulses to a micrometer (B), which converts rotational impulses to translational motion allowing the indenter to advance into the tissues (C).

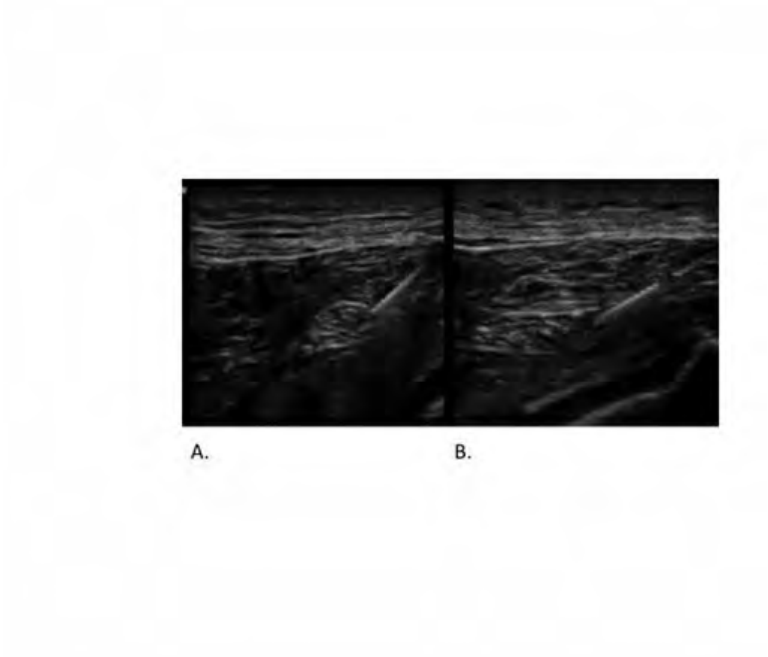

Figure 2. Ultrasound images of the (A) direct needle approach and (B) tangential needle approach during injection of dye into the paraneural sheath of sciatic nerve.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1270
Scientific abstract: Case series (5 or more patients)

Quality of Recovery and Cost Benefit Following Ambulatory Popliteal Nerve Block Catheter in Major Foot Surgery: A Case Series

Matthew Primrose, Vivian Ip, Beth Pedersen, Ban Tsui
University of Alberta

Introduction

Over the past decade ambulatory nerve blocks have become more common in the management of orthopedic surgery patients. Ambulatory popliteal nerve block catheters have been shown to be safe, effective and cost-effective following foot and ankle surgery when compared to inpatient management (1-3).

Disposable infusion pumps are commonly used but can be associated with additional cost (4). After single bolus, the popliteal block can provide prolonged analgesia (5), and we have developed an outpatient nerve block catheter program for major foot surgery at our institution. An additional bolus is delivered prior to same day discharge, instead of connection to an infusion pump. In this case series, we evaluated the quality of recovery scores, as well as an institution specific cost analysis for the first six patients to undergo the ambulatory nerve block program.

Materials and methods (NA for case report)

A popliteal nerve block catheter is placed pre-operatively and bolused with 20cc of 0.5% ropivacaine with 0.125% bupivacaine (1:1). The patient proceeds with surgery, and is seen by the anesthesiologist post-operatively on the surgical day ward. Another 20cc bolus of 0.2% ropivacaine is administered prior to discharge. The patient returns the following morning for one final 20cc bolus of 0.2% ropvacaine and removal of the catheter. Further analgesia is provided with oral analgesics. Standard management includes hospital admission for a minimum of two days and continuous popliteal nerve block via infusion pump.

Patients undergoing the ambulatory nerve block program were contacted retrospectively via telephone, and consented for participation in a survey based case series. Patients were advised to answer the survey as they would have 24 hours post-operatively. The Quality of Recovery – 15 (Table 1), a previously validated post-operative quality of recovery survey, was then administered (6). Additionally, an institution specific cost was calculated for both inpatient and ambulatory patients.

Results/Case report

All popliteal catheters were in place and further boluses of local anesthetic were effective prior to catheter removal the following day. The average QoR-15 score for the cohort was 114 out of a possible 150 (Table 1). When compared to the cohort that was used to evaluate the QoR-15 survey, a score of 114 represented the 68th percentile. There was a low incidence of severe pain, with an average Visual Analogue score of 1.7. A further question of ‘Would you have your surgery and anesthetic done the same way again?’ was proposed. All participants answered yes. Additionally, the ambulatory nerve block program equated to an institution specific cost savings of $2870 per patient, with no readmissions.

Discussion

Our case series demonstrates that major foot surgery patients can be managed effectively, with good quality of recovery, in the ambulatory setting; this can be accomplished with a popliteal catheter, but without an infusion pump. This method decreases resource allocation to providing and managing pumps for blocks that provide prolonged analgesia with local anesthetic boluses. Pain control was adequate, with all participants indicating they would have their surgery done in this way again. There were no readmissions to hospital, and no catheter related complications identified.

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Tables/images

QoR- 15 Item*	Postoperative
1. Able to breathe easy	9.2 +/- 2.0
2. Been able to enjoy food	6.3 +/- 4.2
3. Feeling rested	7.2 +/- 3.1
4. Have had a good sleep	6.0 +/- 3.0
5. Able to look after personal toilet and hygiene unaided	7.8 +/- 3.1
6. Able to communicate with family or friends	9.0 +/- 2.4
7. Getting support from hospital doctors and nurses	7.8 +/- 4.0
8. Able to return to work or usual home activities	7.3 +/- 2.0
9. Feeling comfortable and in control	6.7 +/- 2.7
10. Having a feeling or general well-being	7.5 +/- 2.6
11. Moderate pain	6.7 +/- 3.1
12. Severe pain	8.3 +/- 3.2
13. Nausea or vomiting	7.0 +/- 3.8
14. Feeling worried or anxious	7.3 +/- 3.9
15. Feeling sad or depressed	9.7 +/- 0.8
Total	113.8
*Each scored on an 11-point numerical rating scale (0-10)	

Table 1. QoR-15 survey and average answers

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1271
Medically Challenging Cases (report of up to 4 cases)

Anesthetic considerations in a patient with myotonic dystrophy for hip labral repair

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New York Presbyterian Columbia University Medical Center

Introduction

Myotonic muscular dystrophy (dystrophia myotonica) (DM) is a rare musculoskeletal disease affecting 1 in 20,000 people worldwide. This genetic disease requires significant considerations for patients in the perioperative period. Here we discuss the case of a patient with DM for labral hip repair and literature review on the management and anesthetic concerns of DM.

Results/Case report

Our patient is a 58 year-old man with a history of type 1 DM who presented for repair of a hip labral tear. His past medical history was also significant for obstructive sleep apnea, bipolar disorder, gastroesophageal reflux disease, cataracts, and a bicuspid aortic valve. His only prior anesthetic exposure was for cataract surgery and he had no complications. However, the patient's daughter who also had DM, experienced severe respiratory depression after an anesthetic exposure. We performed a literature review pre-operatively to ensure careful consideration of the anesthetic plan, given the patient's history. Primary considerations in relation to anesthesia include the disease's association with cardiomyopathy and cardiac conduction abnormalities, sensitivity to respiratory depression and ventilatory weakness, prolonged gastric emptying, and triggered myoclonus by stimuli such as hypothermia and specific medications.

Following the application of standard ASA monitors a combined spinal and epidural anesthetic technique was performed successfully in the operating room. The spinal level was tested and found to be at a T10 dermatomal level. External pacer/defibrillator pads were applied given the risk for arrhythmias, and an arterial line was used for continuous blood pressure monitoring and to facilitate arterial blood gas measurements in the event of pulmonary compromise. A thermometer was placed in the patient's axilla for continuous monitoring. The operating room's ambient temperature was increased, a forced-air warming blanket applied to the patient, and a fluid warmer was connected to his intravenous line. Intraoperatively, the patient received small (0.5 to 1 mg) boluses of midazolam and a total of 50 mcg of fentanyl for the duration of the surgical procedure. For the 3 hour and 43 minute procedure, the patient received a total of 10 mg of midazolam and 50 mcg of fentanyl. No complications were noted in the intraoperative period. The patient was transported to the post-anesthesia care unit (PACU) with continuous SpO2, ECG, and blood pressure monitoring.

Discussion

Two genes have been identified in playing a role in the development of DM. A CTG expansion in DMPK gene results in type 1, while an expansion in the ZNF gene results in type 2. The greater the expansion repeats, the more severe the disease. DM affects multiple organ systems, resulting in endocrine disorders such as hyperthyroidism, progressive musculoskeletal weakness, cardiac dysrhythmias, pulmonary complications, and possible cognitive-behavioral disorders. Thorough preoperative assessment and anesthetic planning are required to minimize the risk of anesthetic complications. Patients with DM exhibit exquisite sensitivity to sedatives, neuromuscular blocking agents, and volatile anesthetics resulting in potential postoperative complications. There is limited literature available on successful anesthetic techniques for the DM patient. We present this case report to add to our current fund of knowledge.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1272
Scientific abstract: Regional anesthesia

Does Liposomal Bupivacaine Offer Analgesic Benefits Over Ropivacaine for Ultrasound-Guided TAP Blocks?

Peter Shapiro, Brian D. Sites, Michael C. Kwa
Dartmouth Hithcock Medical Center

Introduction

Multimodal analgesia in the post-operative period offers several benefits, including increased patient comfort, fewer narcotic-related side effects and enhanced recovery. The ultrasound-guided transversus abdominis plane (TAP) block has shown analgesic benefit for laparoscopic surgical procedures.[1] Liposomal bupivacaine (EXPAREL®, Pacira Pharmaceuticals) is a formulation of bupivacaine marketed as having a prolonged duration of action, providing improved analgesia compared to placebo for surgical site infiltration.[2,3] Compared to standard bupivacaine, the liposomal formulation has been shown to decrease opioid consumption and improve pain scores with TAP infiltration after robotic hysterectomy.[4] Our primary aim was to compare the analgesic efficacy of TAP blocks with either standard ropivacaine or liposomal bupivacaine for laparosocpic assisted abdominal procedures.

Materials and methods (NA for case report)

Using our regional anesthesia database, we conducted a retrospective cohort study comparing extended analgesia in patients receiving TAP blocks with either liposomal bupivacaine or ropvicacaine. Our study population involved a single academic medical center in New Hampshire, USA. We reviewed the charts of fifty patients who had received ultrasound-guided TAP blocks for scheduled laparoscopic assisted abdominal procedures performed by a single surgeon whose patients were enrolled in an enhanced recovery after surgery (ERAS) protocol. We recorded post-operative pain scores and opioid consumption in morphine equivalents at four hour intervals for seventy-two hours after surgery stop. Length of stay (LOS) in days was recorded. Patients with chronic pain, post-operative intensive care unit stay, American Society of Anesthesiologists (ASA) status IV or above or those receiving opioid patient controlled analgesia (PCAs) outside of the ERAS protocol were excluded from the study. Statistical analysis was performed using univariate analysis, chi-square statistic for categorical variables, and the t-test for continuous variables. We created comparative scatterplots to examine the relationship between pain scores, morphine consumption, time, and local anesthetic type. For all analyses, we set the p-value for statistical significance to 0.05 (2-sided).

Results/Case report

25 patients in each group received TAP blocks for major laparoscopic abdominal surgery. Patients in ropivacaine and liposomal bupivacaine groups were evenly matched for age (57.4 and 55.7 years, respectively), body mass index (25 and 26 kg/m^2), gender and ASA status. There was a non-statistically significant trend towards decreased opiate consumption at twenty-four, forty eight and sixty hours after surgery end in favor of liposomal bupivacaine (table I). Likewise, we observed a non-statistically significant trend towards decreased pain scores at thirty six and forty-eight hours in favor of liposomal bupivacaine (Figure 1). LOS was found to be similar between ropivacaine and liposomal bupivacaine (3.3 vs 3.9 days, respectively).

Discussion

Our single-center retrospective review of ultrasound-guided TAP blocks for laparoscopic assisted abdominal procedures showed a trend towards reduced post-operative opioid consumption and decreased pain scores in favor of liposomal-based bupivacaine over ropivacaine. We did not observe a decrease in length of stay. Our study is limited by a small sample size, the possibility of a type II error or confounding. More evidence in the form of multi-centered studies is needed to demonstrate the efficacy compared to standard local anesthetics of this costly new formulation.

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Tables/images

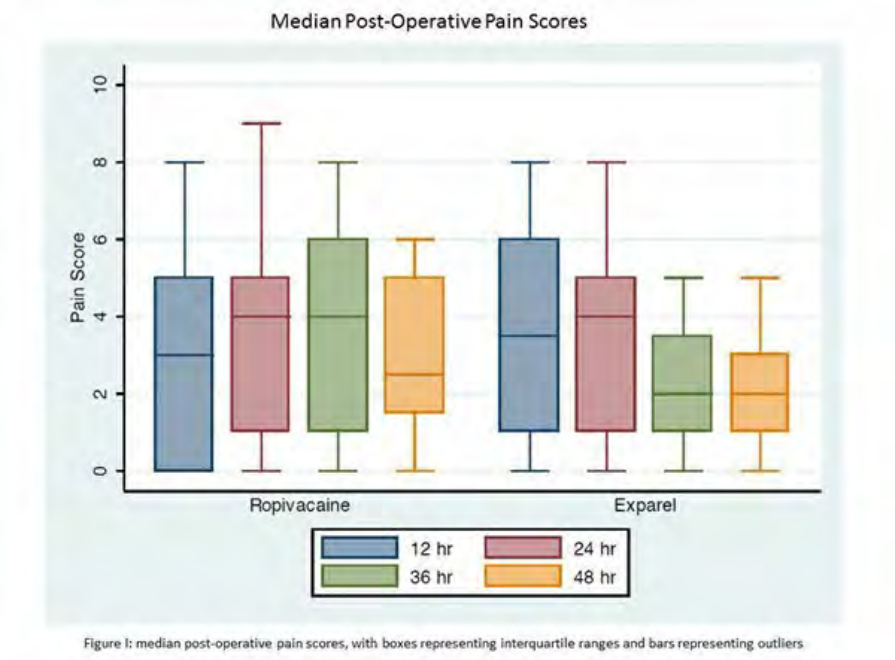

Figure I: median post-operative pain scores, with boxes representing interquartile ranges and bars representing outliers

Table I: Average IV Morphine Consumption

Time (hours)	Ropivacaine (n=25)	Liposomal Bupivacaine (n = 25)	p-value
24	14.5	9.3	0.19
48	22.2	13.2	0.12
60	24.1	14.3	0.15

Average post-operative opiate consumption in morphine equivalents

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1277
Scientific abstract: Acute pain

Postoperative Analgesia in Pancreaticoduodenectomy: Is Epidural Alone Sufficient?

Alexander Stone, Michael Grant, Andrew Page, Vicente Garcia Tomas, Christopher Wu
Johns Hopkins Hospital

Introduction

Given increasing success of early colorectal Enhanced Recovery After Surgery (ERAS) programs, institutions have begun to expand protocols to include alternative surgeries[1]. One traditional ERAS process measure, pre-incision thoracic epidural, has garnered mixed results in pancreaticoduodenectomy due to potentially reduced efficacy in postoperative pain prevention and risk associated with hemodynamic labiality[2–5]. Our group sought to examine the use of thoracic epidural among patients undergoing pancreaticoduodenectomy.

Materials and methods (NA for case report)

A retrospective review was conducted on 107 consecutive patients who underwent pancreaticoduodenectomy at a quaternary care center between June and December of 2014. Patients were partitioned into one of two groups: those who received pre-incision thoracic epidural and subsequent epidural patient controlled analgesia (ePCA) and those who received traditional care with intravenous opioid-based PCA (IV PCA). Primary endpoints included daily median patient reported pain score (Likert Scale 1-10) as well as total daily morphine equivalent (milligram; mg) requirement. Secondary endpoints included potential epidural and opioid-based complications including hypotension, pruritis, delayed gastric emptying and postoperative nausea and vomiting.

Results/Case report

There was no differences in baseline demographic data between patients receiving ePCA (n=48) and IVPCA (n=59) analgesia. Daily average pain scores and daily opioid requirements did not differ between groups (Table 1). 27 ePCA patients experienced clinically significant hypotension (56%) compared to 18 IVPCA counterparts (31%; p=0.007) in the first 24 hours after surgery. Of those patients who received epidurals, 18 (37.5%) required the addition of an IV PCA to their analgesic regimen and 13 (27%) had epidurals aborted due to insufficient analgesia or excessive side effects.

Discussion

Our data fail to show improved postoperative analgesia or reduction in intravenous opioid use with epidural alone for pancreaticoduodenectomy. Our study also highlights a high rate of epidural discontinuation, frequent need for additional IV PCA analgesia and increased incidence of hypotension among ePCA patients. Further high quality prospective studies are warranted to examine the role of epidural in this high risk cohort. Pancreaticoduodenectomy patients represent a population that may benefit from ERAS-based multimodal opioid-sparing process measures rather than thoracic epidural alone.

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Tables/images

	ePCA (n=48)	IVPCA (n=59)	
Pain Score[a]			P value
POD0	4.34 *(2.63-6.00)*	5.00 *(3.33-6.38)*	0.280
POD1	3.98 *(2.50-5.85)*	4.33 *(3.38-5.30)*	0.452
POD2	3.33 *(2.11-4.54)*	3.50 *(2.29-4.82)*	0.489
POD3	3.25 *(2.25-4.38)*	3.33 *(2.34-4.37)*	0.937
Morphine Equivalents (milligrams)			P value
POD0	9.99 *(0.00-54.45)*	22.00 *(9.32-39.50)*	0.126
POD1	142.26 *(7.00-361.75)*	149.00 *(86.50-205.90)*	0.938
POD2	93.62 *(0.00-271.95)*	90.00 *(46.20 -161.85)*	0.749
POD3	53.14 *(0.00-239.60)*	53.21 *(27.00-105.61)*	0.683
Total	452.58 *(93.62-972.75)*	337.00 *(197.40- 515.69)*	0.381

*All values expressed as median (interquartile range) a Based upon Likert scale (1-10); average daily score ePCA=epidural patient controlled analgesia; IV=intravenous; IQR=interquartile range; POD=postoperative day

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1278
Medically Challenging Cases (report of up to 4 cases)

A Case of Central Diabetes Insipidus Caused by a Ketamine Infusion During a Superficial Temporal Artery to Middle Cerebral Artery Anastomosis

Burton Beakley
Tulane Medical Center

Introduction

We report a case of central diabetes insipidus in an 18-year-old woman with moyamoya disease undergoing an STA-MCA bypass believed to be caused by a low dose ketamine infusion 10 µg/kg/min running for 3 hours.

Results/Case report

The patient is an 18-year-old woman with a past medical history of Moyamoya disease, type 2 diabetes mellitus, and the development of a left MCA stroke approximately 6 months prior. She presented with a 1-week history of headache, and left-sided weakness that had since resolved. This episode was diagnosed as a transient ischemic attack, and she underwent a cerebral angiogram. The angiogram showed marked stenosis of her left MCA and evidence of further moyamoya disease progression. She decided to pursue a left superficial temporal artery to middle cerebral artery (STA-MCA) bypass to treat her cerebral ischemia.

The patient was intubated supine and given 0.5 MAC Sevoflurane and Propofol infusion at 125 mcg/kg/min for induction, Succinylcholine 140mg and Rocuronium 10mg for paralysis, and Fentanyl 150 mcg for analgesia. A Remifentanil infusion at 0.5 mcg/kg/min and ketamine infusion at 10 mcg/kg/min were later used as anesthetic adjuncts. Three phenlyephrine boluses were used to maintain her systolic blood pressure within the range of 120-150 mmHg. Following scalp incision one hour into the procedure, and during dissection of the superficial temporal artery, the patient acutely developed severe hypertension (274 mmHg /105 mmHg) with profound bradycardia (bpm = 40's). This episode lasted approximately 2 minutes. Her urine output increased significantly shortly thereafter, urine osmolality decreased to 117 mOsm/kg, and arterial blood gas indicated a metabolic acidosis of pH 7.27, HCO3- of 17.9, and serum sodium of 152 mEq/L. Her hypertensive crisis was controlled with 0.4 mg of atropine and 0.1 mcg of cardene, and she was given 4mcg desmopressin (DDAVP) incrementally. She responded well to the desmopressin, and her output decreased to 2 mg/kg/hr. The procedure was aborted prior to intracranial entry due to the worry that the patient may develop further crises.

Discussion

This report analyzes an 18-year-old woman with moyamoya disease who underwent a STA-MCA bypass and was diagnosed with transient central DI from a ketamine infusion at 10mcg/kg/min for a total of 60mcg. Her polyuria, decreased urine Osmolality, and corresponding hypernatremia one hour into the procedure that intersected with her two minute Cushing-like response of hypertensive crisis with bradycardia led to the diagnosis of transient central DI. The significant hypertension and CT head and CTA performed after the surgery was aborted were both unremarkable and unchanged from her baseline, ruling out the potential of ischemic or infarcted brain tissue triggering a central DI. The patient's urine output had increased rapidly approximately one hour into the procedure, and she was excreting clear, colorless urine with significantly decreased osmolarity. Her abnormal urine output corrected with 4mcg desmopressin, normalizing to 2mg/kg/hr, which further supports her diagnosis of transient central DI.

The patient was taken back by the neurosurgery team the following day and surgery was completed successfully without a ketamine infusion.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1280
Medically Challenging Cases (report of up to 4 cases)

Chloroprocaine. Local anesthetic systemic toxicity in a 9 month infant with paravertebral catheter.

Alejandra Hernandez, Karen Boretsky

Introduction

2-Chloroprocaine is an ester local anesthetic used in regional anesthesia most frequently as a single bolus and for continuous infusions in infants with a rapid onset and short duration of action(1). It has rapid plasma degradation by cholinesterase making local anesthetic systemic toxicity less likely.

Results/Case report

The patient's family reviewed the case report and gave written consent. A 9 month old, 9.4 Kg, male with bilateral hydronephrosis and UPJ obstruction with reflux underwent a left pyeloplasty via a subcostal incision. A left T8 paravertebral nerve block(PVNB) catheter was placed under ultrasound guidance in the operating room prior incision. A continuous infusion of ropivacaine 0.1%, 0.2ml/kg/hr, was maintained during the first 16 hours and stopped in anticipation of hospital discharge. Three hours later, the discharge plans were cancelled due to surgical concerns(low urine output), the pain score increased to 5/10(FLACC scale). After negative aspiration an initial test dose of 2ml of 3% 2-chloroprocaine was administered followed by a bolus dose of an additional 7-ml over 40 secs before resuming infusion. Two minutes after the injection, altered consciousness, tonic-clonic movements and mild oxygen desaturation occurred. Immediate bag mask ventilation and blue code of the hospital were initiated. The episode lasted approximately 40 seconds followed by recovery of consciousness, normal motor strength and oxygen saturation. No dysrhythmias were recorded. The first blood pressure following the seizure was 85/58. The paravertebral catheter was removed and the patient admitted to the intensive care unit. After 24hs, the child was transferred to the ward without sequelae. Ketorolac and oxycodone were used to treat pain until discharge.

Discussion

The use of peripheral nerve blocks in pediatric populations has increased over the past decade with several large databases quantifying the safety profile(2,3). PVNBs are considered peripheral nerve blocks and offer a theoretical advantage over neuraxial blocks due to its location outside the spine. No complications in pediatric patients have been reported.

Chloroprocaine has a rapid onset, short duration action and a plasma half-life of 40 seconds in neonates. We attribute the toxicity in this case to a brisk uptake by the large volume injected over a short period of time in a tight highly vascularized space. We doubt catheter migration into a vascular structure due to the delayed presentation. We doubt significant epidural spread due to the tonic clonic activity and lack of motor weakness.

The large dose of LA administered was a factor in this case. The dose of 1 ml/kg was consistent with reported dosing guidelines for infants for caudal and thoracic epidural use (1), but for PVNB a dose of 0.5 ml/kg gives adequate spread to multiple adjacent dermatomes(4). We now restrict PVNB bolus volume to 0.5ml/kg of chloroprocaine to prevent similar complications in the future. Aspiration, use of a test dose and a slow and gradual injection of larger doses of LA are maneuvers important to detect intravascular injection but none has proved to be 100% reliable.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1281
Scientific abstract: Regional anesthesia

: The influence of peripheral nerve blocks on postoperative physical therapy: A single institution survey of physical therapists' preferences and opinions

Robert McClain, Steven Porter, Scott Arnold, Christopher Robards
Mayo Clinic

Introduction

Early physical therapy (PT) is important to improve functional recovery after total joint replacement (TJR) surgery [1-5]. We conducted a survey of our institution's physical therapists to learn their opinions on pain control modalities based on their experience working with TJR patients. In addition, we asked the physical therapists what form of regional anesthesia they would prefer if they were to undergo a TJR surgery.

Materials and methods (NA for case report)

An anonymous, multiple-choice, Likert-type scaled questionnaire was distributed to every full-time inpatient physical therapist at our hospital. Statistical analysis was performed by a blinded statistician. The nonparametric ordinal type data set was analyzed by identifying associations between each question. All 24 of the survey questions were explored by estimating Kendall's tau-b correlation coefficients. All analyses were performed using SAS version 9.3 software (SAS Inc., Cary, NC 2012).

Results/Case report

At the time of the survey, there were 20 full-time inpatient physical therapists employed at Mayo Clinic Florida and we had a 100% response rate.

While most respondents (79%) agreed that nerve blocks somewhat to greatly improve a patient's pain after TJR surgery, most answered that nerve blocks somewhat to greatly impede a patient's ability to participate in PT and make PT somewhat to very difficult for them as a physical therapist (78% and 84%, respectively). When asked about specific surgeries, 94% and 78% of respondents would prefer that their patients receive periarticular infiltration or no block at all after TKA and THA, respectively. For themselves, 95% and 83% of respondents would prefer periarticular infiltration if they had TKA or THA, respectively. All respondents (100%) answered that they thought lower extremity nerve blocks increased a patient's risk of falling after surgery.

There was a negative association between years respondents have practiced with their opinion on nerve blocks facilitating patient recovery after lower extremity TJR surgery (τ^b = -0.43268, p=0.0362). The opinion that nerve blocks facilitate patient recovery was negatively associated with the frequency with which they treated patients who had undergone TJR (τ^b= -0.56037, p=0.0064). There were positive associations between respondents' opinions of nerve blocks facilitating patient recovery after lower extremity TJR surgery and their opinion of nerve blocks facilitating patient participation in PT and the ease of PT on the therapist (τ^b=0.47529, p=0.0231; τ^b=0.49253, p=0.0239). Therapists who had the opinion that nerve blocks were an impediment to PT were more likely to answer that periarticular infiltration was better than a nerve block for PT after TKA (τ^b=-0.44004, p=0.0389).

Discussion

Physical therapists at our institution believe that nerve blocks impede patient recovery and increase the risk of falls without improving analgesia. When considering surgery for themselves, the therapists indicated that they would not want a nerve block. It is important to note the opinions of other services involved with care of our patients as they can influence perioperative processes. An opportunity exists to "un-silo" the relevant data on these issues from all parties involved in the convalescence of TJR patients [6-10].

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
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Abstract: 1282
Scientific abstract: Case series (5 or more patients)

Dermatomal Spread following Posterior TAP block for pain control in abdominal surgery in children and young adults.

Alejandra Hernandez, Karen Boretsky

Introduction

The transversus abdominal plane(TAP) block is a regional anesthetic(RA) technique used for pain control after abdominal procedures in both adult and pediatric patients. Several techniques for the TAP block have been described with varying patterns of dermatomal spread and efficacy(1). While the mid-axillaryTAP results in unpredictable spread of local anesthetic(LA), the posteriorTAP has not been well studied. We report the results of performing a posteriorTAP block (dermatomal coverage, opioid consumption, pain scores, complications) in a series of pediatric patients undergoing abdominal surgery.

Materials and methods (NA for case report)

After obtaining IRB approval we retrospectively reviewed the electronic medical records of 10 patients having abdominal surgery using a posteriorTAP block for pain management(2). All blocks were performed under general anesthesia using ultrasound guidance. The LA was placed at the junction of the transversus abdominis with the quadratus lumborum muscles(figure 1). Patients were evaluated in PACU when extubated and alert for extent of sensory changes to light touch or temperature(ice) in the midaxillary and anterior axillary line by a regional anesthesia team member. Extent of sensory changes, pain scores, presence of PONV and antiemetic use were retrieved as well as intraoperative and PACU opioid consumption.

Results/Case report

A total of 15 posterior TAP blocks, were analyzed. Mean volume of LA was 0.4ml/kg. The mean age and weight were 15 years (SD 5; range 7-21) and 57kg (SD 21; range 27-97), respectively. The type of surgery and use of single shot versus catheter placement are shown in table 1. A dermatome level of T7 was achieved in 6/15 (40%); T8 level in 10/15 (67%) and T9 in 14/15 (93%). Medial to lateral sensory changes extended from the linea alba to the mid-axillary line in all cases. The mean intraoperative and PACU opioid consumption were 0.34mg/Kg (SD=0.12mg/kg) and 0.04mg/kg (SD=0.05mg/kg) respectively. The median of the average pain score (PS) in PACU was 3 (IQR 25%=2; IQR 75%=6). The median Max PS in PACU was 6 (IQR 25%=3; IQR 75%=8). No episodes of PONV or complications related to regional anesthesia were noted.

Discussion

We demonstrate a more extensive sensory coverage of the abdominal wall with a volume of 0.4ml/kg of LA, accomplishing a T9 level in 93% and a T7 level in 40% of patients, consistent with the adult literature(3). In contrast the mid-axillary line approach, achieves T10 in only 50% of blocks and results in an unpredictable/non-dermatome pattern of sensory block(4). The mean pain score of 3 and a PACU opioid consumption of 0.04mg/kg and a zero incidence of PONV or complications is encouraging. However all patients received nonsteroidal anti-inflammatory drugs intraoperatively, which might influence intra and postoperative opioid consumption, and the pain scores documented in PACU. Despite widespread use, the efficacy, indications and best technique of the TAP block remain controversial. Better understanding of the sensory distribution may help to determine the appropriate clinical application of this block.

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Tables/images

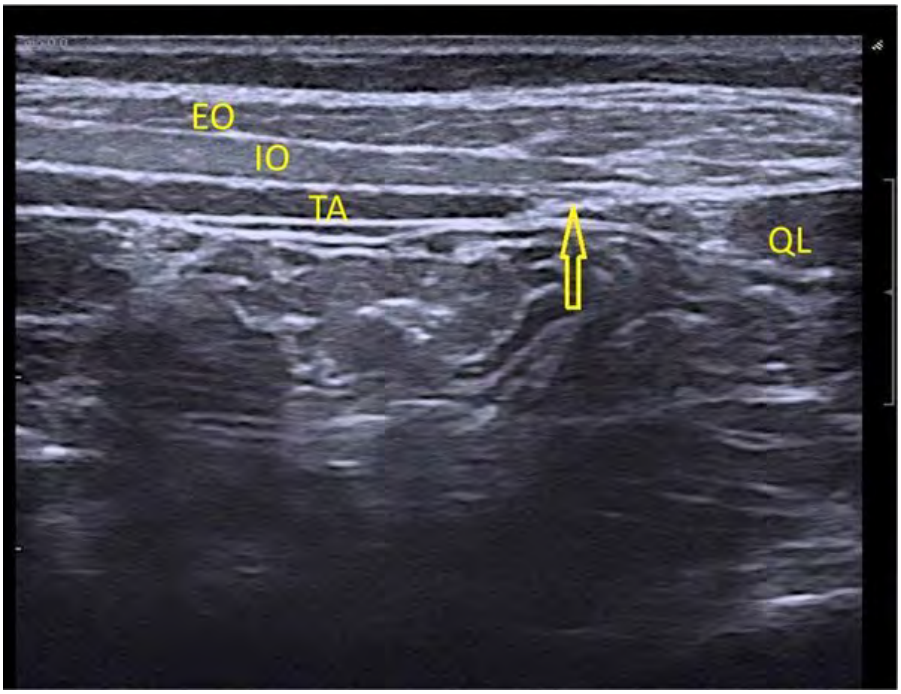

Figure 1. Ultrasound picture showing the abdominal wall muscles and the local anesthetic injection site (arrow). EO=External Oblique; IO=internal oblique; TA=transversus abdominis; QL=quadratus lumborum.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1284
Medically Challenging Cases (report of up to 4 cases)

Necrotizing fasciitis as a complication of a continuous sciatic nerve catheter using the lateral popliteal approach

Daltry Dott, Christopher Canlas, Christopher Sobey, William Obremskey, Andrew Brian Thomson
Vanderbilt University Medical Center

Introduction

Necrotizing fasciitis is a soft-tissue infection characterized by rapidly spreading inflammation and subsequent necrosis of the muscle fascia, subcutaneous fat, and in some cases the epidermidis (1) that carries a high risk for morbidity and mortality. It is a known complication of injections (1-6). Treatment involves antimicrobial regimens, exploration and debridement, and supportive measures for the management of shock and multiorgan failure (7). We report a case of necrotizing fasciitis as a complication of a continuous sciatic nerve block catheter using the lateral popliteal approach.

Results/Case report

58 year old female with past medical history of rheumatoid arthritis, mast cell disorder, Sjogren's syndrome, transverse myelitis, scleritis, hypertension, hyperlipidemia, gastroesophageal reflux disease, multinodular goiter presents for metatarsal resection. She reported 44 allergies, which included 9 pain medications. Home medications were significant for prednisone (17 mg daily) and hydroxychloroquine.

Due to the patient's allergies to multiple pain medications, a preoperative nerve catheter was placed using standard sterile precautions for postoperative pain control. Surgery was uneventful with regional and monitored anesthetic care. She was discharged to home on postoperative day 1 with nerve catheter.

On postoperative day 6, she presented to the orthopedic clinic with concern for redness around prior catheter insertion site. Her erythema continued to worsen and she presented to the emergency department on postoperative day 7 with subjective fevers, increased pain and swelling, tenderness to palpation, and decreased range of motion of the knee. CT of the right lower extremity was significant for superficial and subcutaneous emphysema, interfascial fluid mixed with extensive intramuscular and fascial gas, intramuscular emphysema, and deep soft tissue emphysema. She was taken urgently to the operating room for debridement of necrotizing fasciitis. Cultures from the leg grew methicillin susceptible staphylococcus aureus.

Discussion

Minor complications of continuous peripheral nerve blocks occur somewhat frequently, but major risks including infection and nerve injury are rare (8). Rates of inflammation (9-11) and catheter bacterial colonization, most commonly by coagulase-negative staphylococcus; gram-negative bacillus; and staphylococcus aureus (11), are seemingly high, (12, 13). However, clinically relevant infection is relatively rare (12, 14-19) Risk factors include ICU admission, absence of perioperative antibiotic prophylaxis, infusion duration, and male sex (10).

Continuous perineural catheter infection is an issue that has received little attention to date. Our patient was taking prednisone and hydroxychloroquine for immunosuppression treatment for autoimmune disorders, which could have put her at higher risk for infection. However, one study showed that hydroxychloroquine should be continued during the perioperative period and was not associated with an increase in incidence of infection (20). In the literature, only one report of toxic shock syndrome and sepsis is reported (21) and no accounts of necrotizing fasciitis exist.

Continuous peripheral nerve blocks are an efficacious technique for postoperative analgesia. Technical incidents and the colonization of the catheters are frequent but without clinical repercussion in the majority of cases. This case highlights the potential for unusual complications to arise following what are generally considered benign procedures and the aggressive nature of gas gangrene.

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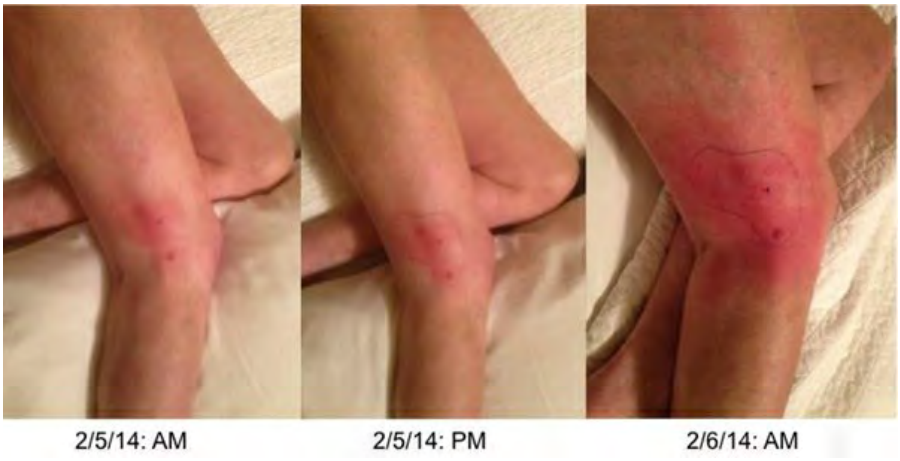
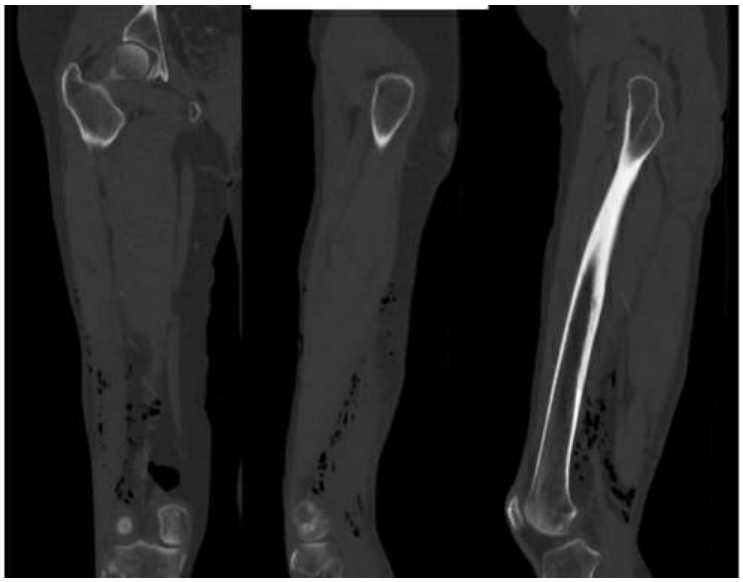
Tables/images



Progression of necrotizing fasciitis


Radiologic imaging of necrotizing fasciitis

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
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Abstract: 1286
Medically Challenging Cases (report of up to 4 cases)

Thoracic Epidural Analgesia in Patient with Hemophilia A for Video-Assisted Thoracoscopic Surgery (VATS) Lobectomy

Breck Finzer, John Lawrence
University of Cincinnati Medical Center

Introduction

The utilization of neuraxial techniques in patients with clotting disorders has been reported for decades[1], but there have been no reports on the use of thoracic epidural analgesia in patients with hemophilia A. There are some reports on epidural anesthesia/analgesia in patients with hemophilia A for labor pain.[2,3] These reports credit success to proper planning for the perioperative treatment of the clotting disorder, with emphasis on maintaining normal coagulation studies and factor level(s).[3]

We present a case of thoracic epidural placement and utilization for perioperative pain control in a male patient with mild hemophilia A for video-assisted thoracoscopic surgery (VATS) lobectomy.

Results/Case report

A 67-year-old male with mild hemophilia A was found to have a lung nodule during evaluation for shortness of breath and cough. The patient was referred to a thoracic surgeon who scheduled the patient for VATS lobectomy. The patient's hematologist prescribed a perioperative factor VIII replacement protocol. His baseline laboratory data showed a partial thromboplastin time (PTT) of 41.8 and factor VIII activity of 19%. After the preoperative factor VIII dose, the PTT was 29.2 and factor VIII activity was 182%. A thoracic epidural catheter was then placed with a paramedian approach with no signs of bleeding during needle or catheter insertion.

The patient underwent uncomplicated VATS lobectomy. His factor VIII activity ranged from 129% to 388% throughout using the prescribed factor VIII replacement protocol. His postoperative course was uncomplicated and pain control was achieved using an epidural infusion of 0.125% bupivacaine and intravenous hydromorphone. The epidural was removed on postoperative day 4 following a dose of factor VIII. The patient had no signs of epidural or local hematoma formation and was discharged 2 days following epidural removal without complications.

Discussion

Hemophilia A is a deficiency of clotting factor VIII with severity based on native factor VIII activity. Hemophiliacs require careful perioperative coordination of care to minimize their risk of bleeding complications, but no guidelines sufficiently cover neuraxial techniques in these patients.

A literature review revealed an article by Choi and Brull and case reports of lumbar epidurals for labor analgesia. The Choi article reviewed 30 studies on neuraxial techniques in patients with clotting disorders from January 1975 to October 2008 and no thoracic epidural placement in a patient with hemophilia A was found.[3] Lumbar epidural placement was deemed safe in these publications if coagulation factor levels were maintained.[3] The United Kingdom Haemophilia Centre Doctors' Organization and the Australian Haemophilia Centre Directors' Organization state that epidural analgesia for labor pains is not contraindicated if coagulation factors are maintained in the normal range during the duration of catheter placement.[4,5] The coagulation goals from these reports were applied to this case. The minimum accepted factor activity in these reports was 50% of normal[2-5], but a minimum factor VIII activity of 60% was chosen for this case.

This case demonstrates that thoracic epidural placement and utilization can be performed safely provided that factor levels are maintained within the normal range prior to and throughout catheter placement.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
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Abstract: 1289
Medically Challenging Cases (report of up to 4 cases)

Thoracic Epidural Placement Options in a Patient with Severe Scoliosis

Jamie Elchenko, Rajnish Gupta
Vanderbilt University

Introduction

This case discusses a patient with severe scoliosis and the attempt to place a thoracic epidural.

Results/Case report

This is a 30-year old man with a past medical history of cerebral palsy, mental retardation and severe scoliosis presenting for transthoracic esophagectomy to remove adenocarcinoma of the esophagus. Imaging shows patient's severe scoliosis has compromised the left lung. Before attempting to place the thoracic epidural, CT imaging was reviewed using the technique described in Bowens, et al.[1] We determined the level of T6-7, the spinous process was about 1.9 cm deep to skin and the epidural space was estimated to be about 3.7 cm from the skin using a paramedian approach. Despite having measurements from the CT scan, we abandoned the procedure after three unsuccessful attempts out of concern for causing more harm than benefit. No complications occurred during the procedure. His intraoperative course was uneventful. He was admitted to the SICU and remained intubated due to multiple endotracheal tube manipulations. The patient's postoperative course was complicated by acute respiratory failure, right hemothorax requiring take back to OR for hemostasis, multiple blood transfusions, prolonged intubation, SIRS, and pneumonia. After being discharged from 13 days in the hospital the patient was readmitted the next day for increased seizure frequency in the setting of pneumonia. The patient was placed on antibiotics and discharged day 3 of re-hospitalization.

Discussion

One of the primary goals of thoracic epidural analgesia is to attenuate postoperative pulmonary dysfunction and prevent pulmonary complications.[2] The use of thoracic epidural analgesia is standard in adult thoracotomy patients. The absence of epidural analgesia has been identified as a significant risk factor for extended ICU stay.[3] Thoracic epidural placement can occur via a midline or paramedian approach. All methods of prepuncture assessment of the local anatomy focus on the planned trajectory of the Touhy needle in order to reach the epidural space. However, the use of surface landmark estimation of anatomy for epidural placement generally assumes a normal orientation of the spine, without curvature or rotation. Ultrasound helps to estimate the depth and location of the epidural space.[4] It has been used successfully in obstetric patients to improve the accuracy with which anesthesiologists identify the lumbar interspace.[5] Unfortunately, there are limited studies on the use of ultrasound assisted epidural placement in the thoracic region. Fluoroscopically-guided epidural blocks have been shown to improve the success rate of epidural punctures. Fluoroscopic guided epidural blocks should be reserved for cases in which the epidural puncture is predicted to be difficult by use of the conventional method. Although we were unsuccessful in placing a thoracic epidural in a patient with severe scoliosis even with the added information of a recent CT scan for preprocedure trajectory assessment, we feel that this case highlights the significant challenges in handling these kinds of patients in the perioperative period. The optimal approach for thoracic epidural placement has not been determined and additional case reports/case series are necessary to help delineate best practices that are safe, effective, and efficient.

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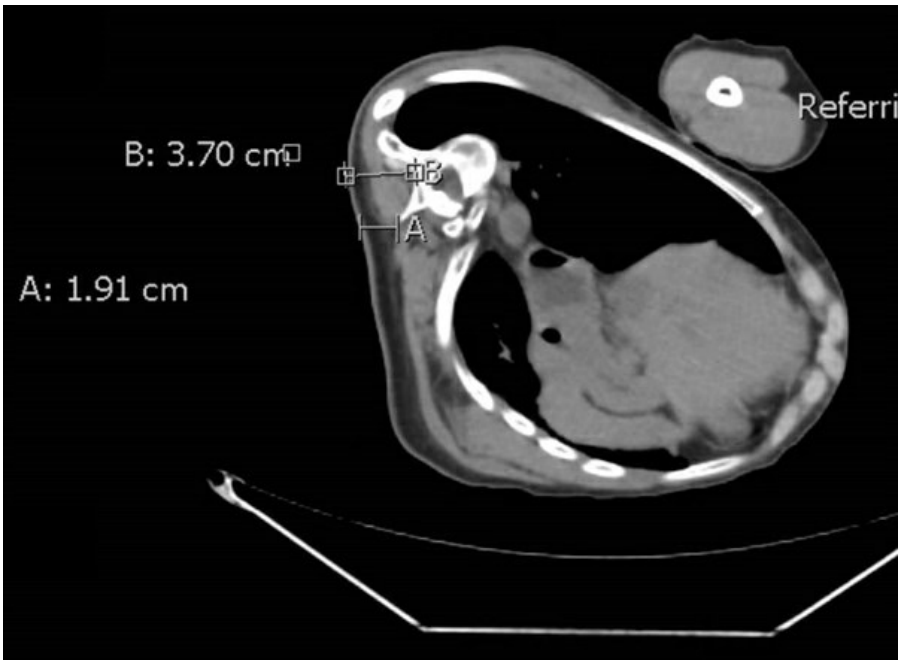
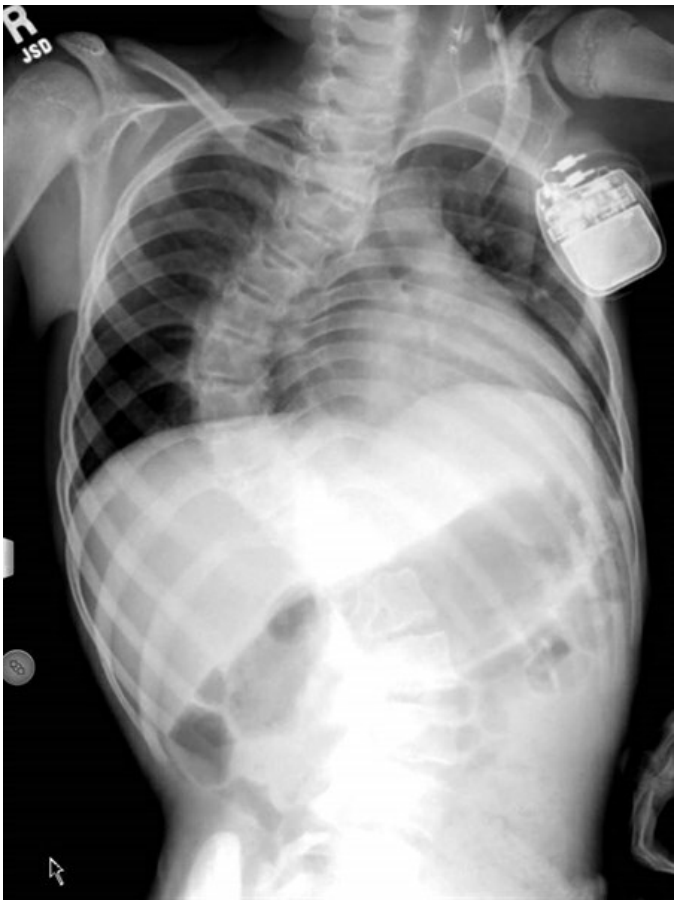
Tables/images



CT image showing showing preprocedure trajectory assessment.



Chest x-ray showing degree of scoliosis.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1290
Scientific abstract: Regional anesthesia

Interscalene Block with General Anesthesia versus Sedation for Shoulder Arthroscopy: A Retrospective Review

Barry Ettinger, Christina Jeng
Mount Sinai Hospital

Introduction

With the introduction of the interscalene block (ISB) in the early 1970's, the anesthetic options for shoulder arthroscopy have evolved. While previously shoulder surgery was always done with general anesthesia (GA), we now had the option of doing the procedure under a regional block. Currently, even with an ISB, GA is frequently used for intraoperative management with the focus of the ISB on postoperative pain relief. When compared to GA alone studies have proven a decrease in hospital discharge time, a decrease in opioid consumption, and an increase in patient satisfaction. The current practice at our institution has shifted from doing an ISB alone to the ISB with GA. The use of GA is thought to increase hospital length of stay (LOS) as well as increase post operative nausea and vomiting (PONV). We hypothesized that the use of an ISB with sedation, as opposed to general anesthesia, will decrease the time to hospital discharge and the incidence of PONV.

Materials and methods (NA for case report)

IRB approval was recently obtained from our hospital's ethics board. Using a retrospective analysis of the cases performed at our institution between 2008-2014, an analysis will be completed looking at the data pulled from the cases. Approximately 800 cases will be reviewed with an estimated 300 cases involving sedation and 500 cases involving general anesthesia. A statistical analysis will be completed using the data acquired.

Results/Case report

Although the data has yet to be analyzed, we hypothesize there will be a decrease in hospital discharge time in the sedation group when compared to the general anesthesia group. We will also analyze opioid consumption in the PACU and post operative nausea and vomiting.

Discussion

Although it is well known that an interscalene block is effective for shoulder arthroscopy, there is limited data available with regards to sedation versus general anesthesia in the setting of a block and its effect on discharge time and PONV. A recent prospective study by Lehmann *et al* demonstrated a statistically significant decrease in hospital stay with an ISB alone versus with GA. There was no difference in opioid consumption between those groups. We hope to confirm this data by looking through our case history to see if a difference truly exists.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1291
Scientific abstract: Regional anesthesia

Continuous Popliteal-Sciatic Blocks: Does Varying Perineural Catheter Location Relative to the Sciatic Bifurcation Influence Block Effects? A Dual-Center, Randomized, Controlled Clinical Trial

Amanda Monahan, Sarah Madison, Vanessa Loland, Jacklynn Sztain, Michael Bishop, NavParkash Sandhu, Richard Bellars, Bahareh Khatibi, Alexandra Schwartz, Sonya Ahmed, Michael Donohue, Scott Nomura, Cindy Wen, Brian Ilfeld
University of California, San Diego

Introduction

For *single-injection* popliteal-sciatic nerve blocks, block characteristics are dependent upon local anesthetic injection relative to the sciatic nerve bifurcation (1-3). In contrast, this relationship remains unexamined for *continuous* popliteal-sciatic nerve blocks (4). We tested the hypothesis that postoperative analgesia is improved with the perineural catheter tip AT the level of the bifurcation compared to 5 cm PROXIMAL to the bifurcation.

Materials and methods (NA for case report)

Preoperatively (with IRB approval), subjects having moderately-painful foot or ankle surgery were randomly assigned to an ultrasound-guided subepimyseal perineural catheter inserted either AT or 5 cm PROXIMAL to the sciatic nerve bifurcation. Subjects received a single-injection of mepivacaine 1.5%, followed by an infusion of ropivacaine 0.2% (6 mL/h basal, 4 mL bolus, 30 min lockout) for the study duration. The primary end point was the average pain measured on a Numeric Rating Scale (NRS; 0-10) in the 3 hours prior to a data collection telephone call the morning following surgery.

Results/Case report

The *average* NRS of subjects with a catheter inserted AT the sciatic nerve bifurcation (n=64) was a **median** [10th, **25th-75th**, 90th quartiles] of **3.0** [0.0, **2.4-5.0**, 7.0] versus **2.0** [0.0, **1.0-4.0**, 5.0] for subjects with a catheter inserted PROXIMAL to the bifurcation (n=64; **P=0.008**). Similarly, *maximum* pain scores were higher in the group AT the bifurcation: 6.0 [3.0, 4.4-8.0, 9.0] versus 5.0 [0.0, 3.0-8.0, 10.0] (P=0.019). Differences between the groups for catheter insertion time, opioid rescue dose, the degree of numbness in the foot/toes, catheter dislodgement, and fluid leakage did not reach statistical significance.

Discussion

For *continuous* popliteal-sciatic nerve blocks, a catheter inserted at least 5 cm PROXIMAL to the sciatic nerve bifurcation provides superior postoperative analgesia in subjects having moderately painful foot or ankle surgery compared with catheters located at the bifurcation. This is in marked contrast with *single-injection* popliteal-sciatic nerve blocks for which benefits are afforded to local anesthetic injection distal—rather than proximal—to the bifurcation.

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Tables/images

Table 1. Primary surgical procedures

	AT Bifurcation (n=65)	PROXIMAL to Bifurcation (n=65) *
Achilles tendon repair	8 (12%)	7 (11%)
Ankle arthroplasty or ORIF	14 (22%)	12 (18%)
Arthrodesis or fusion	7 (11%)	8 (12%)
Arthrotomy, synovectomy and/or debridement	6 (9%)	6 (9%)
Foot osteotomy or ORIF	14 (22%)	16 (25%)
Hallux valgus repair	10 (15%)	12 (18%)
Ligament or tendon repair	6 (9%)	4 (6%)

Values are reported as number of subjects (percentage)

ORIF: open reduction, internal fixation

* Percentages do not add to 100% due to a rounding error

Table 1

Table 2. Post-randomization end points

	AT Bifurcation (n=64) *	PROXIMAL to Bifurcation (n=64) *	P-Value
Local anesthetic injected *pre*-operatively (#)	58 (91%)	56 (88%)	0.59
Catheter placement time (min)	4 [3-5]	5 [4-6]	0.07
Saphenous nerve block administered (#)	37 (58%)	33 (52%)	0.54
Outpatient (#)	56 (88%)	55 (86%)	0.80
Numbness in foot/toes (0-10 scale)	5.0 [0.0-7.0]	5.0 [3.0-8.0]	0.42
Leakage at the catheter site (#)	10 (16%)	11 (17%)	0.75

Values are reported as number (percentage) of subjects or median [interquartile]

NRS: numeric rating scale

* One subject randomized to each treatment group was excluded from the analysis (1 failed catheter insertion and 1 cancelled surgery)

Table 2

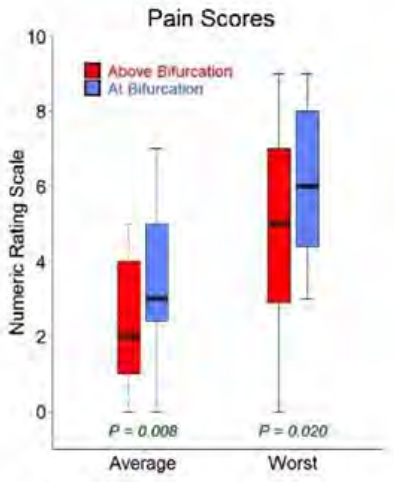

Figure 1. Perineural catheter location—either AT or 5-8 cm PROXIMAL to the sciatic nerve bifurcation—effects on ***average*** and ***maximum*** **postoperative pain** following moderately painful foot/ankle surgery with a ropivacaine 0.2% perineural infusion. Pain severity indicated using a numeric rating scale of 0 to 10, with 0 equal to no pain and 10 being the worst imaginable pain. Data include the 3-hour period prior to a data collection telephone call the morning after surgery. Data are expressed as median (horizontal bars) with 25th–75th (box) and 10th–90th (whiskers). * denotes statistical significance (p<0.05).

Figure 1

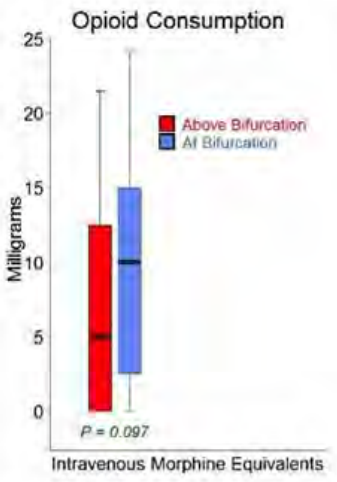

Figure 2. Perineural catheter location—either AT or 5-8 cm PROXIMAL to the sciatic nerve bifurcation—effects on **opioid consumption** following moderately painful foot/ankle surgery with a ropivacaine 0.2% perineural infusion. Data includes the period from recovery room discharge until the data collection telephone call the morning following surgery. Data are expressed as median (horizontal bars) with 25th–75th (box) and 10th–90th (whiskers). * denotes statistical significance (p<0.05).

Figure 2

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1292
Scientific abstract: Acute pain

Improved Analgesia after Implementation of an Enhanced Recovery After Surgery Pathway for Total Mastectomy

Catherine Chiu, Pedram Aleshi, Christina Inglis-Arkell, Candace Shavit, Edward Yap, Monica Harbell
University of California, San Francisco

Introduction

In the U.S., breast cancer is the most commonly diagnosed cancer and second leading cause of cancer death in women.[1] Surgery is the mainstay of treatment; however, up to 60% of patients experience chronic pain after total mastectomy, with poorly controlled perioperative pain as a major risk factor.[2] We describe an Enhanced Recovery After Surgery (ERAS) pathway for total mastectomy, featuring preoperative interventions (acetaminophen, gabapentin, scopolamine) and intraoperative regional anesthesia, to improve postoperative pain and nausea/vomiting (PONV).

Materials and methods (NA for case report)

After IRB approval, all patients undergoing total mastectomy surgeries at UCSF Mount Zion hospital from July 1, 2013 to December 11, 2015, were included in this study. Patients undergoing concurrent bilateral salpingo-oophorectomy or deep inferior epigastric perforators flap reconstruction were excluded. ERAS for total mastectomy was implemented on July 1, 2015. Primary outcomes included total perioperative opioid consumption and incidence of PONV, measured by post-operative administration of antiemetics. Secondary outcomes included highest Numerical Rating Scale (NRS) pain score in the PACU and on the hospital floor. P-values were calculated by Mann-Whitney test for nonparametric continuous variables, and chi-square or Fisher's exact test for categorical variables. Linear and logistic regression models were used to verify significances and correct for potentially confounding variables.

Results/Case report

Of the 341 patients included in the study, 56 patients were enrolled in the ERAS pathway. After implementation of the ERAS pathway, use of preoperative acetaminophen increased from 17% to 88%, gabapentin from 12% to 84%, scopolamine patch from 23% to 71%, intraoperative total intravenous anesthetic from 8% to 27%, and regional anesthesia (either thoracic paravertebral block or Pecs 1 and 2 block) from 19% to 84% ($p<0.001$). Total operating room time, excluding surgical procedure time, increased by 3.4 minutes ($p=0.02$), and total PACU time decreased by 25 minutes ($p=0.04$). There was no difference in length of stay between groups, with all patients discharged on post-operative day one.

Enrollment in the ERAS pathway significantly decreased total perioperative opioid consumption from 38.1mg to 26.0mg IV morphine equivalents ($p<0.001$). Incidence of PONV, measured by administration of any antiemetic from PACU through discharge, decreased from 50% to 4% of patients ($p<0.001$). A logistic regression model, correcting for PONV risk factors, found that patients enrolled in ERAS were nearly 30 times less likely to develop PONV (OR 0.036, $p<0.001$). Finally, patients enrolled in ERAS reported a decrease in highest pain score, markedly in the PACU from 6 to 4 points ($p<0.001$) and less on the hospital floor from 6 to 5.5 points ($p=0.006$).

Discussion

Since implementation of the ERAS pathway for total mastectomy, the use of preoperative acetaminophen, gabapentin, and regional anesthesia has greatly increased. Patients enrolled in the ERAS pathway required fewer opioids perioperatively and antiemetics postoperatively. Patients also reported decreased pain in the PACU, and required shorter PACU stays. Further research includes determining the efficacy of individual ERAS interventions, as well as its impact on chronic post-mastectomy pain.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1296
Medically Challenging Cases (report of up to 4 cases)

Ultrasound Use to Validate a History of Local Anesthetic Resistance

Leah Winters, Jeffrey Gonzales, Sean Malin, Jason Papazian
University of Colorado School of Medicine

Introduction

We present the first case, to our knowledge, of ultrasound use to validate a history of local anesthetic resistance in a patient without prior genetic testing.

Results/Case report

A previously healthy thirty-one year-old Caucasian male presented for incision, drainage, and foreign body removal of the left foot after sustaining a gunshot wound. Preoperative sciatic and saphenous nerve blocks were planned for postoperative pain management.

Medical history was significant for depression and reported resistance to local anesthetic. The patient described local anesthetic “not working” for dental procedures and a history of severe pain immediately following ACL repair, despite pre-procedural femoral nerve blockade. Further questioning revealed that one of the patient’s eight siblings was similarly affected by local anesthetic failure.

Ultrasound placement of a short acting amide local anesthetic (chloroprocaine was unavailable) was discussed with the patient, the goal being perineural local anesthetic placement for determining change in pain, sensory-loss, and motor dysfunction. The patient agreed with the plan and requested no sedation. Consent was signed and time out performed.

The patient was positioned supine with the knee flexed and hip internally rotated. Sterile preparation with chlorhexadine scrub was performed at the lateral aspect of the thigh. A 12-mHz linear ultrasound probe was placed transversely in the popliteal crease. The popliteal artery and vein were identified, as well as the tibial and common peroneal nerves, which were traced proximally to their origin as the sciatic nerve. A ten centimeter, twenty gauge echostim needle was passed via lateral approach near the epineurium of the sciatic nerve under continuous direct ultrasound visualization. Fifteen milliliters of 1.5% mepivicaine was injected, followed immediately by ten milliliters of 0.25% bupivacaine, aspirating every three milliliters. Fluid was observed surrounding the sciatic nerve in the typical fashion under continuous ultrasound visualization. Post-injection testing at five, fifteen, thirty, and forty-five minutes, as well as in the PACU, revealed no analgesic effect, nor decreased sensation to cold, pinprick, or gross touch in the sciatic distribution, nor decreased baseline dorsiflexion and plantarflexion.

Discussion

Few case reports describe potential resistance to local anesthetic blockade. However, none report failure of regional anesthesia after using continuous ultrasound for accurate perineural injection. Our patient’s history and lack of analgesia with properly performed sciatic nerve block under direct ultrasound visualization validate resistance and could potentially suggest sodium channel genetic variation as a mechanism of local anesthetic resistance. Local anesthetic functions via interaction of the sodium channel’s alpha subunit, IV-S6, at sites of amino acid residues of phenylalanine and tyrosine (1). Genetic variation at these sites is a proposed mechanism of local anesthetic resistance (2, 3). When regional blockade fails, attempting blockade with a different local anesthetic is reasonable (4). However, for patients with a true genetic variation, blockade may still fail, despite ultrasound guidance and maximal accuracy, requiring alternate forms of anesthesia. Particularly pertinent is anticipation of potentially failed single shot subarachnoid or epidural block when planned for surgical anesthetic.

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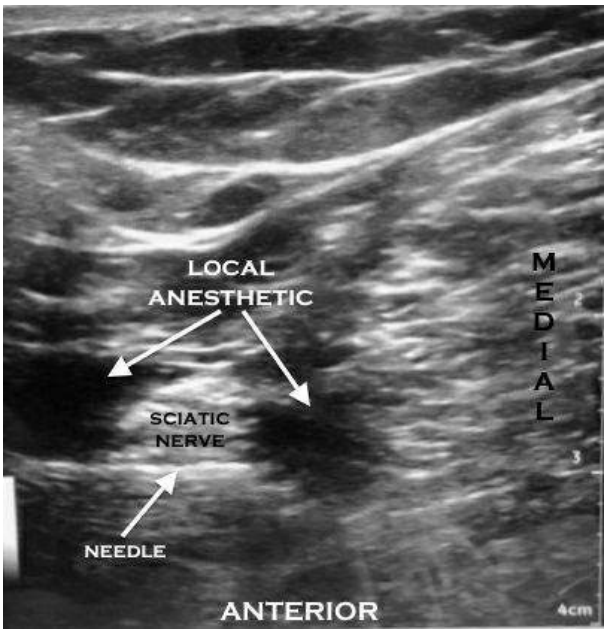
Tables/images



Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1297
Medically Challenging Cases (report of up to 4 cases)

Development of Horner's Syndrome in a Parturient from a Lumbar Epidural: Variation in Anatomy or Inadvertent Subdural Catheter Placement?

Jen Chiem, Daryl Smith, Spencer Burk, NobuyukiHa Tran
University of Rochester

Introduction

Horner's syndrome, or oculosympathetic palsy, is a rare complication of neuraxial anesthesia. It is characterized by unilateral ptosis, miosis, anhidrosis, and potentially anophthalmos. It occurs from the interruption of sympathetic tone originating from the C8-T1 sympathetic nerve fibers. The estimated incidence of Horner's syndrome is 0.4-4% in the parturient population4,5. The incidence of inadvertent subdural catheter placement from an epidural procedure is approximately 0.82%1,2. Subdural catheter placement manifests as delayed, extensive, and asymmetric sensory blockade, often with sparing of the sacral dermatomes, and varying degrees of motor block1.
We report a case of an apparent uncomplicated epidural catheter placement for labor and delivery, which resulted in severe hemodynamic instability and Horner's Syndrome.

Results/Case report

28 year old, G5P2022, 75 kg, parturient at 39 weeks gestation who presented for induction of labor for suspected fetal macrosomia. Her past medical history includes Celiac disease and anemia; while her surgical history includes a low transverse, primary C-section for failure to progress. She previously had one epidural placement that she described as 'somewhat' successful, with her first pregnancy.

At 5 cm dilation, the patient requested an epidural for pain control. Syringe aspiration during the first epidural attempt, in the midline between the third and fourth lumbar levels, was positive for blood. A second epidural catheter placement attempt was made in the midline between the third and fourth lumbar levels. The epidural catheter was threaded to 12 cm at the skin. Syringe aspiration was negative for CSF or blood, and an epidural test dose (1.5% Lidocaine with 1:200,000 Epinephrine, 3mL) was negative. The patient received an epidural bolus of 0.25% Bupivacaine, in two, 4 mL injections and 100 mcg Fentanyl. An epidural infusion consisting of a 0.0625% Bupivacaine and 2 mcg/mL Fentanyl solution was begun at 14 mL/hr. Shortly thereafter, she complained of shortness of breath, became hypotensive with a blood pressure of 77/39 and tachycardic with a heart rate of 120. She had one watery emesis, developed right eye droop, and reported right arm parasthesia. A fluid bolus and Phenylephrine was administered, and the epidural infusion was stopped. Her vital signs stabilized.

Discussion

we performed an epidural contrast study and administered 13 mL of Omnipaque-300 contrast to simulate the total local anesthetic volume administered prior to symptom development. CT imaging revealed contrast predominantly on the right side of the spinal canal, from L5 to C1, with some distribution to the left side at T10-L2, Figure 1 and 2. The contrast surrounds the right nerves root and foramina as seen in both Figure 3 and 4.

While both diagnostic methods would suggest that the patient had a subdural injection, imaging studies revealed that the epidural was in the epidural space. These findings suggest that the patient's anatomic variation of a narrowed, primarily right sided, epidural space led to the development of a right sided Horner's syndrome rather than an accidental subdural catheter placement.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1298
Medically Challenging Cases (report of up to 4 cases)

Intrathecal Opioid Drug Delivery System for the Treatment of Chronic Pain Refractory to Medical Management

Lance Hoffman
University of Cincinnati Medical Center

Introduction

Chronic pain conditions refractory to medical management and surgical intervention can be very difficult to manage. Intrathecal (IT) opioids, administered via an intrathecal drug delivery system (IDDS), can potentially provide effective analgesia for patients with intractable pain. However, there is a paucity of well-documented, prospective data regarding use and management of IT opioid therapy (1).

Materials and methods (NA for case report)

NA

Results/Case report

Case 1: An 82 year old woman with severe low back and leg pain status post failed spinal cord stimulation therapy was referred to our pain clinic after being prescribed a daily cumulative morphine equivalent dose of 300 mg. Due to pain refractory to previous management, she opted to undergo an IT morphine trial that resulted in almost 100% relief. She subsequently had an IDDS placed (Figure 1). Her IDDS with morphine was initiated at 0.25 mg/day with patient delivered doses of 0.02 mg up to every 8 hours.

The patient was weaned off of all oral narcotics with up-titration of her morphine infusion by 10-20% per clinic visit. She has described ongoing pain relief with low dose IT morphine therapy without side effects for greater than one year since her implant placement.

Case 2: A 58 year old woman with a history of multiple sclerosis, fibromyalgia, and chronic low back pain was referred to our clinic for debilitating pain refractory to medical management despite a daily cumulative morphine equivalent dose of 480 mg. After discussing treatment options with the patient, the decision was made to have an IT morphine trial for IDDS placement. She described greater than 70% pain relief with her trial, resulting in IDDS placement. Her IDDS with morphine was initiated at 0.25 mg/day with patient delivered doses of 0.02 mg up to every 8 hours.

The patient was able to be weaned off all other narcotics with up-titration of her IDDS morphine infusion. More than 6 months following implantation, she described excellent pain control without side effects from her IT morphine therapy in conjunction with non-narcotic adjuncts.

Discussion

We presented two patients with chronic pain who were both weaned off their high dose narcotic regimens after initiation of low dose IT morphine therapy. Additionally, fewer side effects were observed with IT morphine in comparison with conventional routes of administration (2). For select patients in whom conventional pain management techniques have failed, the administration of IT opioids may be an effective treatment modality (3).

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Tables/images

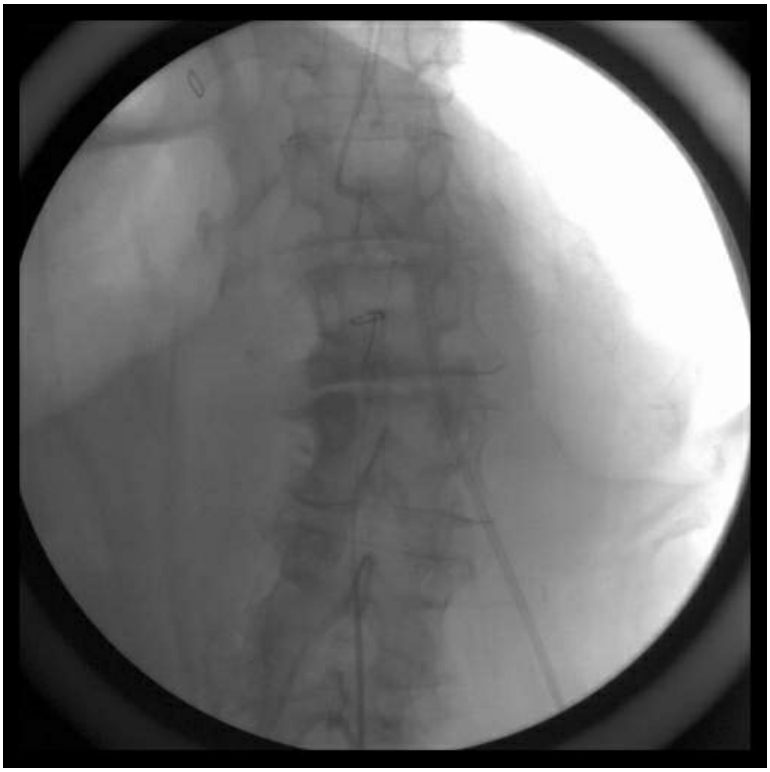

Figure 1: AP fluoroscopic image obtained during placement of an IDDS catheter for patient in Case 1

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1299
Scientific abstract: Regional anesthesia

INCIDENCE OF SUCCESSFUL PARAVERTEBRAL BLOCK USING LANDMARK TECHNIQUE IN A PHANTOM MODEL

Irfan Samee, Jeff Gadsden, Stuart Grant
Duke University

Introduction

The thoracic paravertebral block (TPVB) was first used in 1905 to provide muscle relaxation and anesthesia for upper abdominal surgery (1). It has since been used for a wide variety of indications including breast and thoracic surgery (2). Many institutions across the country, including our own, use the landmark technique as the primary method of block placement. The failure rate of landmark based TPVB has been reported to be 10% when assessed by inadequate pain scores post-operatively (3). To our knowledge, no study has assessed correct needle placement rate in the paravertebral space (PVS) when a landmark based TPVB is attempted. The goal of our study is to define the success rate in landmark based TPVB, as assessed by needle placement in the PVS, using a high-fidelity phantom model as a surrogate. In addition, pleural puncture rate was assessed as a secondary outcome with this model.

Materials and methods (NA for case report)

Anesthesia residents, fellows, and attendings at Duke University were enrolled in the study. Each participant was given access to a computer tutorial on how to perform a landmark based TPVB based on the technique described by Eason (4) and then performed the technique on a high fidelity phantom paravertebral model (Figure 1). This model is an anatomically precise mold from a female thoracic spine of five levels and, via a fiberoptic camera, needle placement can be directly visualized. Each participant performed four landmark based TPVB on the model, two on each side. An investigator observed final needle position and graded this as either successful, unsuccessful, or pleural puncture (Figure 2).

Results/Case report

To date, 24 participants have been enrolled. The success rate, defined as needle placement in PVS was 27% overall with the highest percentage being from PGY- 4 residents (50%) and the lowest from PGY-1 residents (0%). Also, pleural puncture rate was 13% overall. Figure 3 demonstrates success, failure, and pleural puncture rates when stratified by experience level.

Discussion

Based on our study, the success rate of landmark based TPVB was much lower than reported in the literature, although a different modality was used to examine our variables (correct needle placement vs post operative pain scores). Higher rates of success in other studies may be attributed to diffusion of local anesthetic over time into the PVS or minor anatomical variations not seen with our model. In addition, many anesthesiologists perform multilevel PVBs to increase chances of clinical success. Furthermore, a critique of our model is the absence of tactile feedback necessary for correct placement of the block in patients, which may manifest in decreased success rates. As ultrasound is being used as an alternative to the landmark method, it is important to grade these techniques with a model such as ours to help validate improved performance of TPVB. As such, further studies with ultrasound are currently being performed at our institution using this phantom model.

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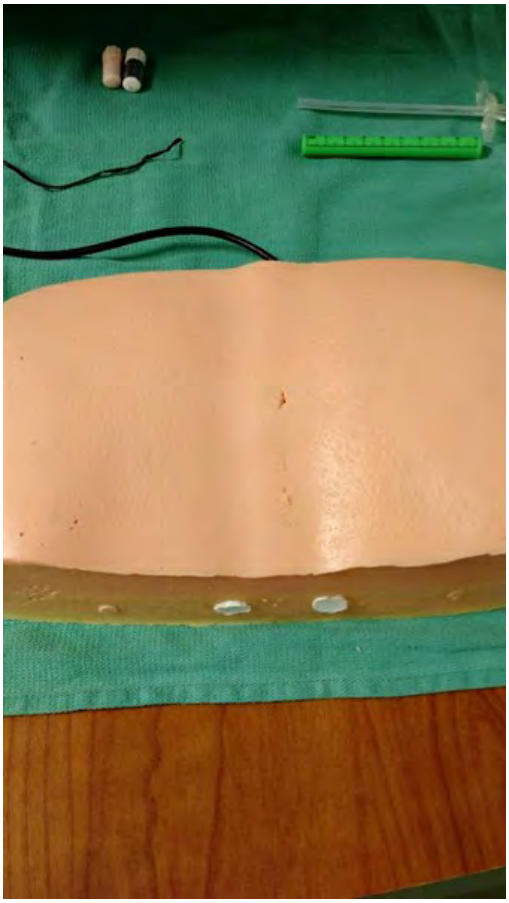

Figure 1

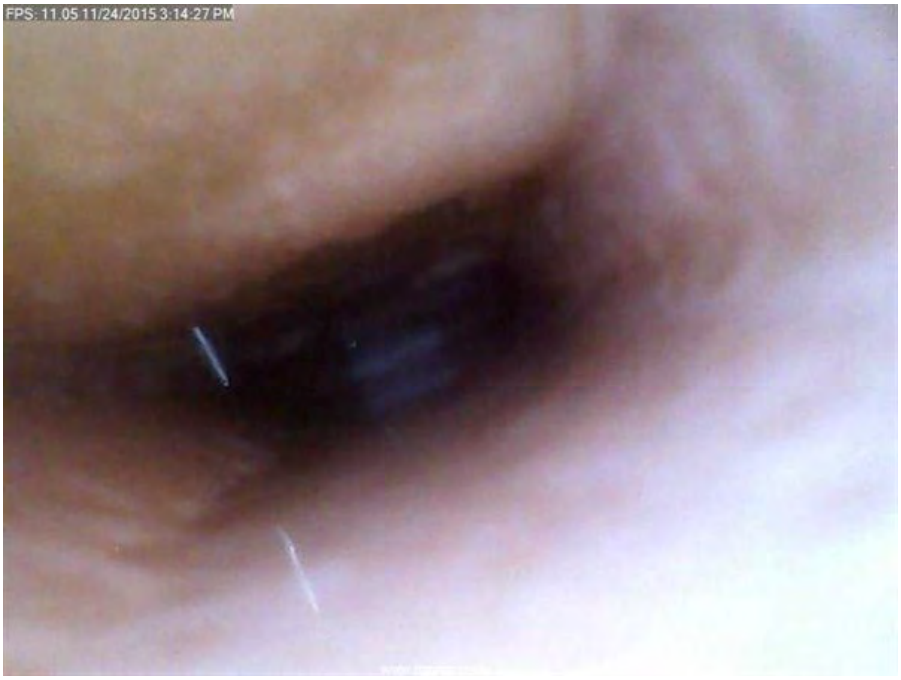

Figure 2

training level	Successful needle position	unsuccesfull needle postion	pleural puncture rate	total attempts	successful percent	unsuccessful percent	pleural puncture rate
PGY-1 (INTERN)	0	4	0	4	0%	100%	0%
PGY-2 (CA-1)	1	9	2	12	8%	75%	17%
PGY-3 (CA-2)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PGY-4 (CA-3)	10	6	4	20	50%	30%	20%
PGY-5 (fellow)	1	0	3	4	25%	0%	75%
1-5 yrs clinical practire	7	22	1	32	22%	69%	9%
6-10 yrs clinical practice	1	7	0	8	13%	88%	0%
11-15 yrs clinical practice	N/A	N/A	N/A	N/A	N/A	N/A	N/A
>15 yrs clinical practice	6	10	0	16	38%	63%	0%
total	26	58	12	96	27%	60%	13%

Figure 3

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1304
Medically Challenging Cases (report of up to 4 cases)

Neuraxial Anesthesia in Spina Bifida Occulta

Peter Fu, Suzanne Mankowitz
Columbia University

Introduction

Spina bifida, literally “cleft spine,” describes a group of conditions that results from incomplete closure of the neural tube. It is the most common neural tube defect in the United States, affecting 1,500 - 2,000 of the approximately four million births each year.[1] The least severe form is spina bifida *occulta*. It is characterized by the failure of fusion of the vertebrae, but the neural tissue (*e.g.* meninges, CSF, and spinal cord) does not protrude through the bony defect. Although neural tissue is confined within the spinal column, pathology may still exist with the neural tissue itself. Here, we report a case of tethered spinal cord and arachnoid cyst in a parturient with known spina bifida *occulta*.

Results/Case report

A 48 year-old G1P0 at 31 weeks and 5 days gestation was admitted for preeclampsia with severe features. Although not in labor, the patient had worsening thrombocytopenia, intrauterine growth retardation with poor interval growth, and new fetal distress on umbilical Doppler ultrasound. The risks of continuing pregnancy outweighed the benefits and decision was made to proceed with cesarean delivery.

On history and exam, the patient reported only chronic low back pain and an incidental finding of spina bifida *occulta* on lumbar MRI. She otherwise denied any focal neurological symptoms and physical examination was unremarkable. Review of her lumbar spine MRI confirmed her known spina bifida *occulta* at L3-4. However, also present was a low-lying conus at L4 with a linear region of T1 shortening within the posterior thecal sac representing lipoma or fatty filum, compatible with a tethered cord. Furthermore, there was a subarachnoid cyst at L3 displacing the conus with mass effect upon the cauda equina causing crowding of nerve roots. Due to these findings, neuraxial anesthesia was deferred and the delivery proceeded uneventfully under general anesthesia.

Discussion

Spina bifida *occulta* may be present in up to 20% of the general population.[2] In its true form, only the vertebral body is affected and spinal and epidural techniques have been performed safely.[3,4,5] There is an intermediate group of conditions where spina bifida *occulta* may be associated with neural tissue pathology. Specifically, intraspinous lipomas or fibrous bands with tethering of the spinal cord may occur in 35-87% of these patients.[4] Our patient reported spina bifida *occulta*, but the term itself did not sufficiently detail the involvement of her spinal cord disease. There have been case reports of devastating complications with regional anesthesia in patients with spina bifida *occulta* and unknown tethered cord leading to paraplegia.[6] Other than increased risk of direct nerve injury, these patients may also be at higher risk for spinal hematomas.[6]

There remains controversy in the literature as to whether the diagnosis of spina bifida *occulta* mandates additional work up. This case highlights the need for lumbosacral imaging of patients with reported spina bifida *occulta* prior to neuraxial anesthesia. It is incumbent on the anesthesiologist to specifically evaluate the level of the bony defect and also the neural tissue itself.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1306
Medically Challenging Cases (report of up to 4 cases)

Acute Spinal Subarachnoid Hematoma After Placement of a Lumbar Spinal Drain

Keith Thompson, Allison Haller, Reordan De Jesus
University of Florida

Introduction

We describe a case of a spinal subarachnoid hematoma after placement of a lumbar spinal drain for vascular surgery. The patient had a lumbar drain placed for spinal cord protection during endovascular aortic repair. An MRI was ordered postoperatively for suspicion of an epidural hematoma, yet a spinal subarachnoid hematoma was revealed. While spinal subarachnoid hematomas are a rare entity, they can contribute significantly to morbidity, thus vigilance and suspicion must be maintained.

Results/Case report

We present a case of a 67 year old male with a thoracoabdominal aortic aneurysm who underwent a thoracic endovascular aortic repair under general anesthesia for which a lumbar drain was placed preoperatively for spinal cord protection. In our institution, this is performed by the regional anesthesia team due to their skill set with neuraxial techniques. The case was completed uneventfully and the patient remained neurologically intact while recovering in the intensive care unit.

After 24 hours postoperatively, the spinal drain catheter was removed. He had no history of coagulopathy and anticoagulation had been appropriately held. That evening, the patient developed lower extremity sensory changes which raised the concern for epidural hematoma. An MRI could not be done due to the endograft, so a CT was performed which was read as normal. He then developed weakness of his lower extremities, raising the concern for spinal cord ischemia. The lumbar drain was replaced, but returned only sanguinous fluid. A repeat CT was then performed for lumbar drain localization which revealed a spinal subarachnoid hematoma.

Once recognized, a neurosurgical evaluation was immediately done, but no intervention was undertaken. It was felt that the symptoms would resolve with conservative management. The patient regained partial sensation, yet at 18 months persistent weakness remained.

Discussion

Lumbar spinal drains are placed for spinal cord protection in patients undergoing major vascular surgery such a thoracoabdominal aneurysm repair. This has been shown to reduce the incidence of paraplegia by preserving spinal cord perfusion (1). Spinal subarachnoid hematomas are a serious yet underappreciated entity. Their incidence following spinal drain placement is unknown. To our knowledge, it has only been reported once previously in the literature (2). The most common causes of spinal subarachnoid hematoma are coagulopathies, lumbar puncture for diagnostic or anesthesiological purposes and traumatic injuries (3 - 7). Spinal subarachnoid hematomas have been known to contribute to significant morbidity, including persistent neurological injury, arachnoiditis and paraplegia (8). Spinal subarachnoid hematomas are difficult to diagnose in the hyperacute phase due to the lesion's imaging characteristics. (9) Magnetic resonance imaging is the diagnostic modality of choice, yet a CT scan may be warranted due to interference or incompatibility of the endograft. (10) Surgical decompression is often the recommended treatment depending on the severity of symptoms, and if done within 8 hours of symptom onset, neurological function will likely resolve. (7)

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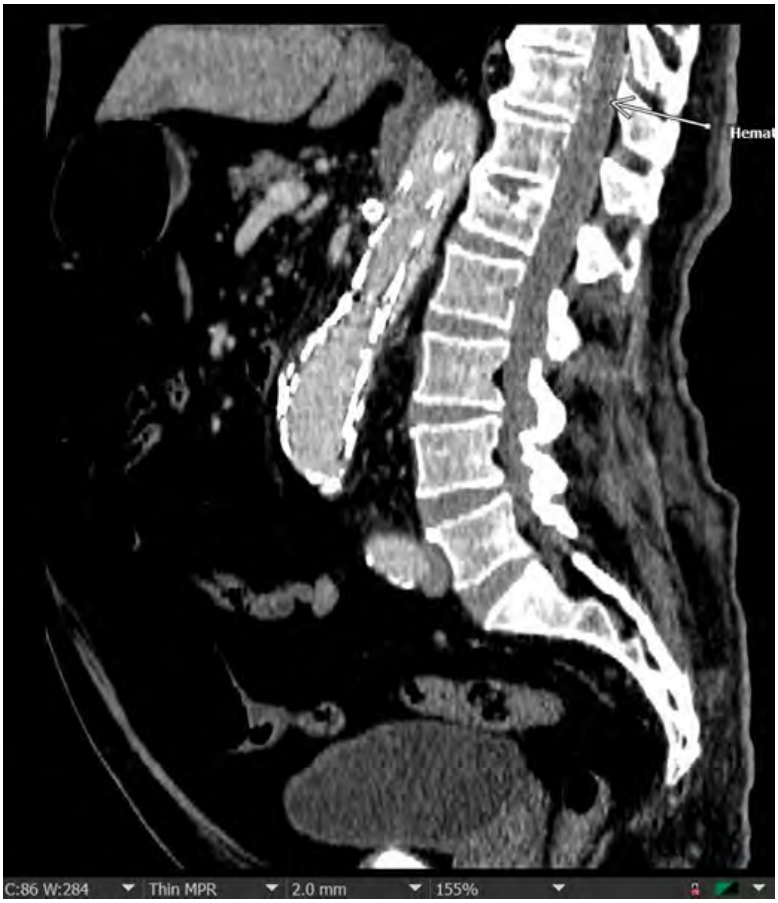
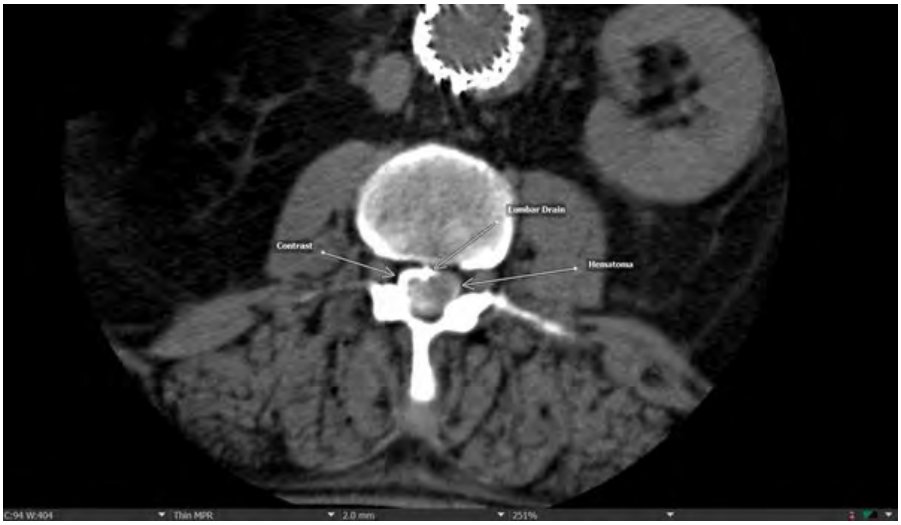
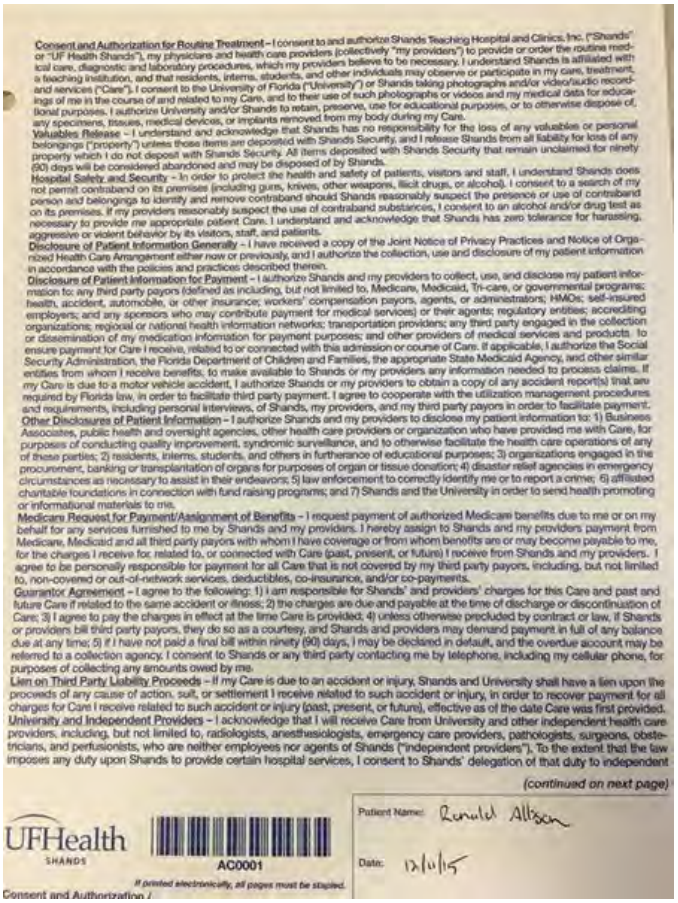
Tables/images



Spinal subarachnoid hematoma at the thoracolumbar level



Spinal subarachnoid hematoma with contrast filling defect



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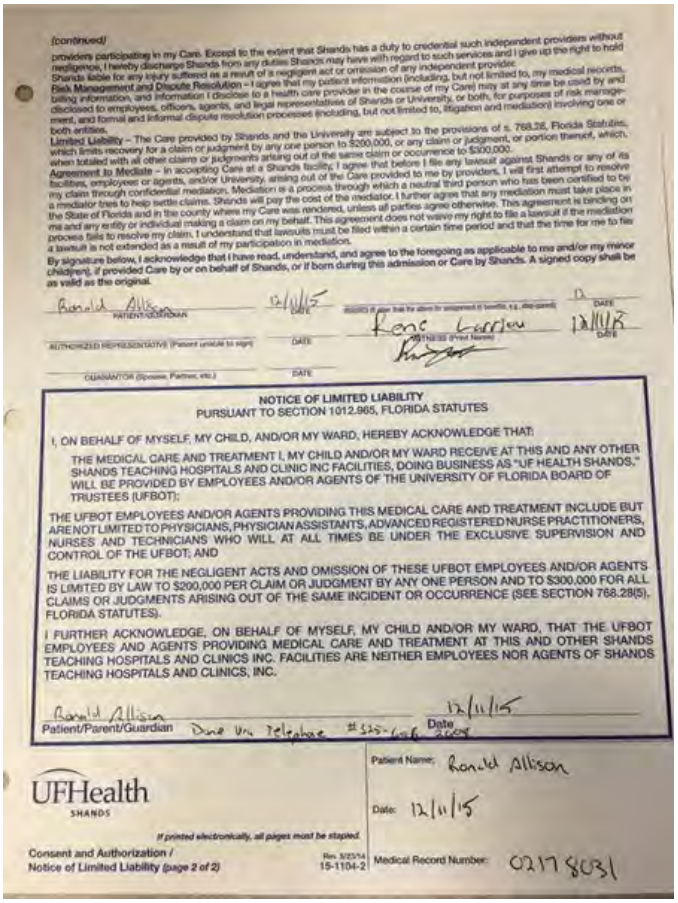
Consent and Authorization /

Patient Name: Ronald Allison

Date: 12/11/15

Patient Consent page 1/2



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providers participating in my Care. Except to the extent that Shands has a duty to credential such independent providers without negligence, I hereby discharge Shands from any duties Shands may have with regard to such services and I give up the right to hold Shands liable for any injury suffered as a result of a negligent act or omission of any independent provider.

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By signature below, I acknowledge that I have read, understand, and agree to the foregoing as applicable to me and/or my minor child(ren), if provided Care by or on behalf of Shands, or if born during this admission or Care by Shands. A signed copy shall be as valid as the original.

Ronald Allison — 12/11/15

PATIENT/GUARDIAN — DATE

AUTHORIZED REPRESENTATIVE (Patient unable to sign) — DATE

GUARANTOR (Spouse, Partner, etc.) — DATE

Rene Garrison — 12/11/15

WITNESS (Print Name) — DATE

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Consent and Authorization / Notice of Limited Liability (page 2 of 2)

Rev. 3/25/14 15-1104-2

Patient Name: Ronald Allison

Date: 12/11/15

Medical Record Number: 02178031

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1309
Medically Challenging Cases (report of up to 4 cases)

Compartment Syndrome: Regional anesthesia did not delay diagnosis.

Jessica Boden, Hillenn Cruz Eng
Penn State Hershey Medical Center

Introduction

Compartment Syndrome is a rare but disastrous complication that can occur after total knee arthroplasty and is a surgical emergency when diagnosed. To reduce morbidity, definitive treatment should occur within 12 hours after onset of symptoms. Delayed diagnosis and treatment is associated with significant morbidity secondary to irreversible ischemic necrosis of the muscles and nerves within the affected compartment. A common mnemonic for compartment syndrome is the " 5 P's" (pain, paresthesia, pallor, paralysis, and pulselessness). Only pain and paresthesia, however, are symptoms that point to the diagnosis of a developing compartment syndrome. Despite these concerns, there is no *evidence* that opioid based-PCA or regional *analgesia* delay the diagnosis of compartment syndrome *with appropiate monitoring*.

Results/Case report

We present a case of a 56 year old male that developed anterior compartment syndrome after an elective right total knee arthroplasty, written consent was obtained. Prior to surgery, an adductor canal catheter was placed under ultrasound guidance. The catheter was not bolused preoperatively. Surgery was performed under spinal anesthesia without complication. Intraoperatively, Local Infiltration Analgesia (LIA) was performed by the surgeon using TKA solution (80 ml ropivacaine 0.5%, 0.3 ml epinephrine (1mg/ml), 1 ml ketorolac (30 mg/ml), and 0.5 ml morphine (10 mg/ml) in 38 ml of NS.

Six hours post-operatively, the patient complained of tightness and aching pain in his right thigh. He described the pain as 8/10 with mild relief obtained with an additional 8 mg dihydromorphone q 8 hr, 4 mg IV morphine q1hr, and 100 mg morphine SR. Ten hours post-operatively, a continuous infusion of 0.2 % ropivacaine 8 cc/hr was started via the adductor canal catheter.

Four hours after infusion was started, the patient complained of unrelenting 10/10 right thigh pain. Despite PRN boluses of additional opioids, the pain persisted. Bedside evaluation demonstrated the patient's right thigh to be extremely tense, edematous, and tender to palpation. Compartment pressures were measured as : anterior compartment, 47 mmHg; adductor compartment, 4 mmHg; posterior compartment, 17 mmHg. An emergent anterior compartment fasciotomy was performed.

Operative findings included a hematoma within the knee capsule but no bleeding or hematoma within the musculature of the compartment. The adductor canal catheter was removed at that time and his pain was managed with his home chronic pain regimen in addition to 200 mg celebrex BID, 1,000 mg acetaminophen q 8hr, 4 mg IV morphine q 1hr PRN, and 15 mg oxycodone q4hr PRN. The patient was able to participate in physical therapy one day after the anterior thigh fasciotomy and was discharged home on hospital day 6.

Discussion

Catastrophic consequences occur if the diagnosis of compartment syndrome is delayed. Patients usually achieve full recovery if decompression is performed within 6 hours of diagnosis. In this case, the patient was diagnosed and treated within 12 hours of symptom onset. Despite saphenous nerve sensory blockade and high doses of opiods, the symptoms of compartment syndrome were not masked. *In the appropiate setting,* regional analgesia may be used safely in patients at risk for compartment syndrome.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1310
Scientific abstract: Regional anesthesia

Bilateral continuous superficial peroneal nerve blockade for postoperative pain management for an acute burn injury

Vikram Bansal, Emerson Conrad III, Vladislav Shick
Vanderbilt University

Introduction

With the advent of ultrasound guided nerve blockade, management of postoperative pain can help alleviate pain in situations where motor blockade and/or narcotics are not ideal. We present a successful case where bilateral continuous superficial peroneal nerve catheters were placed using ultrasound to manage post-operative pain from skin grafts and multiple trips to hydrotherapy for management of second degree burns to the dorsum of his feet bilaterally with minimal use of adjuvant opioid medications.

Materials and methods (NA for case report)

N/A

Results/Case report

A 53 year old male with a BMI of 41.5 and a past medical history of asthma, type II diabetes mellitus, hypertension, coronary artery disease and severe obstructive sleep apnea suffered 3.5% TBSA second degree burns to the dorsum of both feet from boiling hot water. The patient was initially seen in the preoperative area where he was somnolent. He had received a dose of oxycodone 10 mg four hours prior, yet, remained heavily sedated and occasionally desaturated to 85% despite oxygen therapy. Upon physical examination, the patient's burns were located on the dorsum of his feet , sparing the deep peroneal, tibial, and sural nerve distributions. He was scheduled for excision and skin grafting of his bilateral burns. Bilateral continuous superficial peroneal nerve catheters were performed distal to the fibular head and high in the lateral compartment of the calf, to avoid any chance of motor blockade associated with common peroneal nerve blockade or a popliteal sciatic nerve catheter.

Discussion

Using an ultrasound and a high frequency probe, the common peroneal nerve was initially localized at the popliteal fossa and the nerve was traced below the fibular head where the superficial and deep peroneal nerves bifurcate. An 18 gauge touhy needle was placed under ultrasound guidance via an in-plane technique into the fascia layer just below the peroneus longus muscle containing the nerve and a 20 gauge peripheral nerve catheter was threaded into the fascia layer through the needle. This process was repeated for the contralateral side. An initial bolus of 10 mL of 0.2% ropivacaine was placed around each nerve bilaterally through the catheter. An infusion of bupivacaine .0625% at 3cc/hour was run postoperatively and finally trialed off 5 days later, one day before patient was discharged . The patient's pain was controlled with the peripheral nerve catheters, acetaminophen 1000mg q6 hours, and tramadol 25mg q6hrs prn. He did not receive any scheduled narcotics due to his severe obstructive sleep apnea. Prior to surgery, his pain score was an 8 out of 10 on the visual analog scale. On postoperative day 1 , his pain score was 4 out of 10 and on postoperative day 5 his pain score was 3 out of 10 , when the catheters were removed. The patient was able to tolerate numerous dressing changes and multiple trips to hydrotherapy without an increase in his infusion rate or boluses through his peripheral nerve catheter. He was extremely satisfied with his symptom relief and was discharged with prescriptions of tramadol, acetaminophen and ibuprofen.

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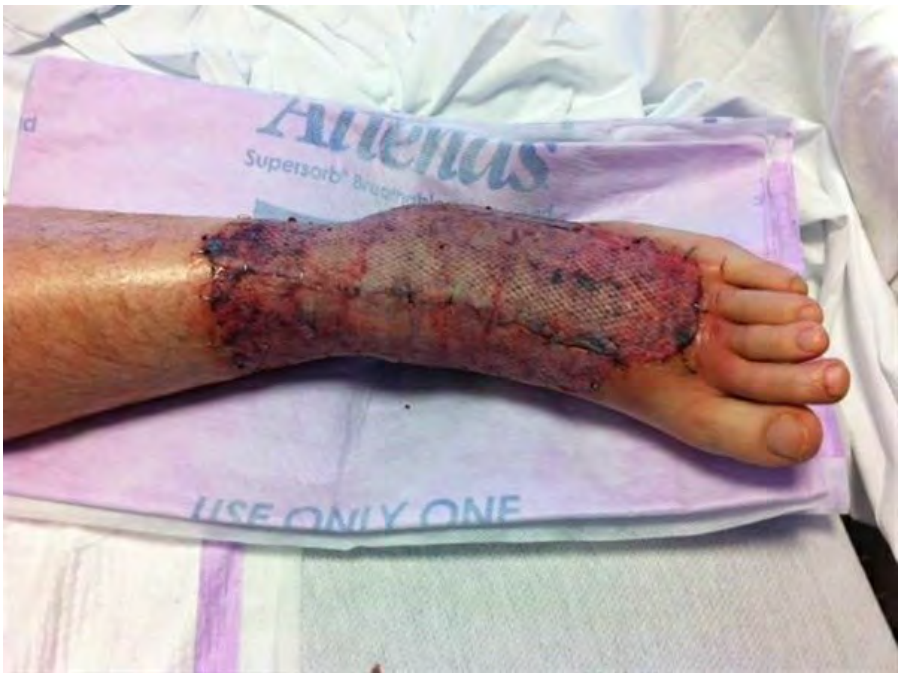
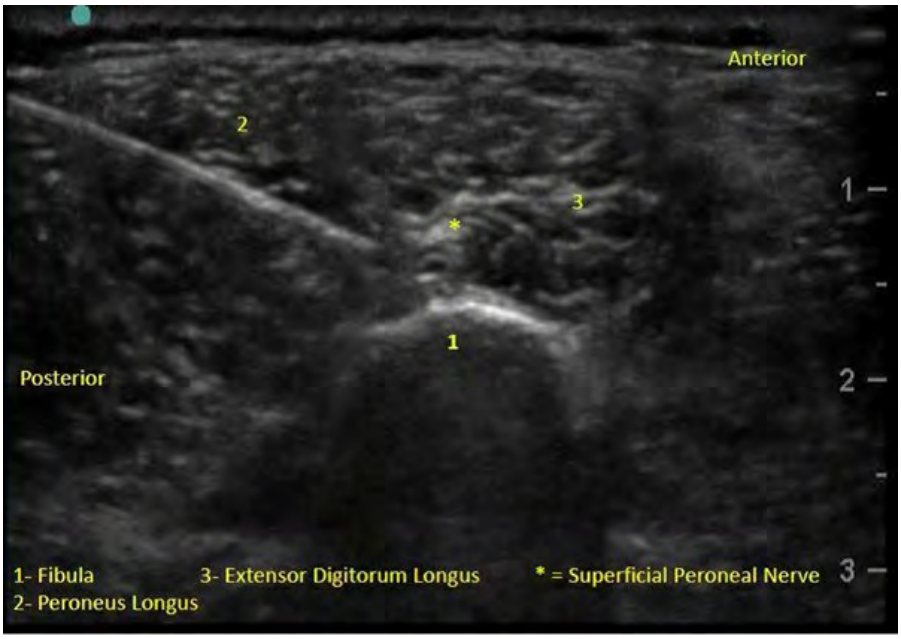
Tables/images



Burn Injury



Ultrasound Anatomy of the Superficial Peroneal Nerve

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1312
Scientific abstract: Acute pain

Clonidine Does Not Reduce Pain or Opioid Consumption After Non-cardiac Surgery: A Randomized, Controlled Trial

Rovnat Babazade, Alparslan Turan, Andrea Kurz, Philip J. Devereaux, Nicole M. Zimmerman, Matthew T. Hutcherson, Amanda J. Naylor, Wael Ali Sakr Esa, Joel Parlow, Ian Gilron, Hooman Honar, Vafi Salmasi, Daniel I. Sessler
The Cleveland Clinic Foundation

Introduction

Multimodal analgesia combines various classes of medications with the principal goal of interrupting pain transmission and moderating the response to noxious stimulation at various levels to improve efficacy while simultaneously diminishing side effects (1). Commonly used non-opioid multimodal analgesics include N-Methyl-D-aspartate antagonists, anticonvulsants, nonsteroidal anti-inflammatory agents, local anesthetics, and alpha-2-adrenoceptor agonists (2) . Clonidine is an alpha-2-adrenoceptor agonist which has analgesic properties (3). However, the analgesic efficacy of perioperative clonidine remains unclear. We therefore tested the hypothesis that clonidine reduces both pain scores and cumulative opioid consumption during the initial 72 hours after non-cardiac surgery.

Materials and methods (NA for case report)

With approval of the Institutional Review Board at the Cleveland Clinic (15-251, 2/26/2015) and written consent, patients having elective, non-cardiac surgery were enrolled in the POISE-2 sub-study. 624 patients having elective non-cardiac surgery under general or spinal anesthesia were included in this sub-study of the PeriOperative ISchemia Evaluation-2 (POISE-2) a randomized, controlled trial (4, 5). Patients were randomized to 0.2 mg oral clonidine or placebo 2 to 4 hours before surgery, followed by 0.2 mg/d transdermal clonidine patch or placebo patch which was maintained until 72 hours after surgery. Postoperative pain scores and opioid consumption were assessed for 72 hours after surgery

Results/Case report

Clonidine had no effect on opioid consumption compared to placebo, with an estimated ratio of means (95% CI) of 0.98 (0.70, 1.38); $P = 0.92$. Median [Q1, Q3] opioid consumption was 63 [30, 154] mg morphine equivalents in the clonidine group which was similar to 60 [30, 128] mg morphine equivalents in the placebo group. Furthermore, there was no significant effect on pain scores, with an estimated difference in means (95% CI) of 0.12 (-0.02, 0.26) points; $P = 0.10$. Mean pain scores per patient were (3.6 ± 1.8) for clonidine patients and (3.6 ± 1.8) for placebo patients

Discussion

Clonidine was reported to be analgesic in many previous trials, a conclusion summarized in a 2012 meta-analysis of available trials (Fig 1). Nonetheless, clonidine was not superior on either opioid consumption or pain scores in our patients, which is by far the largest trial in this area. An updated meta-analysis which includes all available data does not support clonidine providing any important postoperative analgesia. Given that perioperative clonidine does not reduce the risk of myocardial infarction or death, does not provide useful analgesia, and promotes clinically important hypotension and bradycardia, there appears to be little indication for using the drug prophylactically in patients having non-cardiac surgery.

In summary, clonidine did not reduce opioid consumption or pain scores in patients recovering from non-cardiac surgery.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1313
Scientific abstract: Regional anesthesia

Adductor Canal versus Femoral Continuous Peripheral Nerve Blocks For Knee Arthroplasty: A One-Year Follow-Up Pilot Study of Two Randomized, Controlled Clinical Trials

EVAN DAVIDSON, Anthony Machi, Jacklynn Sztain, Nicholas Kormylo, Sarah Madison, Wendy Abramson, Amanda Monahan, Bahareh Khatibi, Scott Ball, Francis Gonzales, Daniel Sessler, Brian Ilfeld, Brian Ilfeld
UCSD

Introduction

For patients undergoing tricompartment or unicompartment knee arthroplasty, 2 previous studies have demonstrated that a continuous femoral nerve block provides superior analgesia in various circumstances compared with a continuous adductor canal block during the local anesthetic infusion (1,2). However, the post-infusion outcomes of these two approaches remain unknown. We therefore evaluated functional outcomes with each approach 1, 4, and 12 months after surgery with this retrospective pilot study. The two previous clinical trials were prospectively registered at clinicaltrials.gov (NCT01759277), conducted within the ethical guidelines outlined in the Declaration of Helsinki, and followed Good Clinical Practice [1,2]. The local institutional review board (University of California, San Diego) approved all study procedures, and written informed consent was provided by each subject (150696X).

Materials and methods (NA for case report)

In the original two studies (1,2), adults undergoing unicompartment or tricompartment knee arthroplasty (n=110) were randomized to receive either a continuous femoral (n=56) or adductor canal (n=54) block. The primary outcome measure was the time from the end of surgery until four criteria were fulfilled without reversion to unfulfilled status: (1) adequate analgesia (defined as < 4 on a 0-10 Numeric Rating Scale for pain, or NRS); (2) independence from intravenous opioids for at least 12 hours; (3) ability to independently stand and sit down (evaluated with the Timed Up and Go test); and (4) unassisted ambulation of at least 30 meters. Perineural catheters were removed the morning of postoperative day (POD) 2 or 3 for uni- and tri-compartment knee arthroplasty procedures, respectively. Following discharge, patients returned for examination at approximately 1, 4, and 12 months following surgery and the results charted in the medical record. Outcomes measures for the current retrospective study included passive range of motion, assistive device use during ambulation, and pain scores collected at follow-up visits at 1, 4, and 12 months. These data were obtained via chart review.

Results/Case report

The underlying previous studies provided evidence that during the local anesthetic infusion itself, a continuous femoral block provided superior analgesia than the adductor counterpart in some situations, but that ambulation and functional mobility were unquestionably superior in subjects randomized to continuous adductor canal blocks (1,2). In contrast, we found no evidence of any differences between the two treatment groups following the perineural infusion measured at 1, 4, and 12 months following surgery (Table 1)

Discussion

This 1-year follow-up pilot study of two previously-published randomized, controlled trials did not find evidence to support the theory that post-infusion, long-term outcomes differ when post-surgical analgesia is provided by either a continuous femoral or adductor canal block in the immediate postoperative period.

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Tables/images

Table 1. Results

Postoperative Time Point		Adductor Canal	Femoral	P-Value
1 Month				
	Total (unicompartment)	54 (15)	56 (15)	
	Postoperative day visit	31 [29-34]	30 [28-34]	0.80
	Pain score (0-10)	2.0 [1.0-4.0]	2.5 [0.8-4.0]	0.80
	Reporting pain score = 0	20%	25%	0.40
	Passive extension ROM (degrees)	3 [0-5]	5 [2-5]	0.55
	Passive flexion ROM (degrees)	110 [100-120]	110 [105-120]	0.67
	Using ambulatory assist devices	47%	55%	0.26
4 Months				
	Total (unicompartment)	51 (15)	52 (15)	
	Postoperative day visit	122 [117-239]	121 [118-127]	0.80
	Pain score (0-10)	0 [0.0-3.0]	0.5 [0.0-2.0]	0.80
	Reporting pain score = 0	55%	50%	0.48
	Passive extension ROM (degrees)	0 [0-2]	0 [0-3]	0.45
	Passive flexion ROM (degrees)	110 [100-120]	110 [105-120]	0.67
	Using ambulatory assist devices	10%	10%	>0.99
12 Months				
	Total (unicompartment)	23 (7)	27 (8)	
	Postoperative day visit	367 [352-405]	382 [363-421]	0.28
	Pain score (0-10)	0.0 [0.0-3.0]	0.5 [0.0-2.0]	0.80
	Reporting pain score = 0	65%	68%	0.65
	Passive extension ROM (degrees)	0 [0-0]	0 [0-0]	0.58
	Passive flexion ROM (degrees)	125 [120-130]	125 [120-130]	0.33
	Using ambulatory assist devices	9%	4%	0.15

Data presented as median [interquartile], or otherwise indicated
ROM: range-of-motion

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1314
Medically Challenging Cases (report of up to 4 cases)

Single Shot Caudal in a Five-Year-Old Girl with Arthrogryposis Multiplex Congenita

Megan Friedman, Junping Chen
Icahn School of Medicine at Mout Sinai, St. Luke's-Roosevelt Hospital Center

Introduction

Arthrogryposis multiplex congenita (AMC) is a rare congenital syndrome associated with multiple joint contractures and can also be accompanied by other congenital abnormalities including gastroschisis, cleft palate, genitourinary and cardiac defects, as well as restrictive pulmonary disease. AMC has an incidence of 1 in 3000 live births (1).

In patients with AMC, the contractures alone can present many challenges for administration of anesthesia, including difficult IV access, difficult positioning, difficult airway management secondary to airway involvement, and very challenging regional anesthesia (2). Additionally, there is concern that AMC patients are susceptible to malignant hyperthermia (3). We present the case of a five year old girl with AMC who underwent bilateral posteriomedial clubfoot release with the use of a single shot caudal regional anesthesia technique.

Results/Case report

The patient was a five year old girl who was born premature at 32 weeks and remained intubated for two weeks after birth. She was born with AMC and ileal atresia for which she had previously underwent ileostomy and closure of stoma at one year of age. The patient had multiple contractures of her hands and feet, as well as markedly abnormal curvature of her spine. On airway exam, the patient was a Mallampati class three, demonstrated micrognathia, limited oral opening, and a short, rigid neck.

After mask induction and challenging IV placement, the patient was intubated using direct laryngoscopy, obtaining a Cormack-Lehane grade one view despite very limited oral opening, and a 4.5 microcuff endotracheal tube was placed. Prior to direct laryngoscopy, 30mcg of fentanyl and 60mg propofol were administered intravenously. Despite the predicted difficult airway, the use of succinylcholine was avoided due to concerns that patients with underlying myopathic disorders may exhibit hyperkalemia with the use of succinylcholine (4). The child was intubated so as to secure the airway given the positioning needed for the procedure, which would entail field avoidance as well as an expected surgical time of approximately three hours given the amount of contractures she had. After securing the airway and being under general inhalational anesthesia, the patient was turned to the right lateral decubitus position. A single shot caudal block was performed using 35 mg of .25% isobaric bupivicaine with 15mcg clonidine. Optimal positioning was limited by the patient's anatomy. A continuous caudal, the technique commonly used for this procedure, was not possible given difficulty threading epidural catheter, likely related to the patient’s anatomic abnormalities. The patient was successfully extubated and went to the PACU, moving all extremities and was started on a morphine PCA with her pain well controlled. Post operative day one she was transitioned to liquid oxycodone and discharged home post operative day two.

Discussion

Patients with AMC often have associated cardiac or respiratory abnormalities, and therefore regional anesthesia and a multi-modal narcotic sparing analgesia regimen offers more benefit. The case presented demonstrates successful surgical analgesia using a single shot caudal technique for a child with challenging anatomy secondary to AMC.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1318
Scientific abstract: Case series (5 or more patients)

Ultrasound Guided Percutaneous Injection of Methylene Blue to Identify Nerve Pathology and Guide Surgery

Pedram Aleshi, Joseph Osorio, Jonathan Breshears, Omar Arnaout, Ashley Hastings-Robinson, Michel Kliot
UCSF

Introduction

Peripheral nerve operations rely on the neurosurgeons to identify their desired surgery location using a combination of antomical knowledge and preoperative imaging. Although meticulous surgical technique allows for successful localization of peripheral nerves, conventional methodology in peripheral nerve surgery can lead to extensive exposures, increased operative times and morbidity. The use of methylene blue (MB) is a well-known technique that is used in the field of anatomy and neurophysiology and has been incorporated into the operating room by surgeons for identification of vital anatomical structures. Regional anesthesiologists are experts in identifying nerves using both ultrasound and routinely inject local anesthetics around the nerves. We report a case series, using intraoperative ultrasound and nerve stimulation by a regional anesthesiologist to identify nerves and injection of MB to allow for a more focused and minimally invasive surgical dissection by our neurosurgery colleagues. This is an off label use of MB.

Materials and methods (NA for case report)

A cohort of thirteen patients with varying indications for peripheral nerve surgery were included in this study. A neurophysiologist was involved in all cases for monitoring of indirect and direct nerve stimulation. Under general anesthesia, prior to skin preparation and incision, a regional anesthesiologist performed sonographic nerve mapping of the target nerve. Once the target nerve was localized, an insulated needle was inserted in plane under ultrasound guidance with the nerve stimulator set at 1.0 mA at 2 Hz with confirmatory placement of the needle based on ultrasound guidance relative to the nerve, indirect stimulation of the nerve captured and recorded by the neurophysiologist as well a confirmatory motor response. Once the needle had been directed to the target nerve, 0.1 ml of methylene blue was subsequently injected to demarcate the distal resection cavity and an additional 0.1-0.2 ml of methylene blue was injected as the needle was withdrawn to provide a colorized operative corridor to the target. A small skin incision was made over the needle entrance site, and the blue color dye was used to guide the operative corridor to the nerve of interest and the extent of the incision.

Results/Case report

On all cases the preoperative ultrasound easily identified the nerve and nerve pathology/region of interest. Indirect stimulation of the target nerve, while maintaining direct ultrasound visualization, was confirmed prior to the injection of methylene blue in all cases. A methylene blue colored surgical corridor was created in all cases, and this allowed the surgeon to dissect with confidence towards the target structure(s) quickly and efficiently while minimizing trauma to surrounding tissues.

Discussion

To our knowledge, this is the first study to demonstrate the use of regional anesthesiologists with ultrasound expertise for intraoperative location of nerve and its pathology and using methylene blue as an operative guidance agent. We present a novel technique that provides the peripheral nerve surgeon a helpful tool to plan and execute surgery. It is a technique that uses readily available resources that could be easily implemented to the benefit of many patients with a wide range of peripheral nerve problems.

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Tables/images

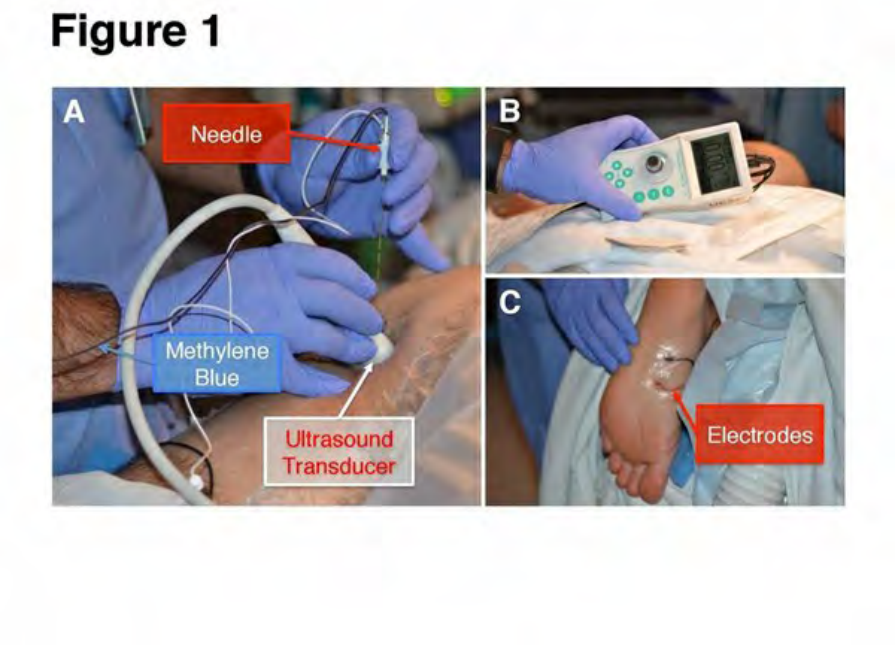

Figure 1

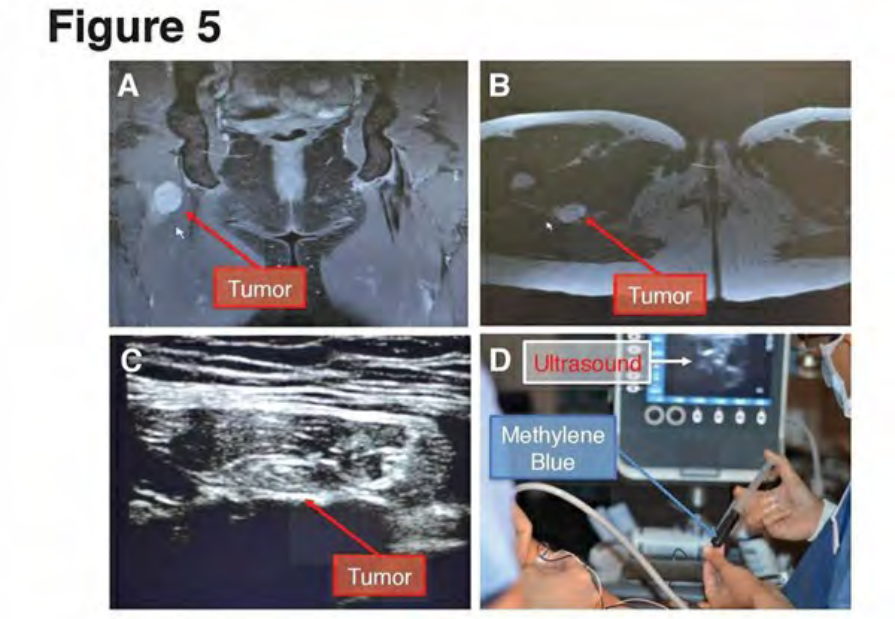

Figure 5

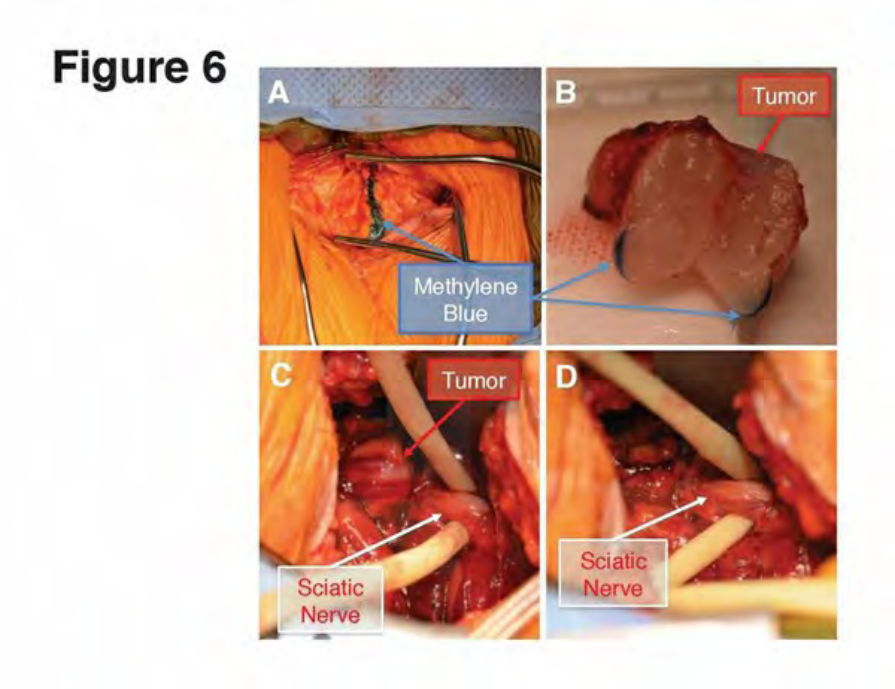

Figure 6

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1320
Medically Challenging Cases (report of up to 4 cases)

Use of Ultrasound to Facilitate Placement of Spinal Anesthetic in a 1.5 kg Infant

Stephen Kelleher, Karen Boretsky
Boston Children's Hospital

Introduction

Th use of ultrasound to facilitate epidural and caudal anesthesia has been described in the pediatric anesthesia literature (1). Ultrasound use for placement of spinal anesthesia has not been studied extensively. We report the use of ultrasound to identify anatomic landmarks, specifically the termination of the spinal cord at the level of the cauda equina, prior to placement of a spinal anesthetic in a 1.5 kg premature infant. Consent to share de-identified case information and images for educational purposes was obtained as part of the patient's anesthesia consent.

Materials and methods (NA for case report)

NA

Results/Case report

A 2 month old ex-27 week 1575g premature infant with a complex medical history was seen for bilateral inguinal hernia repair. After discussion with the surgeon and the patient's mother, a spinal anesthetic was planned. A portable ultrasound machine with a 3.45cm high frequency linear array probe oscillating at 18MHz was used to perform an exam of the patient's spine prior to placement of the spinal. Both a transverse lumbar sonogram (Figure 1) and a longitudinal lumbar sonogram (Figure 2) were obtained. The intervertebral space was identified below the level of the conus medullaris and the level was marked. The depth of dura was estimated at 0.7 cm. After prepping the skin with betadine with the patient held in a seated position, a 1 inch 24 G Quinke spinal needle was placed into the subarachnoid space on the first attempt, confirmed by the egress of clear CSF. 0.2 cc (1.5 mg) of 0.75% bupivacaine in 8.25% dextrose was injected easily. A grade IV block on the Bromage scale (2) was obtained and the patient was swaddled, with special care given not to elevate the lower extremities while prepping. The patient was given sucrose for comfort while the hernia repair was performed. Surgical time was 50 minutes. At the end of the case, the patient began moving her feet spontaneously.

Discussion

Assessment of the neonatal spine using ultrasound allows for identification of anatomical structures including dura, spinal cord, conus medullaris, cauda equina and CSF (Figure 2) (3). The termination of the spinal cord at L2-3 in infants as well as their diminutive size makes identification of an intervertebral space devoid of fixed neural components challenging and imprecise. Ultrasound visualization can be used to identify the exact location of the termination of the cord, potentially increasing safety. Measurement of the depth to dura may also prevent excessive needle insertion depth and therefore reduce risk of injury to the venous plexuses anterior to the spinal cord (1). The use of real time ultrasound has been described in the emergency medicine literature (4) and the interventional radiology literature (5) for lumbar puncture, but using real time ultrasound while placing a spinal anesthetic in an awake, moving infant may be challenging. The information gained by performing a pre-block assessment of the spine prior to administration of a spinal anesthetic, particularly in small patients, may improve the first pass success rate of spinal placement and decrease complications associated with blind needle placement.

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Tables/images

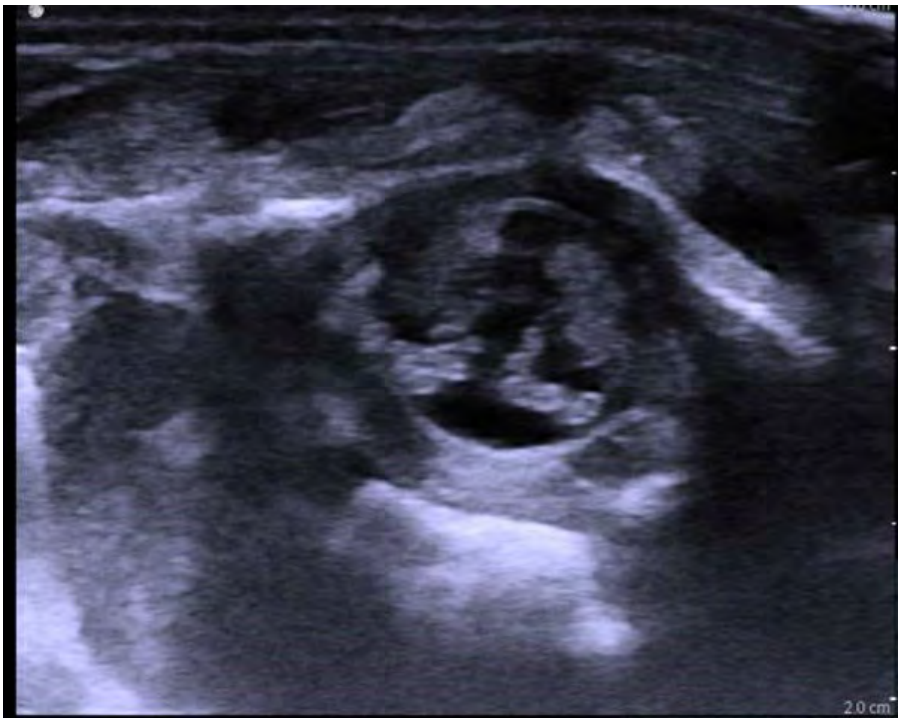

Figure 1: Transverse lumbar sonogram.

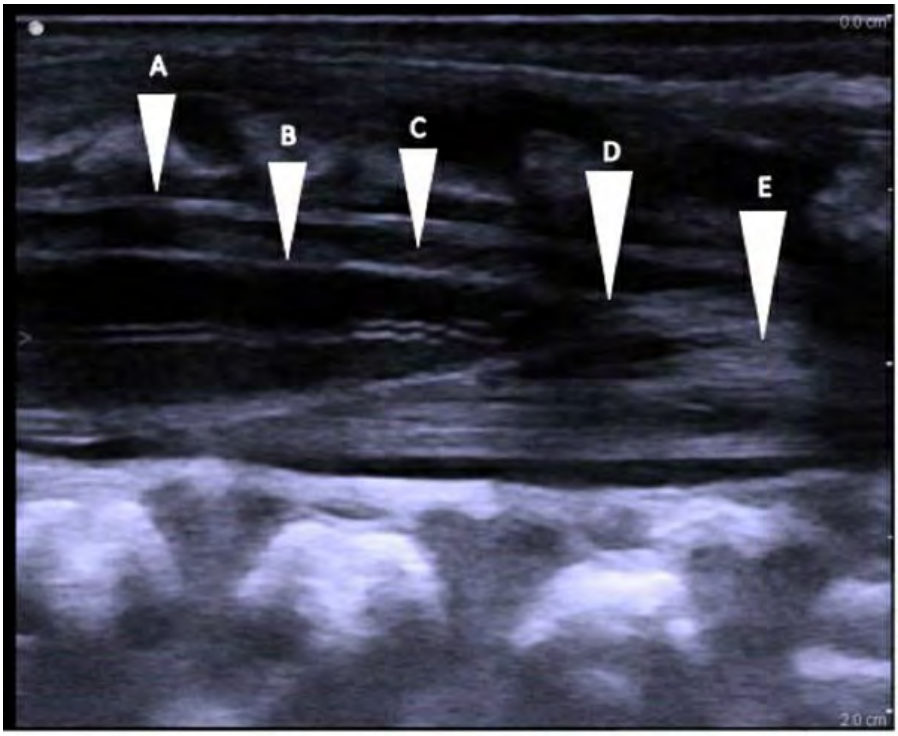

Figure 2: Longitudinal lumbar sonogram. (A) Dura; (B) Spinal Cord; (C) CSF; (D) Conus Terminalis; (E) Cauda Equina.

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
Karen Boretsky, MD is a current consultant for Analogic Corporation; Peabody, MA.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1321
Medically Challenging Cases (report of up to 4 cases)

Fluoroscopically Guided Epidural Blood Patch for Spontaneous CSF Leakage Causing Intracranial Hypotension

Hector Casiano
Medical Science Campus

Introduction

Spontaneous intracranial hypotension (SIH) become recognized with the use of brain magnetic resonance imaging (MRI) with gadolinium. It is caused by spontaneous CSF leakage and can be seen in the absence of trauma or dural puncture. The postural headache is of acute onset and can be accompanied by nausea, vomiting, neck stiffness, tinnitus, and vertigo among other. When SIH is suspected on a brain MRI, radionuclide cisternography and computed tomography (CT) myelography can be used to identify the site of a leak. Even though many cases resolve spontaneously with conservative management, some cases require injection of autologous blood into the epidural space. Some patients may require repeated blood patches.

Results/Case report

A 36 year old male developed fronto-occipital headaches with visual disturbances, neck stiffness, nausea, vomiting and back pain.

The headache worsened while standing and improved in supine. Pain was unrelieved by NSAIDs or opioids. Patient denied fever, trauma, spinal anesthesia or dural puncture. Due to the patient's past medical history of Hodgkin's Lymphoma, he was admitted with a suspicion of malignancy recurrence that was negative. A Brain MRI was performed which revealed diffuse enhancement of pachymeningeal lining consistent with intracranial hypotension. CT myelogram revealed a CSF leak at the eight thoracic level. The diagnosis of SIH was confirmed and due to the refractory nature of the headache, an epidural blood patch was decided upon.

With the patient in prone position the thoracic segment was prepped and draped. The T7-T8 interspinous space was identified under fluoroscopic imaging. 2% Lidocaine was used to anesthetize the subcutaneous tissue. Under fluoroscopic guidance, an 18 gauge Tuohy needle was introduced, and the epidural space identified using loss of resistance to air technique. An autologous mixture of blood and contrast was injected with a total volume of 20 mL. Direct visualization of spread was confirmed and the needle removed.

Patient was discharged home after resolution of symptoms.

Discussion

SIH occurs due to spinal CSF leak, but the cause is unknown. The leak is often located at the root exit site. Different theories state there is an underlying weakness of the spinal meninges.[6] Certain conditions can predispose to developing SIH such as Marfan, Ehler-Danlos, neurofibromatosis and disc disease.[2]

EBP for spontaneous CSF leak is recommended if conservative treatment fails. Success rates range from 35%-77% after single and/or repeated EBP.[2] There are several advantages described when using fluoroscopic guidance. Fluoroscopy makes the epidural puncture easy by visualizing the interspinous space and the direction of the needle insertion. The epidural space can be identified by the administration of contrast medium as well. This decreases the risk of accidental dural puncture as well as the risk of misplacement of autologous blood outside the epidural space. By the administration of a mixture of autologous blood and contrast medium under fluoroscopy, the spread of contrast can be evaluated, and the amount of blood can be titrated to cover the leakage.[3cv]

Recent studies compared the effectiveness of blind versus targeted EBP with a greater success rate when targeted EBP was performed.

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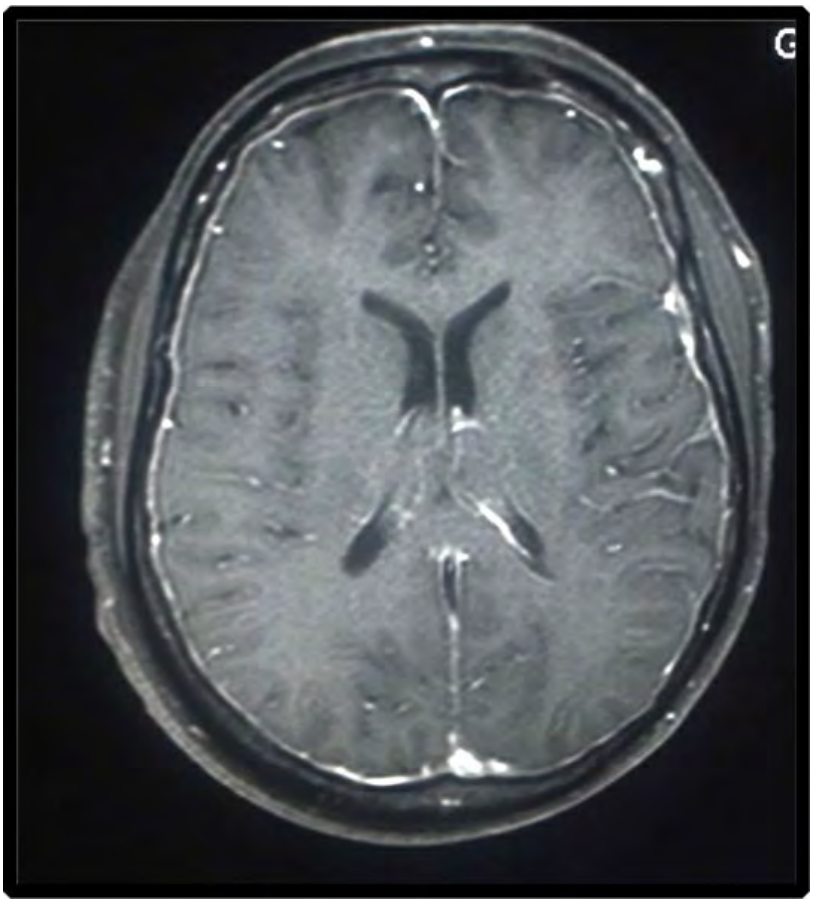
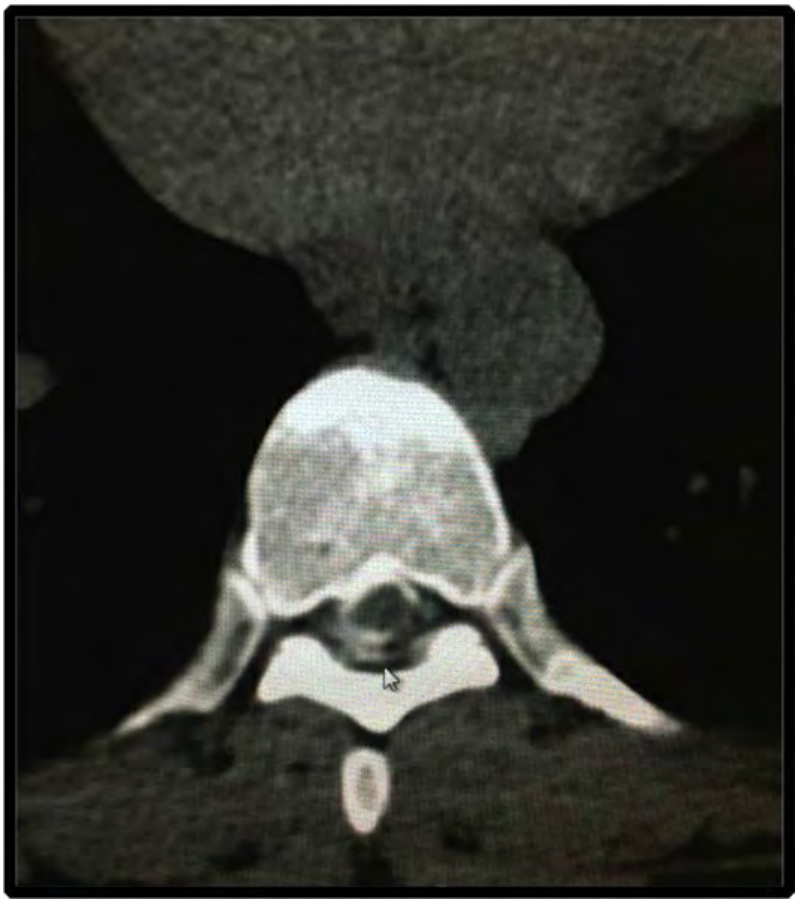
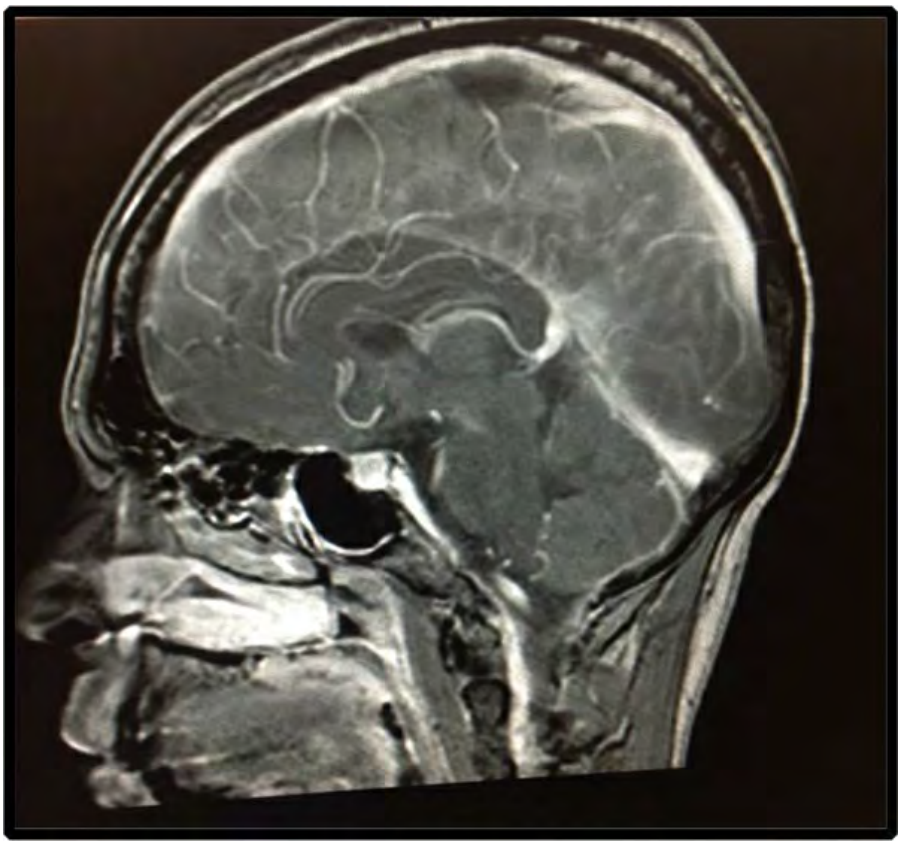
Tables/images







Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1322
Medically Challenging Cases (report of up to 4 cases)

A Low Dose Infusion Infraclavicular Perineural Catheter for a Patient with Both Upper and Lower Extremity Traumatic Injuries

Christina Hardaway, Robyn Landy, Karina Gritsenko
Montefiore Medical Center

Introduction

Advantages cited for continuous peripheral nerve blockade include prolongation of surgical anesthesia, decreased risk for toxicity because of lower incremental doses, postoperative pain relief, and improves physical therapy, mobility, and functional recovery after surgery.

Results/Case report

66 yo F with a PMH of osteoarthritis scheduled for a right hip pinning and right olecraron ORIF secondary to fall. Both procedures were to be performed during the same surgery. The goal was to have the patient be able to ambulate with crutches the following day. Therefore, an infraclavicular nerve block catheter was placed preoperatively using 20cc of 0.5% ropivicaine with 4mg of decadron for prolonged analgesia. Perioperatively, the patient received a spinal with additional sedation and did not need to be converted to general anesthesia for the elbow ORIF (motor/sensory block was adequate). Postoperatively, the patient was started on a continuous perineural 0.2% ropivicaine infusion at 4cc/hr, which was continued at this rate until the next morning. When examined POD#1 the patient had both a sensory and motor block and was very comfortable. Since the goal was to have the patient be able to ambulate that day, the ropivicaine infusion was reduced to 2cc/hr. After lowering the infusion the patient had a continued sensory block with returned motor function. The next couple of days the patient participated in physical therapy with adequate pain control and did very well. The catheter was pulled before discharge.

Discussion

In the above case study we found that a low dose infusion of an infraclavicular perineural catheter allowed for continued sensory block with return of motor function POD #1. The patient was able to actively participate in physical therapy and had adequate pain control. The infraclavicular nerve block accomplishes brachial plexus anesthesia below the level of the clavicle where the axillary vessels and the cords of the brachial plexus lie within the pectoralis muscle. The typical distribution of the block includes the hand, wrist, elbow and distal arm. The first sign of successful block is the loss of muscle coordination within minutes after the injection, followed by sensory, with motor function the first to recover. We initially used a 0.2% Ropivicaine infusion of 4cc/hr and then adjusted the infusion dose to 2cc/hr. Ultimately, this lower dose low infusion rate provided adequate sensory block with preserved motor function for postoperative pain control during postoperative recovery and physical therapy which can be extremely beneficial after a traumatic injury.

References (Maximum 5)

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Nothing to Disclose

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1323
Scientific abstract: Regional anesthesia

Postoperative Pain Relief Following Posterior Placement of a Transversus Abdominal Plane Block

Jacob Fox, Shelly Ferrell, Laura Duling
University of Kentucky

Introduction

The transversus abdominal plane (TAP) nerve block is a well-established method of controlling abdominal wall pain post-operatively. Carney, et al addressed the anatomic spread of local anesthetic using different approaches and needle orientations compared to the traditional nerve block, including a posterior placement.[1] However, there are few case reports of the effectiveness and dermatomal distribution of the posterior TAP block. Furthermore, the difference between a posterior placement and the quadratus lumborum (QL) nerve block is ambiguous. We review the anatomy and clinical application of posterior TAP blocks as well as their differentiation between from the QL block.

Results/Case report

A 42yo female experienced severe deep, osseous, pelvic pain after removal of infected hardware for acetabular fixation. She described left>right, 10/10, unrelenting pain. She was prepped in the left lateral position and the quadratus lumborum and lateral abdominal muscle layers were identified using ultrasound. 30mL 0.5% ropivacaine with 100mcg clonidine was injected in a posteromedial direction between the above mentioned muscle layers. She experienced significant pain relief to 3/10 for 8 hours post operatively.

Discussion

The posterior TAP block is effective at controlling both pelvic and lateral abdominal wall pain post-operatively likely secondary to spread of local anesthetic to the paravertebral space in addition to the TAP plane. Performed with the patient in a lateral position, ultrasound is used to identify the intersection of the quadratus lumborum and lateral abdominal wall muscles. The needle is inserted posterior to the midaxillary line, superficial to the transversalis fascia, and directed medially followed by injection of the local anesthetic. This technique has been shown to deposit local anesthetic primarily in the paravertebral region, with spread cranially to T5 and caudally to L1.[1] In contrast to the posterior TAP, the QL has reportedly been performed both anteriorly in the plane between the peritoneum and QL m. and posteriorly at the junction of the TAP and the QL m.[2,3] Anterior placement of the QL block would almost exclusively offer QL/paravertebral spread, whereas posterior placement of the QL results in hydrodissection of the same plane as the posterior TAP block but significantly less abdominal spread. Clinically, our results have shown effective pain relief in dermatomes as far caudally as L4-L5. We have primarily used this block post operatively in patients complaining of deep abdominal, pelvic, and/or lateral abdominal wall pain in scenarios when neuraxial technique is not possible or desired by the patient. The uniqueness of this approach and volume placement of local anesthetic offers extended posterior coverage in addition to the abdominal wall and should be considered by the astute regional anesthesiologist.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1326
Scientific abstract: Education

Availability and readability of online patient education materials regarding regional anesthesia techniques for perioperative pain management

Gunjan Kumar, Steven K. Howard, Alex Kou, T. Edward Kim, Alexander Butwick, Edward R. Mariano
Stanford University Medical Center

Introduction

Over 80% of adults in the United States use the internet, and 72% of them have searched for health information online in the past year. According to the American Medical Association (AMA), patient education materials (PEM) should be written at a 6th grade reading level or lower. To date, the quality of online PEM related to regional anesthesia has not been reported. We designed this study to evaluate the availability and readability of online PEM related to regional anesthesia and to compare the readability of PEM produced by fellowship and non-fellowship institutions.

Materials and methods (NA for case report)

With IRB exemption, we conducted this descriptive study from July through October 2015. We constructed a cohort of online regional anesthesia PEM by searching websites from North American academic medical centers supporting a regional anesthesiology and acute pain medicine fellowship as listed on the ASRA website and used the Google search engine to identify additional websites with regional anesthesia PEM based on relevant keywords. We included English language PEM greater than 10 sentences from institutions or anesthesiology practices providing patient care. We excluded professional societies, health library articles, and public crowdsourced websites. Readability metrics were calculated from PEM using the TextStat 0.1.4 textual analysis package for Python 2.7 with the primary outcome being Flesch-Kincaid Grade Level (FKGL). We compared 7 other readability metrics (Table) between institutions with and without a fellowship program using Student's t test or the Mann-Whitney U test based on normality of distribution; $p<0.05$ was considered statistically-significant.

Results/Case report

PEM from 17 fellowship and 16 non-fellowship institutions were included in analyses. As a group (n=33) the mean (SD) of FKGL for PEM related to regional anesthesia was grade 12.3 (2.9) compared to the AMA recommended 6th grade level ($p<0.001$). FKGL for the fellowship group was grade 13.8 (2.9) vs. grade 10.8 (1.9) for the non-fellowship group ($p=0.001$). Other results are shown in the Table.

Discussion

The results of this study show that available online PEM related to regional anesthesia for perioperative pain management are well above the AMA recommended reading level. Further, regional anesthesia PEM posted by institutions with fellowship programs are at a higher reading level than PEM posted by non-fellowship institutions.

References

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Tables/images

	Fellowship (n=17)	Non-Fellowship (n=16)	P-Value
Sentence Count	38.1 (32.0)	60.8 (39.4)	0.030
Flesch Reading Ease	36.0 (15.8)	52.4 (10.9)	0.002
Gunning FOG	10.9 (1.5)	9.7 (1.1)	0.018
SMOG	16.0 (2.5)	13.2 (2.3)	0.002
Automated Readability Index	16.0 (3.7)	12.5 (2.2)	0.002
Coleman Liau Index	15.0 (3.1)	12.2 (1.6)	0.003
Linsear Write Formula	12.5 (3.4)	10.5 (3.6)	0.110
Dale Chall Readability Score	9.0 (1.4)	7.8 (0.8)	0.022

Values are reported as mean (standard deviation); FOG (frequency of gobbledygook) = 0.4 x (average number of words per sentence + 100 [number of polysyllabic words / total number of words]); SMOG (simple measure of gobbledygook) = 3.1291 + 1.043 x square root (total number of polysyllabic words x [30 / total number of sentences]).

Table: Sentence count and readability metrics of online regional anesthesia patient education materials.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1327
Scientific abstract: Regional anesthesia

Efficacy of pain control in post-renal transplant patients using transabdominal plane (TAP) nerve block with bupivacaine/liposomal bupivacaine mixture

Christine Lim, Jonathan Danquah, Neal Desai, Nikia Smith, Paul E. Bigeleisen
University of Maryland School of Medicine

Introduction

Transversus Abdominis Plane (TAP) nerve blocks have been shown to be effective in reducing post-operative pain and decreasing opioid consumption following abdominal surgery. However, its efficacy in patients undergoing renal transplantation remains unclear. A liposomal carrier of bupivacaine (Exparel ®) has been shown to provide prolonged reduction of postoperative pain with significant reduction in opioid consumption. Based on previously published studies as well as clinical experience, it was hypothesized that patients who received TAP blocks would have a significant decrease in post-operative opioid consumption in comparison to those who did not.

IRB approval statement: This is to certify that the University of Maryland, Baltimore (UMB) Institutional Review Board (IRB) approved the above referenced protocol entitled, “Efficacy of pain control in post renal transplant patients using transabdominal plane nerve block with bupivicane/liposomal bupivicane mixture”.

Materials and methods (NA for case report)

The study was performed at the University of Maryland Medical Center. All enrolled patients were placed in Group 1 and received an ultrasound guided TAP block after induction using 10 mL of 0.5% bupivacaine as well as 20 mL of liposomal bupivacaine (266 mg). These patients also received a postoperative PCA pump with 0.2 mg/mL hydromophone. Group 2 was the designated control group comprised of eligible patients who received only the PCA pump. Data for Group 2 was collected retrospectively on patients who underwent surgery between May and July of 2015.

Results/Case report

Data for 13 patients in each Group were analyzed via t-test. As shown in Table 2 below, patients in the treatment group have a mean opioid use of 7.57 mg of Dilaudid vs 16.67 mg in the control group (p=0.0240).

Discussion

Postoperative pain management in renal transplant patients remains challenging and unclear. There is no current literature evaluating the efficacy of TAP nerve blocks using a bupivacaine/liposomal bupivacaine mixture in patients undergoing renal transplantation. Although the study performed by Freir et al. in 2012, that proved no changes in postoperative morphine requirements this study shows a statistically significant reduction in opioid consumption. This data will be analyzed after the enrollment of 32 patients total, at which time we will have an 80% power to detect the difference between the groups.

References

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Tables/images

Table 1: Patient characteristics and demographics

	Treatment	Control
Sex		
M	9	8
F	4	5
Total	13	13
Height (cm)		
Mean	175.56	170.56
Range	157.00-187.96	154.00-188.00
Weight (kg)		
Mean	85.3	93.9
Range	54.6-117.8	63.3-117.9
BMI		
Mean	27.7	32.4
Range	19.3-41.2	22.7-39.2
Procedure		
CRT	11	11
Living Donor	2	2
Surgery Duration (hrs:mins:sec)		
Mean	4:16:42	3:27:18

Table 1: patient demographics

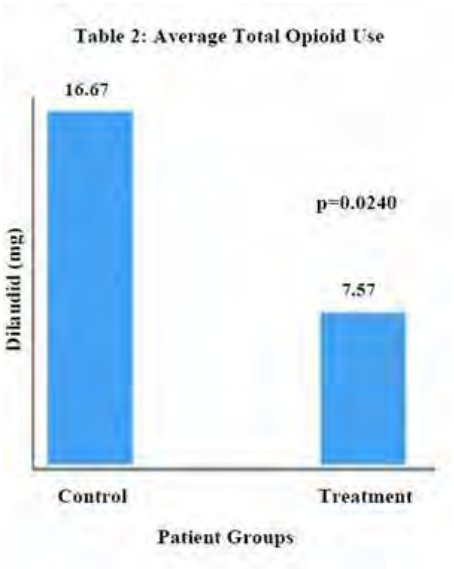

Table 2: control vs treatment group average total opioid use

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1332
Medically Challenging Cases (report of up to 4 cases)

Spinal Anesthesia as a Rescue Anesthetic Alternative After General Anesthesia Induced Cardiovascular Collapse During Repair of Femur Fracture

Britany Raymond, Clifford Bowens
Vanderbilt University Medical Center

Introduction

75 yo female with advanced dementia, coronary disease, and anticoagulation for atrial fibrillation suffered a femur fracture after a fall. She presented for surgical repair, but suffered a cardiac arrest upon induction of general anesthesia. The patient was stabilized and taken back to the OR for a second repair attempt. Spinal anesthesia was performed and surgery was successful.

Results/Case report

PERIOPERATIVE COURSE:

The patient was brought to the OR for a standard induction. General anesthesia was induced with 100 mg lidocaine, 150 mcg fentanyl, 50 mg propofol, and 60 mg of rocuronium. The patient suddenly became bradycardic and hypotensive, which progressed rapidly to an asystolic cardiac arrest. Advanced cardiac life support was initiated with chest compressions and endotracheal intubation. Arterial and large-bore peripheral IV access were obtained while hemodynamics were supported with vasopressors. The patient's heart rhythm converted to ventricular tachycardia and she was defibrillated x 2 with return of spontaneous circulation. Transesophageal echocardiogram demonstrated an ejection fraction of 15-25% with hypokinetic wall motion in the LAD and RCA territories. She was taken emergently to the catheterization lab and was found to have severe three-vessel disease without an intervenable lesion. The patient was medically optimized and transferred to the cardiac intensive care unit.

On postoperative day 1, she remained intubated but hemodynamically stable. She was at her baseline neurologic function, and her family wanted to proceed with surgery.

The following day she was taken back to the OR. A right internal jugular central line was placed. Since rivaroxaban had not been given for three days, she was a candidate for neuraxial anesthesia based upon the guidelines of the American Society of Regional and Pain Medicine Anesthesia. She was placed in the right decubitus position and a spinal anesthetic was performed via a left paramedian approach in the L3-L4 interspace. The surgery was completed successfully and the patient was extubated and weaned off vasopressors the following day.

Discussion

Learning Points:

Perform Perioperative Cardiac Risk Evaluation (1):

Figure 1

Indications for preop electrocardiogram (EKG):

- Low risk surgeries- never indicated
- Moderate/high risk surgeries- consider for asymptomatic patients; reasonable to obtain for those with known heart disease.

Indications for preop echocardiogram (echo)-

- Patients with heart disease- obtain if there has been a change in clinical status, or if cardiac function has not been evaluated within the past year

- Dyspnea of unknown origin

Compare Safety Profile of General vs. Spinal Anesthesia:

Regional anesthesia has traditionally been associated with decreased risk of thromboembolism, cardiovascular events, blood transfusion, and respiratory complications over general anesthesia (2). However, more recent data is more neutral.

Table 1 (4).
Authors from this review concluded the data was insufficient to establish outcome differences with the exception of delirium.

A 2015 retrospective cohort study involving 56,729 elderly patients undergoing hip fracture repair found no difference in 30 day mortality, but a reduced length of stay by 0.6 days with regional anesthesia (3).

Identify Challenges of Regional in the Elderly:

Figure 2 (5)
The population of elderly surgical candidates is growing exponentially, and we must appreciate their distinct anatomic, physiologic, and pharmacologic traits.

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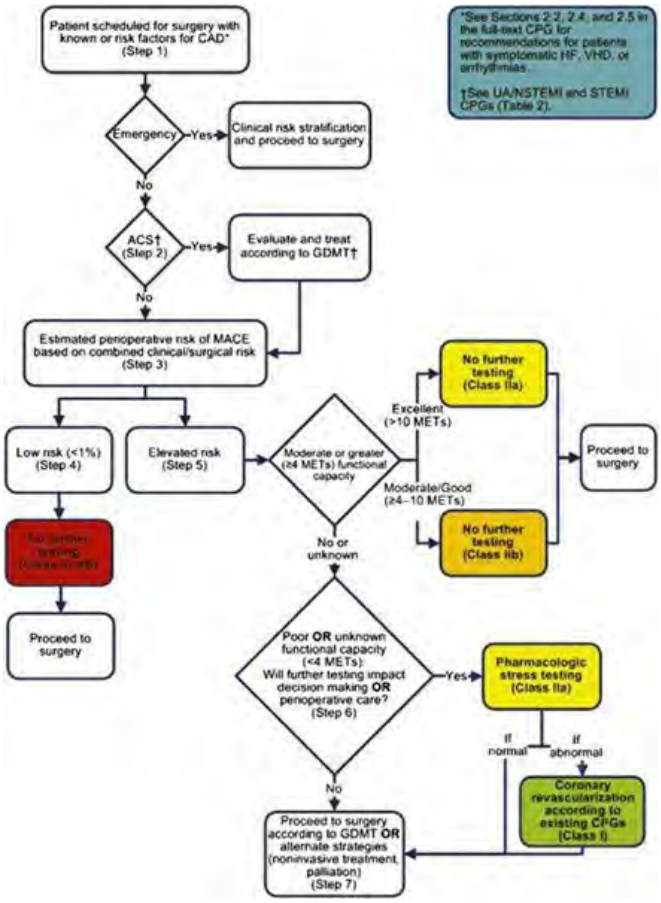
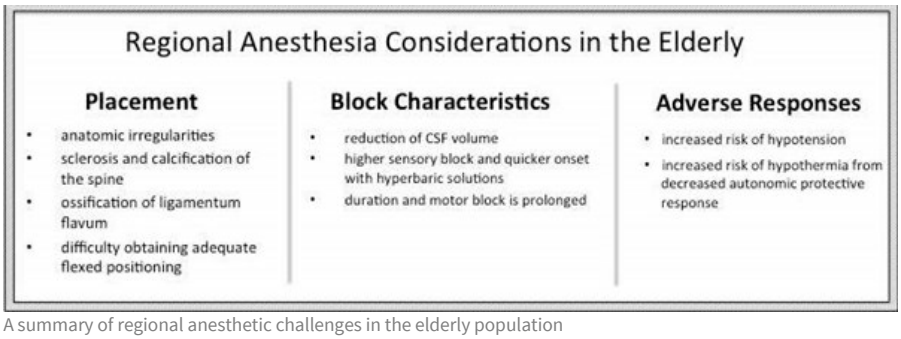
Tables/images



2014 ACC/AHA Task Force Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery

Outcome	Regional Incidence	General Incidence	Relative Risk (95% CI)
Early mortality, <1 month	7%	9.60%	RR 0.73 (0.54-0.99)
Mortality at 1 month	6.90%	10%	RR 0.69 (0.5-0.95)
Length of stay	108 days	110 days	N/A
Vomiting	4.30%	6.10%	RR 0.7 (0.12-3.94)
Delirium	9.40%	19.20%	RR 0.5 (0.26-0.95)
Pneumonia	3.70%	4.70%	RR 0.76 (0.44-1.3)
Myocardial infarction	1%	2.10%	RR 0.55 (0.22-1.37)
Pulmonary embolism	1.50%	2%	RR 0.88 (0.32-2.39)
Deep vein thrombosis	30.20%	36.90%	RR 0.64 (0.48-0.86)

Summary of outcomes from Cochrane Review Database of 22 RCTs



A summary of regional anesthetic challenges in the elderly population

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1333
Scientific abstract: Regional anesthesia

A retrospective review of lumbar epidural and lumbar plexus nerve blocks for patients undergoing primary total hip arthroplasty and receiving multimodal analgesics

Steven Aho
Medical University of South Carolina

Introduction

Total hip arthroplasty (THA) is associated with significant postoperative pain. Both lumbar epidurals and lumbar plexus nerve blocks (LPNB) have been described for postoperative pain control after THA [1-4], but existing studies have not compared these techniques.

Materials and methods (NA for case report)

After institutional review board approval, a retrospective cohort of 48 patients meeting inclusion criteria was randomly selected using electronic medical records. All received perioperative oral multimodal analgesia. Half (n=24) received epidurals for postoperative pain management and the other half (n=24) received single injection LPNB.

Postoperative opiate consumption in morphine equivalents (ME) at 48 hours was the primary endpoint. Time to first ambulation, ambulation distance, level of assistance with ambulation, and time to discharge orders were secondary endpoints. Descriptive statistics were calculated to characterize subjects in the different block type groups. Comparisons in opiate consumption were evaluated with linear mixed models. Primary and secondary endpoints were examined in multivariable models.

Results/Case report

The variables considered in the multivariable model include total ME given in the OR, age, block type, time, and the interaction between block type and time. Significant differences existed between block types at 36 and 48 hours. Patients with an epidural consumed 62% more morphine between 24-36 hours than patients with a LPNB after controlling for amount of morphine received in the OR ($P = 0.037$, 95% CI = 4.4-119%). Patients with an epidural consumed 69% more morphine between 36-48 hours than patients with a LPNB after controlling for amount of morphine received in the OR ($P = 0.020$, 95% CI = 11.4-126%).

Time to first ambulation was significantly associated with the block type received and presence of dizziness within the first 24 hours postoperatively ($P = 0.043$ and 0.014, respectively). After controlling for dizziness, patients that received an epidural ambulated 7.4 hours later. Distance ambulated, level of assistance with ambulation, and time to discharge orders did not differ between groups.

Discussion

This retrospective study comparing lumbar and LPNBs for primary THA demonstrated that opiate consumption was similar between the two groups for the first 24 hours postoperatively. However, the LPNB group consumed less ME from hours 24-48 and ambulated earlier. These findings suggest that LPNBs provide comparable analgesia to lumbar epidurals for the first 24 hours after THA. Additionally, VTE prophylaxis initiation required epidural catheter removal on postoperative day one resulting in a substantial increase in opiate consumption. Since early postoperative physical therapy has been demonstrated as an important factor for continued rehabilitative success after THA, secondary endpoints related to functional recovery were examined. Patients receiving LPNBs were found to ambulate earlier than patients with epidurals and this persisted after controlling for dizziness. Compared with lumbar epidurals, LPNBs can provide effective analgesia for THA, avoid anticoagulation conflicts with VTE prophylaxis, and promote functional rehabilitation.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1335
Scientific abstract: Regional anesthesia

Using regional anesthesia to reduce postoperative pulmonary complications in a patient with COPD

Ajitpal Grewal, Rafik Tadros
Allegheny Health Network

Introduction

Even though no large studies exist when comparing the effects of general anesthesia (GA) vs neuraxial anesthesia on postoperative pulmonary complications (PPC), we present a case of closed reduction of percutaneous pinning (CRPP) of left femur neck where anesthetic plan was changed from GA to lumbar epidural in order to reduce PPC.

Results/Case report

A 68 year old female with past medical history significant for severe pulmonary hypertension (peak systolic pressure of 68 mmHg), severe chronic obstructive pulmonary disease (COPD) (GOLD grade IV), oxygen dependent on 4 liters, and multiple admissions for respiratory failure leading to tracheostomy for two months presented to the emergency room after a fall sustaining a left femoral neck fracture. Patient was taken to the operating room on day 2 for CRRP of left femur neck.

Given the history of respiratory failure with multiple risk factors, discussed below, the anesthetic plan was changed from GA to lumbar epidural. A lumbar epidural was placed preoperatively, and surgery was done using minimal sedation (Propofol 20 mcg/kg/min). Post-operatively, patient had acute on chronic hypercapnic respiratory failure based on arterial blood gas (pCO_2 of 98). Patient's hypercapnea slowly resolved with the use of BiPAP in post anesthesia care unit (PACU). In conjunction with the surgical team, it was decided to use the lumbar epidural post-operatively as the sole means of providing pain relief as patient would not tolerate systemic opioids.

The lumbar epidural provided adequate pain relief for three days postoperatively, with the patient complaining of minimum pain (VAS of 2 with movement). The patient's respiratory status improved during the course of hospitalization and patient was discharged to rehab center on postoperative day 11.

Discussion

This patient carries multiple risk factors for PPC, which are as follows with the odds ratio of PPC: American Society of Anesthesiologist (ASA) classification of 4 (odds ratio [OR] 4.87; 95% confidence interval [CI], 3.34-7.10), COPD (OR, 1.79; CI, 1.44-2.22), advanced age (OR, 2.09; CI, 1.65-2.64), partial functional dependence (OR, 1.65; CI, 1.36-2.01), and plan for GA (OR, 1.83; CI, 1.35-2.46). Based on the guideline from the American College of Physicians (ACP), these risk factors carry a strength recommendation of A and would likely increase the chances of patient requiring prolong intubation, which in itself increases PPC. Based on patient's multiple risk factors, clinicians focused on minimizing PPC by changing the anesthetic plan from GA to neuraxial anesthesia (lumbar epidural). Additionally, lumbar epidural has been shown to play a key role in providing pain relief during hip surgeries in conjunction with systemic opioid use. Most of the studies comparing the two favor epidural for pain relief. In this case, the lumbar epidural was used as sole modality for analgesia post-operatively. Even though no large studies exists comparing the effects of neuraxial anesthetic vs GA in lowering PPC, physicians must consider regional anesthesia as an alternative to GA when developing their anesthetic plan to lower intraoperative and postoperative PPCs and to provide adequate analgesia postoperatively.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1338
Scientific abstract: Regional anesthesia

One-Year Analysis of Neurologic Symptoms after Peripheral Nerve Blocks

Sam Nia, Eric Schwenk, Richard Epstein
Sidney Kimmel Medical College at Thomas Jefferson University

Introduction

Peripheral nerve block complications, such as nerve injury, occur rarely. We created an electronic database to track possible nerve injuries after nerve blocks, including all block types performed at our hospital. We analyzed our data after one year.

Materials and methods (NA for case report)

This was a retrospective, quality improvement initiative taken by the regional division in the anesthesiology department at Thomas Jefferson University Hospital. The Regional Anesthesia Management System (RAMS) program was implemented in August 2014 using LiquidOffice™ software. Of the more than 500 patients who received a block, data were entered on 464 patients. Blocks included interscalene, supraclavicular, infraclavicular, femoral, sciatic, pectoralis, and transversus abdominus plane (TAP) blocks. The following were collected: surgery performed, preoperative pain scores (0-10), presence of pre-existing neuropathy, block type, local anesthetic dose, and complications (hematoma, intravascular catheter placement, paresthesias). Patients were called postoperatively by anesthesia attendings, residents, or medical students; presence or absence of numbness, tingling, or weakness in block anatomical distribution; and patient satisfaction with block/catheter. All RAMS entries from September 2014 to November 2015 were analyzed using Microsoft SQL software. Extracted data included presence of numbness, tingling, and weakness in the nerve block distribution; the number of patient phone contacts attempted; and the number of patients reached. Delayed symptoms were defined as symptoms not present at 1 week but present at 3 months; persistent symptoms were defined as being present at both intervals.

Results/Case report

Of the 464 patients included, 428 were contacted by phone at least once. From this group, 259 had data at 1 week postoperatively and 33 (12.7%) reported numbness. Similarly, 107 were evaluated at 3 months, with 27 (25.2%) reporting numbness.

Two hundred forty-eight patients had data on tingling at 1 week with 23 (9.3%) reporting this. One hundred two patients were evaluated at 3 months and 12 (11.8%) reported tingling.

Two hundred sixty-four patients were evaluated for weakness at 1 week. Three patients (1.2%) experienced this. At 3 months, the 103 patients evaluated had 5 (4.9%) with weakness.

For all complications, the number of patients reached at 1 week was greater than the number reached at 3 months.

Delayed and persistent numbness, tingling, and weakness were analyzed and are described in Table 1.

Discussion

Our database suggests a surprisingly high occurrence of neurological symptoms after nerve blocks. Our incidence of both persistent numbness and tingling was higher than the published incidence of nerve injury(0.4 per 1000 blocks);[1] however, not all cases in our database were confirmed nerve injuries. The reason for the relatively high incidence of delayed numbness and tingling is not clear. A strength of this database is the inclusion of many block types and the prospective recording of data. Future efforts will analyze the relationship of persistent neurological symptoms to block type and surgery, as well as the chronic pain incidence and patient satisfaction after peripheral nerve blockade.

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Tables/images

Table 1. Delayed and Persistent Neurological Symptoms in Patients Who Received Peripheral Nerve Blocks.

	Numbness	Tingling	Weakness
Total Patients Contacted, N	48	42	41
Delayed Symptoms, N (%) 95% binomial CI	9 (18.8) (8.95 to 32.63)	6 (14.3) (5.43 to 28.54)	3 (7.3) (1.53 to 19.92)
Persistent Symptoms, N (%) 95% binomial CI	3 (6.25) (1.31 to 17.20)	1 (2.4) (0.06 to 12.57)	0 (0) (0.0 to 8.60)

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1339
Medically Challenging Cases (report of up to 4 cases)

Application of Nerve Block to Facilitate Traumatic Joint Manipulation and the Following Physical Therapy at the Home

Hui Yuan, Anjali Patel, Jermey Chastain, Joseph Folz
St. Louis University Hospital

Introduction

Traumatic joints injury cause severe physical disability among the patients with injury. Commonly the patient requires intensive physical therapy and joint manipulations under general anesthesia. Here we report that the combination of single and continuous nerve block facilitates surgical joint manipulation and the following physical therapy at home in the patients with severe traumatic joint injury.

Results/Case report

Two patients each received a single shot femoral nerve block with 0.5% bupivicaine and indwelling adductor canal catheters with 0.2% ropivicaine for joint manipulation in the operating room along with monitored anesthesia care. Patients were discharged with catheters and followed up with physical therapy at home. Both patients had improved range of motion in the operating room as well as home. Patient 1 had increased in range of motion to 125 degrees in the OR while patient 2 had improvement to 130 degree. Both patients experienced minimal pain post operatively as well as at home. The catheters were kept in place for 3 days.

Discussion

Traumatic joint injury can result in significant pain and disability. Patients with these injuries are often brought to the OR to improve range of motion so they may progress in physical therapy. These patients benefit from peripheral nerve block, typically femoral nerve block, for pain control. We have found that a dense femoral nerve can help with joint manipulation in the operating, while avoiding general anesthesia. We have also found that the addition of an adductor canal catheter helped with improvements in range of motion and pain control while continuing home physical therapy. Adductor canal catheters as opposed to femoral nerve catheters help to preserve quadriceps strength to allow for active physical therapy.

We have shown that the combination of a dense femoral nerve block and adductor canal catheter can help patients with joint injuries avoid general anesthesia for manipulation in the operating as well as continue to help with improvement in the physical therapy, pain satisfaction, all while preserving quadriceps function.

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Tables/images

Patient 2, post-op flexion with assistance of therapist

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1341
Scientific abstract: Regional anesthesia

Dermatomal skipping after paravertebral block with liposomal bupivacaine

Elizabeth Van Cott, Jason Longwell

Introduction

Increasing evidence suggests that regional anesthesia may decrease the risk of cancer recurrence and chronic pain. Specifically, paravertebral blocks (PVB) are being utilized more often for breast cancer surgery; numerous studies have shown positive benefits[1]. Liposomal bupivacaine has been approved for infiltration techniques. It has not been approved for peripheral nerve blocks, but several case reports show improved pain control when using liposomal bupivacaine off-label. We present a case of bilateral PVB performed with liposomal bupivacaine for mastectomy that resulted in inadequate pain control, possibly secondary to poor spread in the paravertebral space.

Results/Case report

A 42 year-old female with grade 2 ER+/PR+ DCIS of the right breast presented for needle localized biopsy. Preoperatively, right T2, T3, and T4 PVBs were performed using anatomic landmarks; 7 milliliters of 0.5% ropivacaine were injected at each level. She was satisfied with her pain control. One month later, she presented for repeat excision secondary to positive margins. No block was performed; overall, she was less satisfied with her pain control. Pathology again revealed positive margins, and she returned for a bilateral mastectomy with right SLNB. Pre-operatively, bilateral T1, T3, T5, and T7 PVB were performed. Five milliliters of equal parts liposomal bupivacaine and 0.5% bupivacaine were injected at each level. Her PACU pain score was 8/10. On exam, she had decreased sensation to sharp touch in T1, T3, and T5 bilaterally, with complete sparing of the dermatomes in between. These findings were reproduced on POD#1 with a neurological pinwheel.

Discussion

Liposomal bupivacaine is a new addition to the arsenal of local anesthetics available for regional anesthesia. Although not FDA approved for this use, there are mounting case reports describing its use in this manner. One case series showed excellent pain control when single-shot PVBs were performed at T2, T4, and T6 prior to mastectomy for breast cancer[2]. While we performed our block similarly to those described (every other dermatome), our case is unique in the dermatomal skipping. In our experience, injections of typical local anesthetics at every other thoracic level result in adequate sensory blockade of the neighboring dermatomes as well. We hypothesize that the viscosity of liposomal bupivacaine prevented its spread to adjacent dermatomes. Techniques using larger volumes of diluted liposomal bupivacaine have been reported with various degrees of success; the case series referenced above is among these and seemed to have better outcomes. However, when using larger volumes, care must be used to avoid epidural spread and to ensure that a dense enough blockade is obtained to reap the benefits of opioid sparing techniques. Further studies are needed to elucidate the efficacy and optimal dose of liposomal bupivacaine for PVB in breast cancer surgery. Chronic pain is a frequent morbidity of these surgeries, and improved methods of pain control could be of benefit.

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Consent for publication was granted by the patient and Naval Medical Center Portsmouth.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1347
Scientific abstract: Education

Sonoanatomy Course for First-Year Medical Students Allows Early Exposure to Anesthesiology as a Career.

Andrew Curtis, Brooke Baker, Mary Billstrand, Randy Rosett, Rebecca Hartley
University of New Mexico

Introduction

Recruiting medical students to anesthesiology is an issue that all anesthesiology residencies must deal with. Studies have shown that clinical exposure is an important factor in specialty interest [1,2]. Unfortunately, many medical schools do not allow rotations in anesthesiology until the medical student's final year. At that point many have chosen their career path and have begun applications to other fields. Many anesthesiology departments are looking for ways to access medical students earlier in their medical education.

Our department at the University of New Mexico has found one way to access our students earlier. Research has noted that students enjoy using ultrasound technology [3] and that teaching anatomy by ultrasound is “a highly effective method for facilitating student learning and significantly enhances knowledge of living clinical anatomy” [4].

In 2011 the School of Medicine introduced a new adjunct course to the anatomy block for first-year med students. Anatomy by live ultrasound, or sonoanatomy, is taught by members of our anesthesiology department, as well as members of the departments of emergency medicine and obstetrics. Students are required to attend and questions on their exams reflect what they should have learned during the sonoanatomy lectures. In addition, students are offered the opportunity come to our outpatient surgery center and watch anesthesiologists using ultrasound machines to place regional blocks in the preoperative area.

We contend that participation in this sonoanatomy course is an avenue to introduce anesthesiology to the new students who may never had considered it and generate interest in those participants.

Materials and methods (NA for case report)

After IRB approval, an electronic survey was emailed to first and second year medical students at the University Of New Mexico School Of Medicine. Questionnaires were given to these medical students upon completion of their anatomy blocks. Data was stripped of identifying markers.

Results/Case report

40% of 218 students responded to the electronic survey. 93% of respondents reported participating in the sonoanatomy course. 71% of respondents had not considered anesthesiology as a career upon entering medical school. For 79% of respondents the sonoanatomy course was their first experience with an anesthesiologist. Of the respondents who had not considered anesthesiology as a career, 20% reported increased interest in the field after completing the course. None of the students accepted our invitation to come to our outpatient surgery center to observe live ultrasound use, although since participating in our survey, a handful of students have requested the opportunity to visit.

Discussion

We feel that we have found a productive avenue to access of medical students early in their education. Ultrasound technology is used in a wide variety of fields and has led to an increased interest among medical students. We as anesthesiologists, who are experts in ultrasound, should take advantage of this interest. At UNM, an ultrasound interest group among medical students is mentored by an anesthesiologist. We recommend participating in medical students early education as sonoanatomy instructors as a way to expose them to anesthesiology as a career choice.

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Tables/images

UNM anesthesiology faculty working with medical students and professional anatomy model.

UNM anesthesiology faculty showing brachial plexus by ultrasound to medical students on a professional model

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1349
Scientific abstract: Acute pain

Local Infiltration Analgesia for Posterior Knee Pain Following ACL surgery with Hamstring Autograft

Rohit Y. Rahangdale, Rahul Reddy
Northwestern University of Feinberg School of Medicine

Introduction

Femoral and adductor canal blocks are commonly used to provide postoperative analgesia for anterior cruciate ligament (ACL) reconstruction surgery. The limitation of these blocks is the incomplete analgesia they provide of the knee joint. This may lead to the patient experiencing significant posterior knee pain when a hamstring autograft is used. A rescue sciatic nerve block may provide complete analgesia, however the associated motor blockade may make ambulation in the postoperative period more difficult. The use of ultrasound guided (USG) local infiltration analgesia (LIA) in lieu of a sciatic nerve block may spare motor function and provide analgesia to the posterior knee. The use of LIA, however, has not been evaluated in the arthroscopy population. The purpose of this study was to assess postoperative outcomes following ultrasound-guided LIA compared to an ultrasound-guided sham block for patients undergoing ACL reconstruction with hamstring autograft.

Materials and methods (NA for case report)

Following IRB approval, written informed consent was obtained from adult patients (>18 y/o) undergoing elective ACL reconstruction with hamstring autograft. All patients received a preoperative adductor canal block with 20mL of 0.5% bupivacaine + 1:300k epinephrine. Subjects were randomized into Group 1 (USG-LIA blockade with 30mL of 0.2% bupivacaine + 1:300K epi) or Group 2 (USG-sham blockade with 30 mL of preservative free normal saline). The needle insertion was at the level of the femoral condyles, in a medial to lateral direction, between the popliteal artery and capsule of the knee. All blocks were placed pre-operatively. Patients received prn oral analgesia and IV narcotic for breakthrough pain only. Time to first report of pain behind the knee, quality of recovery (QoR15), overall patient satisfaction between groups, opioid consumption was compared using the Kruskal-Wallis H test.

Results/Case report

18 (8M/10F) patients completed the study. Patient demographics were similar among groups. Intraoperative narcotic use was identical per protocol in both groups. Reported pain scores behind the knee upon arrival to PACU were less in group 1 (LIA): 0(0-3) compared to group 2 (saline): 7(5-8), *P*=0.009. Reported pain scores behind the knee were less at the time of Phase 1 discharge and 24 hours in Group 1 (LIA) compared to Group 2 (saline), but did not reach statistical significance. Narcotic consumption was lower in Group 1 (LIA) compared to Group 2 (saline) at the time of Phase 1 and 2 discharge and at 24 hours, but again did not reach statistical significance. The quality of recovery at 24hrs following surgery was not different among groups. (Fig 1)

Discussion

Our initial findings show that USG- LIA between the popliteal artery and the capsule of the knee did not reduce pain or opioid consumption in the postoperative period following ACL repair with hamstring autograft in a statistically meaningful way. The lack of a difference amongst groups may be due to our small sample size. Additionally it is possible that there exists a washout effect of pre-operatively injected local anesthetic from the arthroscopic irrigation solution used intraoperatively. Future studies evaluating the use of USG-LIA performed in the operating room immediately postoperatively may be warranted.

References

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Tables/images

	Group1 LIA (n=8)	Group 2 Normal Saline (n=10)	P
Age (y)	25(24-32)	29(23-38)	0.47
Weight (kg)	75(66-83)	82(75-90)	0.62
Height (in)	68(64-70)	67(66-68)	0.72
Gender (n, %)			
Male	4 (50)	4 (40)	1.00
Female	4 (50)	6 (60)	0.82
Pain (NRS 0-10)			
Preoperative baseline	0.5(0-1.5)	1(0-5)	0.37
Upon arrival to PACU			
Global	5(3-7)	7(5-8)	0.18
Behind the knee	0(0-3)	7(5-8)	0.009
Phase 1 recovery discharge			
Global	5(4-7)	5(4-7)	0.93
Behind the knee	4(2-5)	5(1-6)	0.59
24hr Global pain (AUC)†			
At rest	102(58-160)	135(112-146)	0.40
Plantar flexion	115(50-182)	128(96-144)	0.82
Behind the knee (AUC)†			
At rest	92(47-147)	118(76-146)	0.86
Plantar flexion	100(41-167)	106(76-142)	0.89
Morphine use (mEq)			
Intraoperative Fentanyl (mcg)	200(163-263)	200(125-250)	0.93
Phase 1 Recovery	30(19-30)	42(23-60)	0.24
Phase 2 Recovery	10(7.5-10)	15(5-20)	0.40
24 hour	50(40-70)	70(50-80)	0.18
Quality of Recovery (QoR-15)			
Preoperative baseline	139(136-142)	130(127-142)	0.10
24hr	96(84-110)	102(80-114)	0.82
Difference in total score	40(32-56)	28(23-44)	0.18
Time to phase 1 discharge (min)	70(65-73)	78(65-95)	0.39
24hr side effects*			
Nausea	2,1,3	2,3,1	0.64
Vomiting	1,1,0	0,0,1	0.49
Patient Satisfaction (0-10)			
Pain control	8(7-8)	8(6-10)	0.78

Data presented as median (interquartile range). NRS= numerical rating scale. All reported P values are two-tailed. †=Area under the curve for pain measurements: possible range is 0-190. * Likert scale of mild, moderate, and severe reported as n.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1350
Scientific abstract: Regional anesthesia

A comparison of opioid vs. non-opioid containing epidural solutions on the incidence of opioid related side effects.

Kareem Aggour, Scott Byram, Sarah Strowd, Patti Murray
Loyola University Medical Center

Introduction

Thoracic epidural anesthesia (TEA) has become one of the most extensively utilized and versatile regional anesthetic techniques. It is a popular method for postoperative analgesia in numerous surgical procedures. TEA has been consistently shown to provide excellent pain relief, facilitate early extubation, ambulation, oral intake and gastrointestinal function, to attenuate the stress response, and improve postoperative pulmonary function.

Many different epidural solutions are available. An opioid containing solution has the benefit of activating spinal mu receptors and thus augmenting the local anesthetic block at the level of the cord. A plain local anesthetic solution may provide adequate pain control on its own and thereby negate some common side effects of opioids including nausea and vomiting, ileus/constipation, urinary retention, pruritus, respiratory depression, and sedation. However, if a plain local anesthetic solution is used, the patient may also require parenteral opioids and therefore side effects may also occur.

We compared the incidence of post operative ileus and urinary retention with opioid containing epidural solution versus plain local anesthetic solution.

Materials and methods (NA for case report)

After obtaining IRB approval, we conducted a retrospective analysis of 107 patients who received TEA for post operative analgesia for colorectal, hepatobiliary, gynecological and urological procedures. Of these patients, 55 received a solution containing hydromorphone 10 mcg/ml with bupivicaine 0.1% and 52 patients received plain 0.2% ropivacaine.

Results/Case report

55 patients received an opioid containing epidural solution. Five patients experienced urinary retention (9%) and three experienced post operative ileus (5%).

52 patients received 0.2% ropivacaine. One experienced urinary retention (2%) and three experienced postoperative ileus (6%). None of the patients had both occur in either group.

Discussion

The results of this study show that there is no significant difference in either postoperative ileus ($P = 0.861$) or urinary retention ($P = 0.113$) in patients receiving opioid containing thoracic epidurals.

Postoperative ileus, the most common complication after colon surgery, can interfere with resumption of diet, hospital discharge, and time to restoration of full activities. Contributors to intestinal hypomotility include pain, increased sympathetic tone, use of systemic opioids and intestinal neuroinflammatory processes. TEA has been shown to decrease sympathetic tone, thus allowing unopposed parasympathetic tone and promoting peristalsis. TEA has also been shown to increase intestinal mucosal capillary blood flow leading to improved anastomotic healing.

Urinary retention induced by epidural opioids is likely related to interaction with opioid receptors located in the sacral spinal cord. This interaction promotes inhibition of sacral parasympathetic system outflow causing detrusor muscle relaxation and an increase in maximal bladder capacity.

The level of urinary retention is likely dose-dependent and more common if the opioid is administered intrathecally. Some studies suggest that urinary retention is more common with the use of morphine and less common with more lipophilic opioids because systemic absorption is faster with lipophilic opioids and thus less time is spent inhibiting sacral innervation of urinary function.

The low incidence of patients experiencing micturition and intestinal motility problems with epidural opioids suggests that the benefit of a multimodal approach may have advantages in providing superior pain relief with minimal side effects.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1353
Scientific abstract: Chronic pain

Fluoroscopy-guided pudendal nerve blocks in the treatment of chronic pelvic pain – a single center outcomes evaluation

Tracy Burns, Padma Gulur, Esther Banh, Michael-David Calderon
University of California, Irvine

Introduction

In the United States, Chronic Pelvic Pain represents 10% of all ambulatory referrals to a gynecologist (1). Management is challenging and includes pharmacotherapy, psychophysiological therapy, and peripheral nerve blocks including the pudendal nerve block (PNB). Commonly performed via a blind transvaginal approach for labor analgesia, they are an increasingly utilized part of multidisciplinary treatment plans (2). More recently, a fluoroscopy-guided, transgluteal approach has been described (3, 4). Current literature demonstrating effectiveness of this approach is limited. The purpose of the present investigation was to explore patient outcomes after receiving fluoroscopy-guided pudendal nerve blocks.

Materials and methods (NA for case report)

We conducted a retrospective chart review of patients who received fluoroscopy-guided PNB at our pain center from February 2010 through November 2015. Pain scores and opioid medication usage before and after PNB were evaluated to ascertain effectiveness. Oral morphine equivalence was determined for opioid medication use in the sample population (5). Effectiveness of the blocks was considered a decrease in reported pain scores and opioid medication usage. Our institutional review board approved this study.

Results/Case report

Thirty-seven patients were treated with fluoroscopy-guided PNB during the study period. The most common indication was pudendal neuralgia. Women represented the majority of patients treated at nearly 70%, and mean patient age was 41 (range 13 – 81 years). Seventy-nine blocks were performed during the study period. On average, patients received two blocks, and one outlier received seven (Table 1). Oral morphine equivalence data showed 9 patients decreased opioid use, 7 increased, and 7 had no change after the PNB (Table 2). No complications were noted during the study period, and the most common issue was minimal to no pain relief. An acute worsening of neuropathic symptoms and transient unilateral lower extremity paresthesia were noted in a small number of patients.

Discussion

The multifactorial etiologies, recalcitrant symptoms, and resultant functional disability make chronic pelvic pain a challenging condition to control. Pudendal nerve blocks have shown utility in symptom management. Image-guidance may improve accuracy because the pelvic exit point, between the sacrospinous and sacrotuberous ligaments at the ischial spine, is more consistently identified (6,7). Fluoroscopy affords direct visualization of the ischial spine with increased patient comfort, and likely safety (3,4).

We evaluated the effectiveness of fluoroscopy-guided PNB in the treatment algorithm by comparing pre and post pain ratings and opioid pain medication usage in oral morphine equivalents. The blocks provided temporary decreases in pain, demonstrating usefulness. However, of those taking opioids, 60% had either no change or increased usage. Many of our patients present with numerous pain complaints, so parsing block effectiveness many require a more granular approach.

Limitations included retrospective nature, a single-center assessment, and small sample size. Evaluating additional outcomes such as functional improvements and block medications used would add further insight. Further research directly comparing outcomes in patients who received image-guided PNB versus blind approaches will likely guide physicians in the ongoing effort to provide this patient population with optimal pain management.

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Tables/images

Table 1 – Sample Population Demographics

Variables		All N = 37	Women N = 26	Men N = 11
Age in years		47.2 [13 - 81]	45.9 [13 - 81]	50.2 [31 - 79]
# PNB Performed		79	2.2 [1 - 7]	1.9 [1 - 3]
VAS Pain Rating	Pre	6.4 [3 - 10]	6.3 [3 - 10]	6.7 [5 - 8]
	Post	3.7 [0 - 10]	4.1 [0 - 9]	2.8 [0 - 10]
Daily Opioid Use as mg OME	Pre	62.9 [0 - 240]	57.3 [0 - 240]	75.9 [6.1 - 180]
	Post	56.2 [0 - 127.5]	52.8 [0 - 165]	64.1 [0 - 127.5]

Pudendal Nerve Block – PNB, Visual Analog Scale – VAS, Oral Morphine Equivalents - OME

Table 1 - Sample Population Demographics

Table 2 – Post Pudendal Nerve Block Changes in Pain Rating and Opioid Use

Patient	Pain Rating	Opioid Usage	Patient	Pain Rating	Opioid Usage
1	Decreased	NA			
2	Decreased	Decreased	20	Decreased	Decreased
3	Decreased	Decreased	21	Increased	NA
4	Decreased	Decreased	22	Decreased	NA
5	Decreased	NA	23	Decreased	No change
6	Decreased	Decreased	24	Increased	NA
7	Decreased	No change	25	Decreased	Increased
8	Decreased	NA	26	Decreased	NA
9	NR	NA	27	Decreased	No change
10	Decreased	Increased	28	NR	Increased
11	Not Recorded	Increased	29	Decreased	NA
12	Decreased	Decreased	30	Increased	Decreased
13	Decreased	NA	31	Decreased	No change
14	NR	No change	32	Decreased	NA
15	Decreased	Decreased	33	Decreased	Increased
16	NR	Increased	34	Decreased	NA
17	Decreased	No change	35	NR	No change
18	Decreased	Increased	36	Decreased	NA
19	Decreased	Decreased	37	NR	NA

Not Recorded – NR; Not applicable (patient not taking opioids) – NA

Table 2 - Post-Pudendal Nerve Block Changes in Pain Rating and Opioid Use

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1354
Scientific abstract: Regional anesthesia

Impact of Clonidine on Block Performance for Ultrasound Guided Interscalene Blocks in Total Shoulder Arthroplasty: A Retrospective Analysis

David Olsen, Adam Jacob
Mayo Clinic

Introduction

Total shoulder arthroplasty (TSA) may result in significant postoperative pain. Single injection interscalene blockade (ISB) has been used successfully to reduce postoperative pain after TSA(1). A limitation of single injection ISB is untimely block offset resulting in poorly controlled pain during nighttime hours. Clonidine, an alpha-2-adrenergic agonist, is a frequently used local anesthetic adjuvant for the purpose of improving block duration and quality of analgesia. Results from past studies evaluating the role of clonidine in peripheral nerve blockade have shown conflicting analgesic outcomes (2-7), in many cases limited by small sample sizes. The aim of this study was to retrospectively evaluate the analgesic efficacy of perineural clonidine when added to ISB for TSA.

Materials and methods (NA for case report)

Following IRB approval, we retrospectively reviewed the medical records of all consecutive patients who underwent TSA with an ultrasound guided single injection ISB for postoperative analgesia at our institution from January 2010 through November 2015. Any adult undergoing a TSA with preoperative ISB was eligible. After excluding patients with multiple blocks performed, the following data was recorded: baseline demographics, regional block technique, peri-operative medications, pain scores, 24 hour oral morphine equivalents(OME), time to first opioid administration after PACU dismissal, and peri-operative complications (intraoperative bradycardia [HR < 60], hypotension [percent of case with MAP < 60], stroke, ICU admission, or death).

Results/Case report

There were 1332 blocks performed without and 289 with perineural clonidine during the study period. There was no statistically significant difference in patient demographics (age, gender, ASA status, BMI), local anesthetic volume or peri-operative opioid administration between groups. Median clonidine dose was 100 mcg (mean 95 mcg). Pain scores are shown in Figure 1. There was a statistically significant decrease in pain (-0.39; 95% CI -0.13 to -0.64; p = 0.003) for the hours 3-7 after the block for the clonidine group. There was no difference (clonidine vs. none) in 24 hour OME (71.6±6.1 vs. 68.3±2.8 mg; p = 0.61) or time after surgery to first opioid administration (8.1±0.3h vs 8.0±0.2h; p=0.80). The clonidine group had more intraoperative hypotension (19.4±1.0% vs 17.3±0.4%, p =0.049), but no difference in vasopressor use. No other differences were observed in adverse effects including intraoperative bradycardia, unexpected ICU admission, stroke or death. Subgroup analysis controlling to one surgeon, fixed local anesthetic volume, and clonidine dose showed similar results.

Discussion

This retrospective study showed a statistical improvement in pain within the first 3-7 hours postoperatively; however, this difference was likely not clinically significant. Further, this did not translate into differences in opiate usage. This reflects past studies that show little to no improvement with clonidine (5). This review, while significantly larger in size than any prior study, suffers from the limitations of a retrospective study including the inability to control for all possible confounding factors or to record all measurements of interest including characterization of block quality. In summary, this study suggests only slight gains with the addition of clonidine; albeit without significant side effects.

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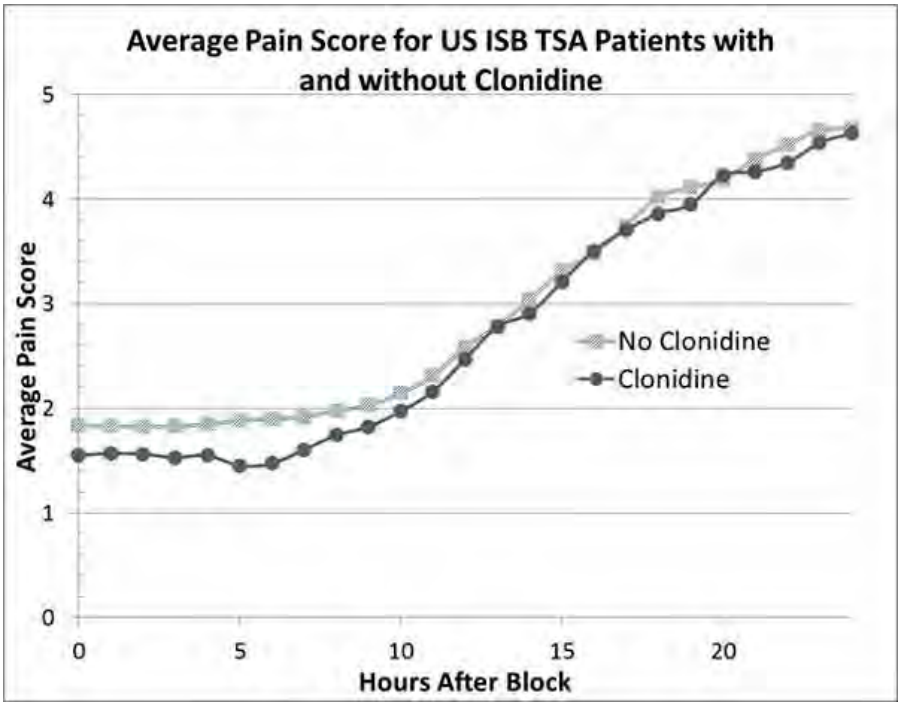

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1355
Medically Challenging Cases (report of up to 4 cases)

Hemodynamic Instability Following an Intrathecal Dose of Local Anesthetic

Alyce Richard, Marc Shnider
Beth Israel Deaconness Medical Center

Introduction

This abstract is intended to address an interesting case of hemodynamic instability, following a spinal, in a patient receiving a total hip replacement. The patient, who has consented, is a 62 year old male with a history of right hip osteoarthritis, ulcerative colitis, depression, and hypothyroidism. The indication for the procedure was severe right hip pain. To note, the patient did not have a history of any cardiac issues. His functional capacity was limited by hip pain, but he denied any episodes of palpitations, chest pain, or shortness of breathe at rest or with activity.

Materials and methods (NA for case report)

N/A

Results/Case report

The patient was to undergo monitored anesthesia care in addition to a spinal at the L4-5 level. ASA standard monitors were placed in the operating room prior to any anesthetic intervention. The patient was subsequently placed in the left lateral decubitus position. Prior to incision, 1g of tranexamic acid was injected through the peripheral IV slowly over 5 minutes. Forty-five minutes following the spinal dose and several moments after the initial incision, severe bradycardia in the form of complete heart block and hypotension ensued. The hemodynamic compromise was not responsive to 15mg of ephedrine. The patient was then treated with 0.5mg of atropine, 100mcg of epinephrine, and pacer pads were placed. He was then intubated. His heart rate and blood pressure responded appropriately and sinus tachycardia with hypertension was observed. The patient never needed pacing. The procedure was then aborted and the patient was taken to the PACU intubated with plans for ICU transfer.

His PACU course was complicated by atrial fibrillation that responded appropriately to beta blockade. Further cardiac workup including enzymes, imaging, and vessel diagnostics were as follows: enzymes were relatively normal, echo was significant for depressed EF of 45% with hypokinesis of the anterior septum and apex; cardiac catheterization demonstrated significant disease of the non-dominant RCA. The patient was discharged home several days later on an anti-coagulant, an ACE-inhibitor, and a beta blocker with cardiology follow up and a plan to return to the OR after cardiology and anesthesia clearance. The patient returned to the operating room and successfully had his hip replaced under general anesthesia. To note, the patient required pressor support throughout the case, but all support was weaned by the end of the case.

Discussion

There are several possibilities that could have caused this sequence of events, such as: a physiologic reflex associated with spinal anesthesia, an underlying conduction abnormality, or drug side effects (e.g. TXA) . The most likely is that this event was the result of a reverse Bainbridge reflex. The reflex explains the decrease in heart rate observed under conditions in which venous return is reduced, such as during spinal and epidural anesthesia. This response is secondary to sympathetic denervation of both resistance and capacitance vessels with an increase in vagal tone as well as a decrease in both right and left atrial stretch responses. The vascular response and changes in autonomics would lead to decreases in cardiac output, systemic vascular resistance, and stroke volume.

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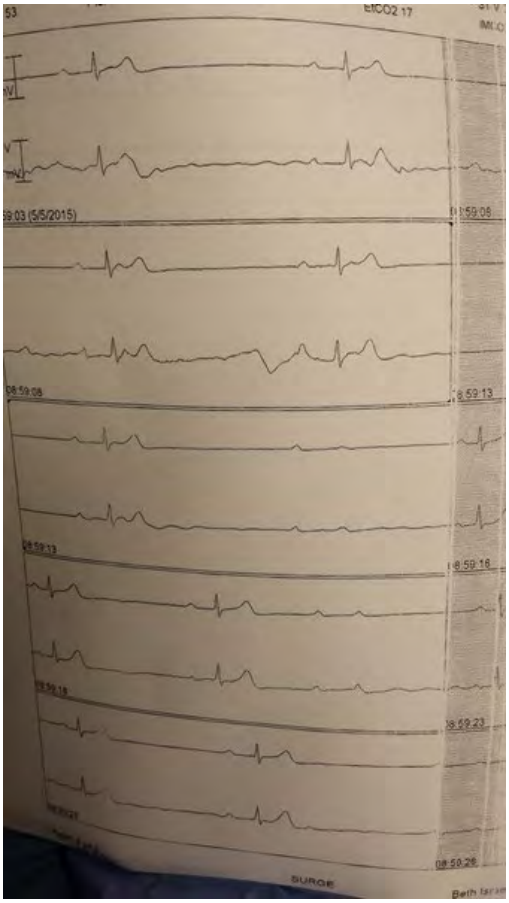
Tables/images



Intra-op record: Complete Heart Block

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1356
Scientific abstract: Regional anesthesia

Case Report of Bilateral Continuous Suprascapular Block for Bilateral Shoulder Arthroplasty

James Flaherty, Neil Hanson, Dave Auyong
Virginia Mason Medical Center

Introduction

Regional anesthesia provides effective analgesia following shoulder surgery. Continuous brachial plexus block using an interscalene approach, however, causes hemidiaphragmatic paresis in 100% of patients[1]. While this is tolerated in healthy patients, bilateral brachial plexus block is not well studied.

A continuous suprascapular nerve catheter may be an effective alternative for shoulder analgesia. This nerve provides 70% of shoulder innervation and is blocked further away from the phrenic nerve than traditional plexus blocks[2]. We report a novel case of a patient undergoing bilateral shoulder arthroplasty with adjunctive continuous selective suprascapular blocks.

Results/Case report

A 52-year-old healthy female presented for bilateral shoulder hemiarthroplasty due to chronic shoulder dislocations and proximal humeral fractures. Resting pain on an 11-point numerical rating scale (NRS) was 4/10 in either shoulder, requiring daily use of 20-30 mg oxycodone. We opted to place selective continuous suprascapular nerve blocks for postoperative pain.

Using ultrasound, we traced the suprascapular nerve laterally as it branched from the superior trunks of the brachial plexus. On each side, a Tuohy was inserted posterior to the probe and advanced in-plane until adjacent to the suprascapular nerve (Figure 1). Catheters were advanced and tip locations confirmed with 10 mL of 1.5% mepivacaine. Continuous 0.2% ropivacaine infusions were set to 3 mL/hr preoperatively and increased to 5mL/hr in the post-anesthesia care unit (PACU) due to patient discomfort after an uneventful general anesthetic.

FVC and diaphragmatic excursion were measured at baseline, in PACU, the evening following surgery, and on postoperative days 1 and 2. The average FVC reduction was 23%. Diaphragmatic excursion remained near baseline (Figure 2). The patient did not experience hypoxemia, dyspnea, or hand numbness. Her pain was controlled near baseline, averaging 46 mg IV morphine equivalents per day. Catheters were removed prior to discharge on postoperative day 3.

Discussion

This case suggests that bilateral continuous suprascapular blocks are a feasible option for bilateral shoulder surgery. Our patient enjoyed excellent analgesia with modest effect on pulmonary mechanics despite a history of chronic opioid use.

We found an average 23% reduction in FVC in our patient. By contrast, *unilateral* interscalene block reduces FVC between 25-40%[3-6], a side effect that has not been reliably eliminated despite numerous studied methods[7]. Few cases exist documenting bilateral brachial plexus analgesia effective for shoulder surgery[8];one case of bilateral interscalene catheters found a 60% decrease in FVC[9]. Impressively, our patient's pain scores remained near baseline illustrating the effectiveness of continuous suprascapular analgesia. Though assessing the opioid sparing effect of the blocks is difficult, our patient's opioid requirements compare well with the available literature given her chronic opioid requirement and the bilateral nature of the surgery[10-12].

In conclusion, continuous suprascapular nerve blocks may minimize perioperative lung dysfunction by limiting phrenic nerve paralysis while reducing pain and opioid consumption following shoulder surgery. The minimal impact on FVC may make continuous suprascapular analgesia a favorable option for patients with pulmonary disease undergoing shoulder surgery. Future studies are required to generalize our results.

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Tables/images

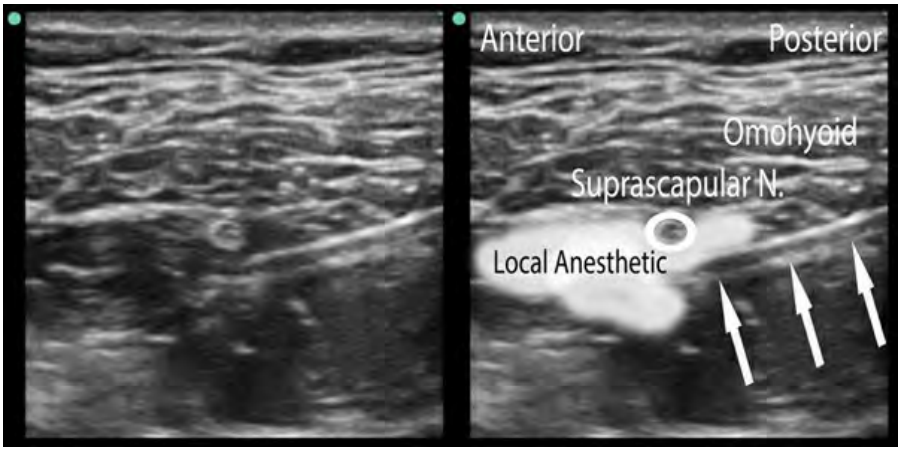

Figure 1: An unlabeled (left) and labeled (right) image of the suprascapular nerve with needle in view (arrows). Local anesthetic is seen surrounding the nerve prior to the catheter being threaded.

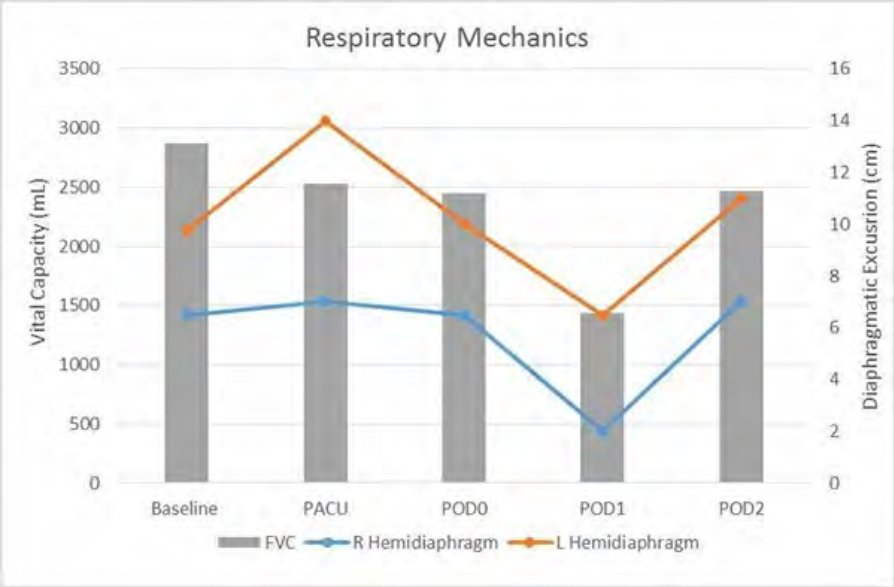

Figure 2: Respiratory mechanics measured over the hospital course. PACU = post-anesthesia care unit. POD = postoperative day. FVC = forced vital capacity.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1357
Medically Challenging Cases (report of up to 4 cases)

Pulsed-Radiofrequency Lesion Of The Left Stellate Ganglion Provides Durable Suppression Of Drug-Resistant Ventricular Arrhythmia

Jeffrey Walker
University of California, San Diego

Introduction

Electrical Storm (ES) is defined by life-threatening recurrent ventricular tachycardia (VT) or fibrillation (VF). Various treatments have been used for ES, including: anti-arrhythmic medications, surgical sympathectomy, electrical cardioversion or defibrillation, ablation, and continuous left-sided stellate ganglion block and neurolysis.[1] Local anesthetic blockade of the left stellate ganglion produces effective but transient suppression of ventricular arrhythmias.[2,3] Surgical sympathectomy has been used for long-term management of ES, but may be contraindicated in critically ill patients or due to anatomic abnormalities. Pulsed radio frequency ablation (PRFA) may provide an effective and durable treatment alternative.[4-6]

Results/Case report

Permission was obtained by the patient to use his healthcare information for this purpose. The patient is an 85 year old male with ischemic cardiomyopathy, aortic stenosis, hypertension, non-insulin dependent diabetes, and hypothyroidism who developed post-CABG VT and VF refractory to pharmacological interventions, requiring trans-venous pacing at 100bpm. Due to his critical status electrophysiologic interventions and ICD placement were not feasible.

On post-op day 7, a left stellate ganglion block with bupivacaine suppressed VT and VF for 4 hours. On post-op day 10 the left stellate ganglion was treated with PRFA. Under fluoroscopic guidance, three, three-minute PRFA lesions (5Hz, 50 msec pulse width) were applied in a triangular configuration along the anterolateral aspect of T1 vertebral body using a 22 gauge, 10 cm radio frequency cannula with 10 mm active tip.

Fifteen minutes post-block, pacing was discontinued, revealing normal sinus rhythm (NSR) henceforth. Vasoactive and anti-arrhythmics infusions were subsequently weaned and discontinued and the patient was extubated on post-op day 11. Unfortunately, on post-op day 12, the patient expired after rupture of a newly diagnosed AAA. Notably, NSR persisted through the rupture and throughout the resuscitation efforts, despite extreme hypotension.

Discussion

There is literature supporting the treatment of tachyarrhythmias subsequent to central nervous system disease with stellate ganglion block going back over 4 decades.[1,2,3] This is an option also for recalcitrant catecholaminergic polymorphic ventricular tachycardia where implantable cardioverter–defibrillator (ICD) shocks may trigger new arrhythmias, and for which more invasive techniques, such as surgery with left cardiac sympathetic denervation or ablation, may be contraindicated. PRFA overs an advantage over other modalities because it avoids the potential complications of an invasive surgical procedure (and general anesthesia) compared to the site-specific nature of PRFA, as well as offering a longer term solution than a block.

Given the nature of a case report, there are limitations in selection bias and internal validity. A larger randomized prospective double-blinded clinical controlled study with 2 arms is needed to demonstrate efficacy and longevity of this approach over conventional approach. Moreover, given the significant advantages of PRFA, more studies are needed not only to delineate the mechanism behind it but also expand its use beyond the known indications.

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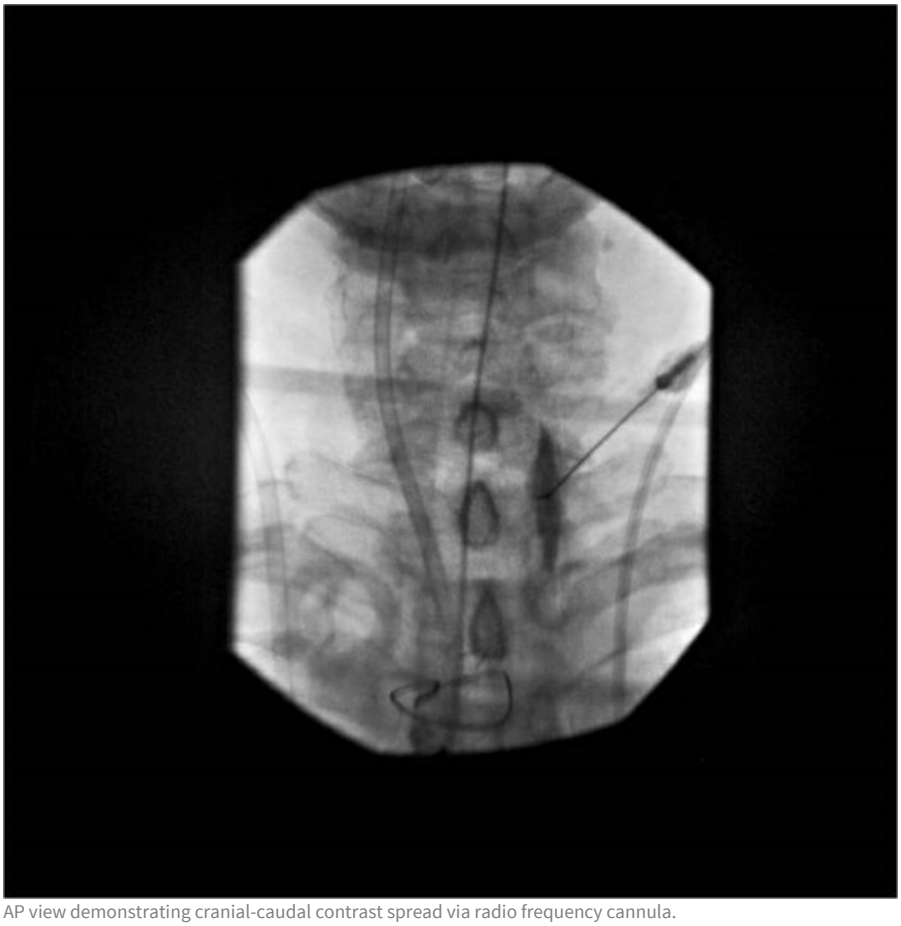

AP view demonstrating cranial-caudal contrast spread via radio frequency cannula.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1358
Scientific abstract: Acute pain

Bilateral Thoracic Paravertebral Catheter Placement for Treatment of Double-Lung Transplant Complications

Kara Pinjuv, Bahareh Khatibi, Jennifer Jou, Jacklynn Sztain
University of California, San Diego

Introduction

End-stage respiratory insufficiency from cystic fibrosis (CF) is the third major indication for lung transplant (1). The bilateral thoracosternotomy incision for a double lung transplant causes severe postoperative pain. When undertreated, this pain can result in multiple pulmonary complications. Thoracic epidural analgesia (TEA) is an accepted method for post-thoracotomy pain management and a clinically proven option for post-lung transplant pain (2). New evidence exists that thoracic paravertebral blockade (PVB) has similar efficacy with a better safety profile and is a reasonable alternative to a TEA for non-transplant procedures (3). We report a case of bilateral continuous PVB for analgesia following a double-lung transplant.

Results/Case report

A 32-year old man with end-stage CF presented for a double lung transplant. The patient's postoperative course was complicated by hypotension requiring two vasopressors, hypoxia, hypercarbia, prolonged ICU stay and poorly controlled surgical pain. The primary team determined that splinting from pain was the cause of his hypoxia and hypercarbia. On postoperative day (POD) 7 the regional anesthesia service was consulted.

In the 24 hours prior to consultation the patient reported bilateral 4-10/10 sharp pain at the T4 incision and T7 chest tubes. He was requiring a total of 20 mg of oxycodone, 50 mg tramadol and acetaminophen around the clock daily. In addition, he was on bilevel positive airway pressure (BiPAP) overnight, norepinephrine 3-6 mcg/min and vasopressin 0.04 units/min.

Bilateral T4-5 PVB catheters were placed following injections of 10 mL of 0.25% ropivacaine with 1:400,000 epinephrine under real-time in-plane ultrasound guidance. Ropivacaine 0.2% was infused at 4 mL/hour with a 4 mL patient-controlled bolus available every 60 minutes.

The patient required no opioids for the duration of the catheter infusions. He was weaned off vasopressors within 10 hours of catheter placement. On POD 8 (catheter day 2) he no longer required BiPAP and was transferred to a step-down unit on the morning of POD 9 (catheter day 3). The catheters were removed on POD 11 (catheter day 5). The patient's respiratory status remained stable and remaining hospital course was unremarkable. (Table 1)

Discussion

This case illustrates the benefit of PVB analgesia for a lung transplant patient with pulmonary and hemodynamic complications. Insufficient post-lung transplant pain control can result in pulmonary complications, uninhibited perioperative stress response complications and increased risk for chronic pain. TEA is currently the gold standard for post-thoracotomy pain relief and its benefits have been well established in the management of post-lung transplant pain (4). A best-evidence review reported that four of five studies found that TEA reduced duration of mechanical ventilation, shortened ICU stay, and decreased respiratory complications in lung-transplant patients (2). Recent studies have suggested that PVB provide comparable analgesia to a TEA with greater hemodynamic stability, improved preservation of pulmonary function, decreased urinary retention, lower failure rate, and superior side effect profile (3). Given our patient's fluid restriction and vasopressor requirements we hypothesized that bilateral PVB catheters would be preferable to TEA. This case demonstrates that bilateral continuous PVB can provide effective analgesia with hemodynamic stability in double-lung transplant patient.

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Tables/images

	48h prior to PVB catheters	48 hours post PVB catheters
Pain Score (NRS)	4.41 (0-7)	0.1 (0-3)
Oral Morphine Equivalents (mg)	50	0
PaCO2 (mmHg)	53 (50-60)	N/A
SpO2 (%)	94.85 (88-100)	97.59 (94-100)
MAP (mmHg)	69.36 (60-98)	70.59 (52-87)
Norepinephrine (mcg/min)	4.79 (1-9)	0.36(0-2.5)*
Vasopressin (units/min)	0.4 (0.4)	0.075 (0-0.4)**
Total IV fluids (mL)	2,382.6	1,880.6

* Norepinephrine gtt discontinued approximately 8 hours post bilateral PVB catheter placement
** Vasopressin gtt discontinued approximately 9 hours post bilateral PVB catheter placement
N/A – Arterial blood gases not medically necessary

Table 1

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1359
Scientific abstract: Acute pain

Decreased ventilator and mortality impact of paravertebral nerve catheters on outcome of trauma patients with multiple rib fractures: a retrospective analysis.

Nicholas Schott, Beverly Pearce-Smith, Jacques Chelly, James Ibinson, Jason Sperry, Louis Alarcon
University of Pittsburgh Medical Center

Introduction

Multiple rib fractures (MFR) are associated with significant morbidity and mortality. Treatment includes controlling pain and optimizing oxygenation and ventilation. We sought to compare outcomes of a high number of MRF patients treated with paravertebral nerve catheters (PVC) compared to standard patient controlled analgesia (PCA) medication.

Materials and methods (NA for case report)

A retrospective review was performed of trauma patients with MRF admitted between 2006-2013. Data collected included patient age, injury severity score (ISS), days of mechanical ventilation, ICU length of stay (LOS), total hospital LOS, and in-hospital mortality. Epidural catheters were not included in analysis for hospital preference as well as safety and hemodynamic stability concerns.

Results/Case report

4640 patients sustained MRF after blunt chest trauma. Of these, 460 patients met criteria to receive PVC for treatment. All-cause mortality was lower in patients treated with PVC (2.0% vs 6.1%, $p<0.01$). Duration of mechanical ventilation was shorter for PVC patients (0.51 ± 2.15 d vs 2.00 ± 5.5 d [mean± SD], $p<0.01$). ICU LOS was shorter for PVC patients (2.71 ±3.26 d vs 3.71± 7.35 d, $p=0.04$). Hospital LOS was not different between groups. After excluding patients with significant head, abdominal or pelvis injury (Abbreviated Injury Scale ≥4), in-hospital mortality remained lower for PVC patients (1.6% vs 3.4 %, $p<0.01$). Duration of mechanical ventilation was shorter for PVC patients (0.46 ± 2.19 d vs 1.17 ± 3.78 d, $p < 0.01$). However, ISS, ICU and hospital LOS were not different between groups.

Discussion

In this large retrospective review, the use of PVC in patients with MRF is associated with a decrease in duration of mechanical ventilation and in-hospital mortality compared to PCA. These results suggest that PVC may be an effective and safe pain management modality in patients with MRF after assessing a large cohort of patients.

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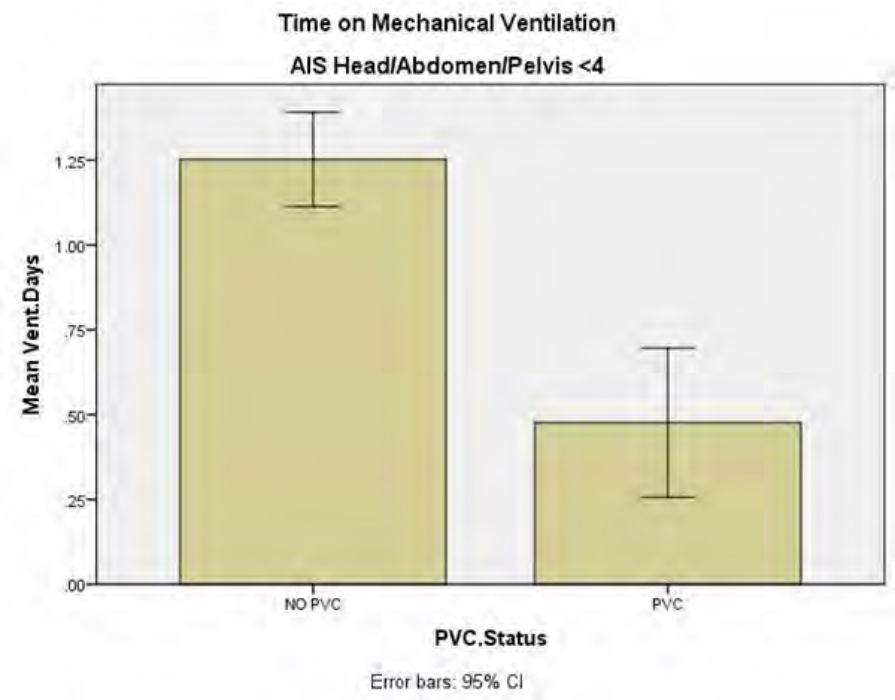
Tables/images



Comparison Graph of Days on Ventilator of Patients who had analgesia with PVC and without PVC (PCA only).

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1360
Medically Challenging Cases (report of up to 4 cases)

Baclofen Pump Exchange in a Patient with end stage Amyotrophic Lateral Sclerosis: Transversus Abdominis Plane Block as the Sole Anesthetic

Iman Hadaya, Matthias Braehler
UCSF Department of Anesthesia & Perioperative Care

Introduction

Amyotrophic Lateral Sclerosis (ALS) is a progressive neurodegenerative disease that affects upper and lower motor neurons, eventually leading to death from respiratory failure. Patients with ALS present unique challenges to perioperative management. Special anesthetic considerations include the avoidance of neuromuscular blocking agents and the risk of prolonged mechanical ventilation postoperatively.[1,2]

Results/Case report

A 50 year old female with end stage ALS presented for left abdominal Baclofen pump replacement.

Preoperatively: The patient was extremely debilitated. She was wheelchair bound with no movement of her arms and legs, and severe spasticity of her legs. She was dysphonic and communicated mostly by eye blinking. She required nightly non-invasive positive pressure ventilation (NIPPV). The year prior, she was hospitalized for Influenza A for which she required nearly a week of NIPPV before returning to her baseline.

Intraoperatively: The patient underwent an uneventful left transversus abdominis plane (TAP) block and received 40 ml of Ropivacaine 0.375% (150 mg) to anesthetize the left lower quadrant of the abdomen. No sedatives or analgesics were administered during the surgical procedure. The only other medication administered intraoperatively was Cefazolin.

Postoperatively: The procedure was successfully completed without any complications. At her one-month follow-up appointment, mental status and neurological exam were at baseline. Of note, patient approval was obtained for publication of this abstract.

Discussion

It is prudent to consider anesthetic plans other than general anesthesia in patients with ALS whenever possible, so as to avoid the risk of succinylcholine-induced hyperkalemia and postoperative pulmonary complications. There have been reports of successful neuraxial and regional blocks in these patients.[3-5] To the authors' knowledge, this particular regional block has not been reported in this patient population. This case report demonstrates successful placement of a TAP block in a patient with end stage ALS and offers a safe and feasible anesthetic technique that can also be performed in other high risk patients. This case reaffirms the importance of having an alternative anesthetic option available to patients who would otherwise be exposed to a much higher risk under general anesthesia.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1362
Medically Challenging Cases (report of up to 4 cases)

Opioid-Induced Hyperalgesia and Allodynia in Chronic Pancreatitis

Joshua Bennitz, Michael Bautista
Memorial University

Introduction

Opioid-induced hyperalgesia (OIH) is used to describe the paradoxical increase in pain and pain sensitivity despite escalating opioid doses (1). This is felt to be due to central sensitization through increased NMDA receptor activity, increased spinal dynorphin concentrations, and alterations in descending inhibitory control and opioid receptor G-protein activity (1). We present a case of OIH in a patient admitted with abdominal pain with a history of chronic pancreatitis and chronic opioid use. Patient consent was obtained.

Results/Case report

A 46 year old male with 3 year history of alcohol-related chronic pancreatitis was admitted with worsening epigastric over the preceding two weeks. The pain radiated to his back, and was associated with diarrhea and nausea. He had several past admissions for abdominal pain. His medical history includes HIV-related neuropathy, left-sided sciatica treated with lumbar discectomy, fibromyalgia, Bowen's disease, former alcohol abuse, and depression. His family doctor maintained his opioid dose at home, so he presented to hospital. His medications included oxycodone 5mg/acetaminophen 325mg, 12 tablets per day, cyclobenzaprine, amitriptyline, and marijuana. During his hospital stay, he started parenteral morphine 5mg q6h PRN; though he took it regularly, his pain worsened and became more generalized.

On examination, the patient was in obvious discomfort. Abdominal exam revealed sharp pain and guarding with light and deep palpation of the epigastrium and right upper quadrant. Brush-evoked allodynia was exhibited over the entire abdomen wall. There were no signs of peritonitis. Upper extremities demonstrated deep allodynia bilaterally, which differed from his fibromyalgia. Investigations revealed normal leukocyte count, liver enzymes, lipase, amylase, and bilirubin.

Given his escalating dose of narcotics without improvement, his oxycodone/acetaminophen was rotated to a 30% less equivalent of morphine sustained release 40mg BID. He started dextromethorphan 15 mg TID and clonidine 0.1-0.2 mg TID PRN for withdrawal symptoms. The patient's pain was significantly reduced and he was discharged within 3 days. His abdominal wall allodynia and deep allodynia in his arms resolved.

Discussion

Opioid-induced hyperalgesia is a concern with patients receiving opioids in both acute and chronic settings (2). A recent study by Wasserman *et al.* found an association between higher opioid doses and lower pain tolerance (3). Interestingly, male patients with suspected OIH given additional fentanyl showed a hyperalgesic response.

The differential for chronic pain patients with escalation of pain includes progression of the disease process, a new disease, fibromyalgia, opioid tolerance, and OIH. The diagnosis of OIH is challenging as the symptoms can mimic opioid tolerance. A key feature of OIH is the paradoxical increase in pain with opioid dose escalation, whereas in opioid tolerance pain decreases. Symptoms suggestive of OIH include presence of new or changed pain, such as brush-evoked allodynia in our patient, and pain in other dermatomes or locations.

Treatment modalities include opioid rotation, buprenorphine, NMDA receptor antagonists (e.g., ketamine, dextromethorphan), methadone, COX-2 inhibitors, and α^2 receptor agonists (4). The treatment of OIH can be time consuming and frustrating. Many patients in pain are reluctant to decrease their narcotic dose, and results may not be seen immediately.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1363
Medically Challenging Cases (report of up to 4 cases)

Borderline Thrombocytopenia & Neuraxial Anesthesia: A Case Report

Patrick Laughlin
Georgetown University Hospital

Introduction

Thoracic aortic aneurysm (& dissection) is a pathology requiring surgical intervention to avoid devastating complications. But, however beneficial surgery may be, paraplegia remains one of the most devastating complications of thoracoabdominal aortic surgery and is associated with a significant increase in both morbidity and mortality[1]. With an incidence between 8-28%[2], modern repair techniques employ a variety of modalities aimed at reducing the risk of spinal cord ischemia inherent with surgical management, one of which is lumbar cerebrospinal fluid (CSF) drainage. However, the potential benefit of CSF drainage must be balanced against the risks associated with its use. With the patient's approval, we present a case where a patient presented for thoracic endovascular aortic/aneurysm repair (TEVAR) with a rapidly developing thrombocytopenia and a platelet count of 46,000.

Results/Case report

A 75 year old male presented with chief complaint of diarrhea. His past medical history was significant for end stage renal disease (ESRD) secondary to hypertension, hyperlipidemia, gastroesophageal reflux disease (GERD), and a 4.9 cm thoraco-abdominal aortic aneurysm (TAAA) that was asymptomatic. An abdominal CT scan revealed that his TAAA had increased from 4.9 cm to 6.5 cm over a two-year period, and he was scheduled for a TEVAR. At that time, significant labs included hemoglobin 9.1, hematocrit 29.6, and platelets of 133. Orders were placed for Cefazolin 1g IV every 24 hours. In the following 24 hours, the patient's platelet count dropped from 133,000 to 46,000 on the day the patient was scheduled for surgery. A repeat complete blood count was ordered, at which point the platelet count had further decreased to 15,000. The case was postponed and the patient was transfused 1 six-pack unit of platelets. The patient's heparin and cefazolin were discontinued, and he was started on darbepoetin alpha; his platelet count increased from 15,000 to 66,000, and continued to rise over the ensuing days to 108,000 five days later. The procedure was then done without complication, and did include placement of a lumbar CSF drain.

Discussion

Despite advances in operative technique, the risk of spinal cord ischemia or infarction remains in the range of 8%-28% if open but is decreased in TEVAR, to 4%-8%[2]. Augmenting spinal cord perfusion by increasing arterial pressure, lumbar CSF drainage, and reattachment of segmental arteries are effective for the treatment of spinal cord ischemia[2]. This discussion will focus on the current recommendations regarding CSF drainage placement in thrombocytopenic patients, which state that in the absence of additional risk factors for spinal hematoma, a platelet count of 80,000 is ‘safe’ count for placing an epidural, or a spinal anesthetic, and 40,000 is ‘safe’ count for lumbar puncture[3]. For patients with platelet counts of 50,000-80,000 requiring neuraxial anesthesia, an individual decision based on assessment of risks and benefits should be made. In our particular case, the case was urgent but not emergent, so the case was delayed while the thrombocytopenia (believed to be due to an adverse reaction to Cefazolin) was corrected over a period of 4 days.

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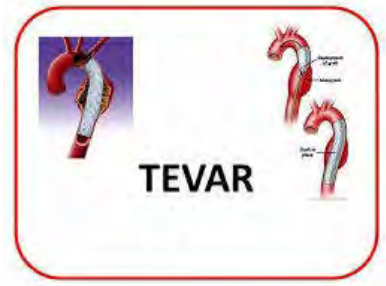
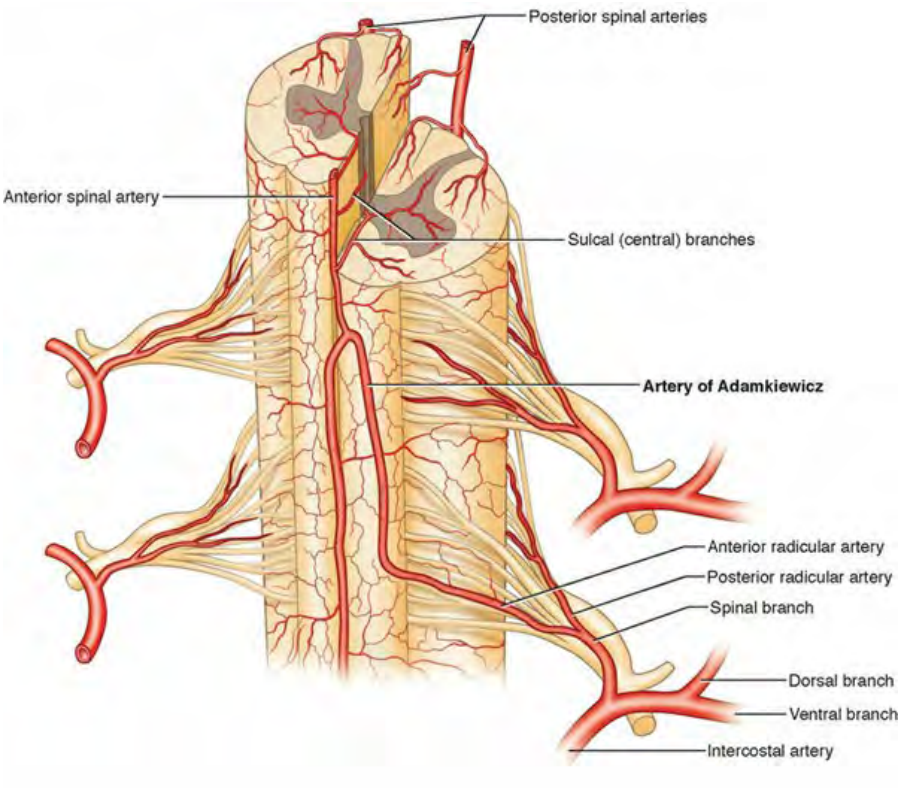
Tables/images



TEVAR diagram



Blood flow spinal cord diagram

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1364
Scientific abstract: Acute pain

Estimating the effect of intravenous acetaminophen (IV-APAP) on length of stay and inpatient costs

Eve Shaffer, Robert L. Woldman, Andrew Spiegelman, Scott Strassels, George Wan, Thomas Zimmerman
The Advisory Board Company

Introduction

Opioid analgesics are a mainstay for acute pain management, but their usage is associated with adverse events and increased costs. Multi-modal analgesia has been shown to improve those factors, and intravenous acetaminophen (IV-APAP) can be incorporated as the foundation of a multi-modal pain management strategy to help contribute to reduced costs and improved outcomes.

The goal of this study was to model length of stay (LOS), opioid-related complications, and costs for patients reducing opioid use via initiation of IV-APAP for management of post-operative pain.

Materials and methods (NA for case report)

Data for this study were deidentified inpatient encounters from The Advisory Board Company from 297 hospitals across 2012 – 2014, containing 2,238,433 encounters (IV-APAP used in 12.1%).

Encounters for adults >= 18 years of age admitted for cardiovascular, colorectal, general, OBGYN, orthopedics, or spine surgery were included. Encounters with invalid or incomplete data, with inpatient mortalities, or with discharge to hospice were excluded. Potential opioid-related adverse drug events related to respiratory, gastrointestinal, central nervous, urinary, and other events were defined using ICD-9-CM codes [1].

The effects of reducing opioids and adding IV-APAP were estimated using hierarchical statistical models. Independent variables were: opioid use (none/low/medium/high), non-opioid use (none/low/medium/high) and IV-APAP use (none/used). Covariates included: age, gender, Elixhauser comorbidity index, All-Patient-Refined-Diagnosis-Related-Groups severity level, and admission type. Parameter estimates were applied to observed average LOS and complication rates.

Costs were estimated by multiplying modeled reductions in LOS or complication rates by observed average volumes for medium-sized facilities (AHA 100-399 beds), and by average cost per day or per complication (LOS: $2,383/day (HCUP-2013), complications: derived from observed charges).

Results/Case report

Across all surgery types, LOS showed an average of 18% (11%-31%) reduction for the modeled scenario of reducing opioids by one level (high to medium, medium to low, or low to none) and replacing it with IV-APAP, with an associated total LOS-related cost-savings of $4.5M (Table 1).

Modeled opioid-related complication rates showed similar improvements, averaging a 23% (5%-44%) reduction with an associated cost-savings of $0.2M.

In aggregate, costs decreased by an estimated $4.7M for a medium-sized hospital.

Table 1 – LOS and LOS-Related Costs

Category	Estimated Avg. Admissions (medium-sized facilities)	Observed Avg. LOS	Calculated LOS After Dropping One Level of Opioids & Adding IV-APAP	Calculated LOS Reduction for Dropping One Level of Opioids & Adding IV-APAP	% Change in LOS	Calculated Annual Impact (medium-sized facilities; Admissions * LOS Reductions *$2383 per day (HCUP 2013))

Cardiovascular	276	4.01	3.00	1.01	25.2%	$664,285
Colorectal	206	6.13	4.55	1.58	25.8%	$775,619
General	54	2.68	1.96	0.72	26.9%	$92,651
OBGYN	1,573	2.70	2.41	0.29	10.7%	$1,087,053
Spine	246	3.13	2.17	0.96	30.7%	$562,769
Orthopedics	604	3.51	2.58	0.93	26.5%	$1,338,579

Discussion

This investigation indicates that reducing opioid use and including IV-APAP during treatment can contribute to decreasing LOS, opioid-related complication rates, and costs from a hospital perspective.

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Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
Funding for this study was provided by Mallinckrodt Pharmaceuticals. Drs. Strassels, Wan, and Zimmerman are employees of Mallinckrodt Pharmaceuticals. Ms. Shaffer, Mr. Woldman, and Dr. Spiegelman are employees of The Advisory Board Company.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1367
Medically Challenging Cases (report of up to 4 cases)

Perioperative Neuraxial Procedures for Patients with Spinal Cord Stimulator

Rakhi Dayal, Hao Ho, Benjamin Record, Kyle Ahn
University of California, Irvine

Introduction

Spinal cord stimulation (SCS) is an advanced therapeutic modality that is increasingly offered for chronic pain conditions such as diabetic peripheral neuropathy, post-laminectomy syndrome, and complex regional pain syndrome (CRPS). Worldwide, thousands of patients undergo spinal cord stimulator implants each year. With increasing use of SCS, approaches to neuraxial anesthesia in the perioperative period in these patients present an unfamiliar and challenging task.

Results/Case report

A 72-year-old male with hypertension, CRPS, and chronic low back pain s/p multiple back surgeries presented for a Whipple procedure for pancreatic cancer. A thoracic epidural was planned for postoperative pain control. However, the patient reported on the day of surgery that he had preexisting lumbar and cervical spinal cord stimulators (SCS). Discussion with the pain team elucidated the likelihood of limited epidural space between the two stimulators. Subsequently, ultrasound-guided, bilateral paravertebral catheters were placed preoperatively, and used as part of effective multimodal postoperative analgesia.

Discussion

Case reports of successful epidural and spinal anesthesia in patients with a neuromodulation device have been noted in literature review (1,2,3,4,5). Due to the risk of SCS hardware infection or dislodgement, special consideration is needed prior to neuraxial blockade (1,6). The anesthesiologist administering the neuraxial technique in patients with SCS is advised to communicate with the pain management team to ascertain the anatomy of lead placement, power source location, and path of the extension wire (1). Typically SCS leads enter the epidural space at the lumbar or thoracic levels and are threaded cephalad for several vertebral segments. One may incorrectly assume that neuraxial entry below this site would be considered safe. However, the entire tract of SCS leads and implantable pulse generator must be determined to prevent injury to the tunneled leads or implantable pulse generator. This can be accomplished by reviewing or obtaining imaging studies such as plain film X-rays, computed tomography, or magnetic resonance imaging (MRI), if the device is MRI compatible.

Our patient presented a unique challenge because he not only presented with one, but two spinal cord stimulators! Radiographic review of the x-rays, confirmed that the two spinal cord stimulator leads occupied almost the entire thoracic epidural space. As noted in the image, the lower lead ended at T8 vertebra and the upper lead entered the epidural space at T6 vertebra. Clearly, there was no available space to place a thoracic epidural for perioperative analgesia.

Paravertebral block provides an alternative analgesic modality. Bilateral paravertebral blocks would provide somatic and sympathetic blockade of multiple contiguous dermatomes, with efficacy similar to epidural analgesia (7,8). Another option is bilateral transversus abdominis plane blocks, which can anesthetize the anterior abdominal wall.

In summary, patients with neuromodulation present unique challenges to postoperative pain management and alternatives to neuraxial analgesia should be considered.

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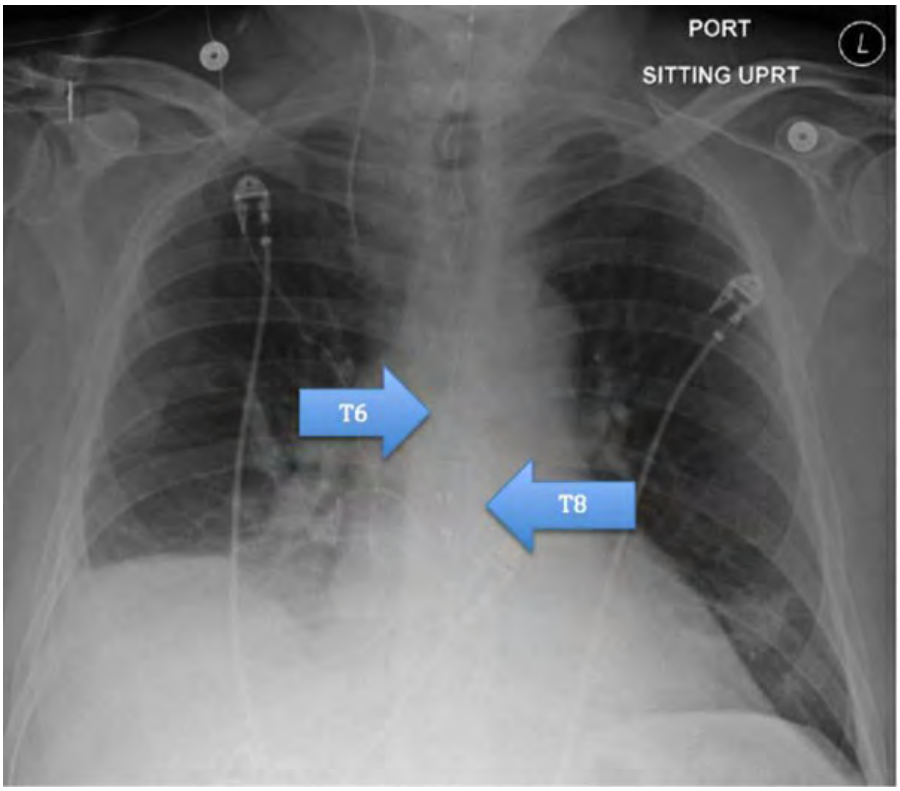
Tables/images



Spinal Cord Stimulation Lead Location

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1368
Scientific abstract: Regional anesthesia

Adductor canal blocks: Changing practice patterns and associated quality profile

Patrick Hartmann, Melissa Masaracchia, Brian Sites, Michael Herrick, Michael Barrington
Dartmouth Hitchcock Medical Center

Introduction

Peripheral regional anesthesia involving the femoral nerve has been the gold standard approach for post-operative analgesia following total knee arthroplasty. However, an alternative, the adductor canal block, has recently gained popularity since it is thought to result in less block-induced quadriceps muscle weakness. Our primary aim of this time-series analysis was to identify, through a multi-institution clinical registry, whether or not practice changes have occurred around the performance of femoral versus adductor canal blocks. Furthermore, if practice changes have occurred, our secondary aim was to assess for possible associated changes in safety and quality.

Materials and methods (NA for case report)

Using a 20 member clinical registry, we conducted a time-series analysis examining the practice patterns and safety around the performance of adductor canal blocks for primary total knee arthroplasty between July 18, 2011 to October 9, 2015. To obtain a more granular insight into possible changes (good or bad) in quality associated with a transition to an adductor canal block intensive practice, we analyzed clinical outcomes data from a single member institution.

Results/Case report

4,382 patients had 6,921 blocks performed for 4,822 unilateral TKAs. Across the registry, adductor canal block utilization increased from 0% during the first three months to 50.1% during the last three months. This increase in utilization was not associated with any increases in immediate or recovery room related complications. When analyzing the largest surgical volume center, the worst reported numeric rating scale decreased from 5.5 to 4.9 ($p = 0.005$), length of stay decreased from 3.2 to 2.9 ($p = 0.03$), and 30-day hospital revaluations for pain increased from 3.3% to 6.7% ($p = 0.001$).

Discussion

The large increase in the utilization of ACBs among the participating members of the IRORA was not associated with changes in safety. However, we found conflicting quality information when comparing a before and after period around adoption of adductor canal blocks for the largest contributing member hospital.

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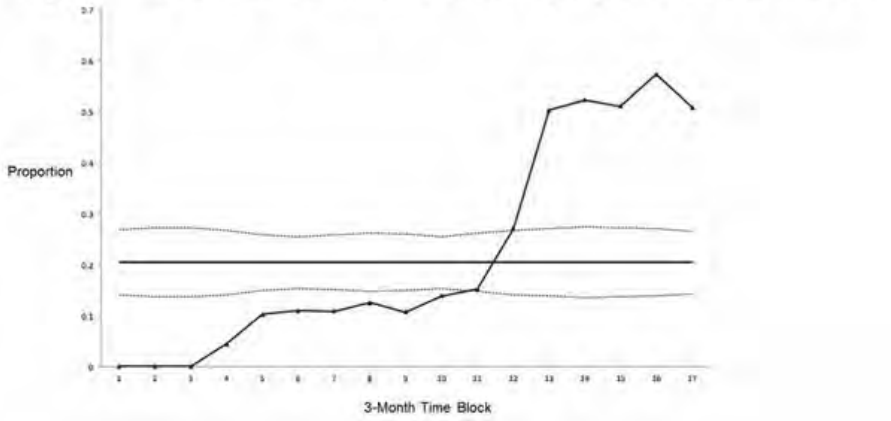
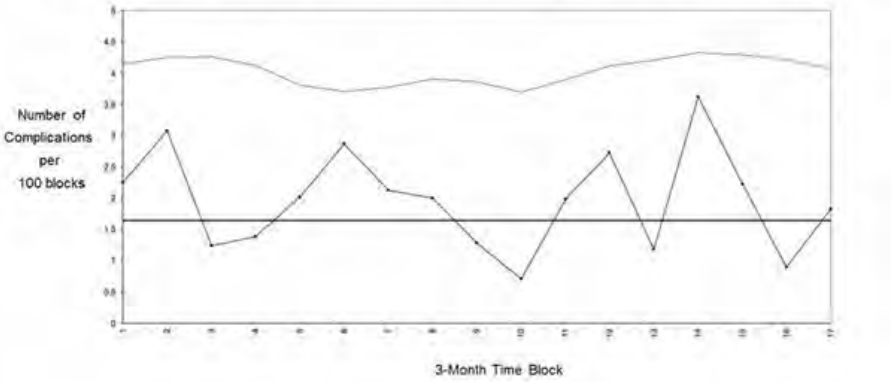
Tables/images

Figure 1: Adductor canal blocks as a proportion of all blocks

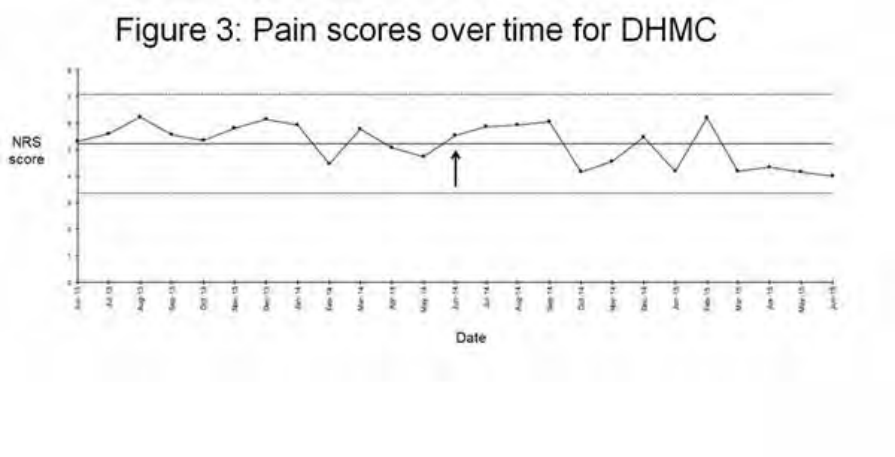


The solid line is the running average, dashed lines above and below are upper and lower control limits. Time period 13, represents a significant increase in the utilization of adductor canal block as a proportion of all blocks.

Figure 2: Immediate and PACU complications over time



Total immediate complications per 100 blocks at DHMC over the study period. The solid black line indicated the running average. The dashed line signifies upper control limit. There were no special cause signals, suggesting that the process is stable.



The solid line is the running average, dashed lines above and below are upper and lower control limits. The arrow is a practice change to adductor canal block for TKA. There are no special cause signals, suggesting that the process is stable

Table 1: Characteristics of regional anesthesia for TKA by hospital (2011-2015)

Hospital	TKA *n* (%)	Adductor *n* (%)	Femoral *n* (%)	Sciatic[π] *n* (%)	Other[‡] *n* (%)	Catheter[?] *n* (%)
1	1,307 (27.1)	169 (11.9)	1,224 (30.6)	549 (54.7)	253 (49.7)	1,188 (39.6)
2	2 (0.04)	0 (0)	2 (0.05)	0 (0)	0 (0)	1 (0.03)
3	427 (8.9)	177 (12.5)	280 (7.0)	4 (0.39)	1 (0.19)	442 (14.8)
4	221 (4.6)	63 (4.5)	165 (4.1)	147 (14.6)	21 (4.1)	122 (4.1)
5	129 (2.7)	1 (0.07)	128 (3.2)	7 (0.69)	7 (1.4)	1 (0.03)
6	19 (0.39)	0 (0)	21 (0.52)	0 (0)	2 (0.39)	1 (0.03)
7	3 (0.06)	0 (0)	3 (0.08)	0 (0)	0 (0)	1 (0.03)
8	67 (1.4)	4 (0.28)	53 (1.3)	8 (0.79)	15 (2.9)	49 (1.6)
9	71 (1.5)	0 (0)	54 (1.4)	1 (0.09)	18 (3.5)	42 (1.4)
10	16 (0.33)	0 (0)	13 (0.32)	2 (0.19)	3 (0.58)	6 (0.20)
11	352 (7.3)	202 (14.3)	266 (6.7)	181 (18.0)	99 (19.4)	310 (10.4)
12	189 (3.9)	138 (9.8)	179 (4.5)	93 (9.3)	37 (7.3)	189 (6.3)
13	60 (1.2)	2 (0.14)	53 (1.3)	3 (0.29)	5 (1.0)	3 (0.10)
14	2 (0.04)	0 (0)	2 (0.05)	1 (0.09)	0 (0)	0 (0)
15	1,664 (34.5)	599 (42.4)	1,328 (33.2)	2 (0.19)	22 (4.3)	517 (17.2)
16	114 (2.4)	6 (0.42)	108 (2.7)	0 (0)	0 (0)	63 (2.1)
17	42 (0.87)	14 (0.99)	30 (0.75)	0 (0)	0 (0)	42 (1.4)
18	122 (2.5)	26 (1.8)	83 (2.1)	6 (0.59)	26 (5.1)	10 (0.33)
19	2 (0.04)	1 (0.07)	1 (0.03)	0 (0)	0(0)	1 (0.03)
20	13 (0.27)	12 (0.84)	1 (0.03)	0 (0)	0 (0)	7 (0.23)
Total	4,822 (100)	1,414 (100)	3,994 (100)	1004 (100)	509 (100)	2,995 (100)

TKA = total knee replacement (unilateral), includes revision surgery
[π] Sciatic block includes any approach from popliteal fossa to proximal gluteal region
[‡] Other block includes lateral femoral cutaneous, obturator, and lumbar plexus
[?] Catheter refers to a continuous peripheral nerve block administered through a catheter

Characteristics of regional anesthesia for TKA by hospital (2011-2015)

Table 2. Practice comparision between pre and post adductor canal policy change for DHMC

	n	Pre-policy[c]	Post-policy[c]	p value[~]
Adductor Canal[π]	1,060	0.86%	85.7%	<0.001
Femoral[c]	1,060	97.9%	14.0%	<0.001
NRS score[¥]	1,060	5.5 (3.4)	4.9 (3.7)	0.005
30-day hospital re-evaluation following TKA[?]	1,060	3.3%	6.7%	0.001
30-day hospital re-evaluation following THA[?]	1,057	0.84%	0	0.05
Length of stay[£]	1,060	3.2 (2.1)	2.9 (1.8)	0.03

DHMC = Dartmouth-Hitchcock Medical Center; TKA = total knee arthroplasty (primary and revision), THA = total hip arthroplasty (primary and revision)
[π] Percentage of all blocks that were adductor canal blocks
[c] Percentage of all blocks that were femoral nerve blocks (includes either continuous or single shot)
[¥] Numeric Rating Scale score for pain, max recording in recovery room, mean (sd)
[?] Percentage of patients who experienced a hospital visit following discharge for pain related reasons
[£] Length of stay in days, mean (sd)
[=] Pre-policy June1, 2013 to May 31, 2014; Post-policy June 1, 2014 to June 18, 2015
[~] Comparing pre-policy with post-policy; chi square for proportional data; two sample t-test for continuous data

Practice comparison between pre and post adductor canal policy change for Dartmouth Hitchcock

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1371
Medically Challenging Cases (report of up to 4 cases)

Intra-operative TAP block performed directly on abdominal wall musculature during transverse rectus abdominus (TRAM) flap reconstruction following mastectomy for breast cancer

Melody Herman, Pascal Scemama De Gialluly, Jonathan M. Winograd,, A. Sassan Sabouri
Massachusetts General Hospital

Introduction

Previous studies have shown transversus abdominis Plane (TAP) blocks to significantly reduce post-operative parenteral opioid requirements following transverse rectus abdominis (TRAM) flap reconstruction of the breast (1). TAP block performed on an open incision and over abdominal muscle wall, for deep inferior epigastric perforator(DIEP) flap has been reported (2). This case report describes a TAP block under ultrasound guidance performed directly on the abdominal muscle wall, prior to skin closure.

Results/Case report

This case describes an obese (BMI 31.6) 67 year old female patient that underwent left nipple-sparing mastectomy with TRAM flap reconstruction. Past medical history consisted of post-partum DVT 29 years ago (not on anticoagulation), hypertension, hyperlipidemia, depression, and anxiety. Allergies included penicillin, sulfa, and blue dye. After proper consent, anesthesia was induced with standard induction agents and maintained with sevoflurane. Paralysis was maintained with rocuronium. Intra-operatively the patient received 250mcg of fentanyl at the start of the surgery and 1mg hydromorphone in divided doses of 0.2mg (the last dose of dilaudid was administered 3.5 hours before extubation, approximately 5 minutes after the TAP block was completed). While the TRAM flap was sewn to the pectaralis muscles, the TAP block was performed by the regional anesthesiologist simultaneously (two and half hours after surgery start time).

The block was performed directly over the external oblique muscle at the level of the umbilicus, mid-axillary line (Image 1,2). Under ultrasonic verification the three muscle layers, external oblique, internal oblique and transversus abdominis were identified with no overlying subcutaneous fat or tissue. A 22Ga, 80mm insulate Pajunk needle was advanced with in-plane approach and a total of 60 mL (30 mL per side) of 0.25% bupivicaine with 1:400,000 epinephrine was injected incrementally in 3cc aliquots post negative aspiration in the plane between the tranversus abdominus and internal oblique muscles(image 3). Post-operatively, the patient emerged without pain. First opioid analgesia request was 4 hours after the block completion and the patient was subsequently started on morphine PCA. On POD 1 the patient was successfully transitioned from morphine PCA to oxycodone. On POD 2 the patient was discharged home with low-dose oxycodone taper.

Discussion

To our knowledge, this is the first reported TAP block performed directly on the abdominal wall musculature for TRAM flap reconstruction of the breast. We decided to do a TAP block intra-operatively rather than post-operatively given the patient's obese body habitus. Removal of skin and subcutaneous tissue significantly improved visualization of the muscle planes. Surgical removal of the rectus abdominus muscle and placement of a mesh over the external oblique muscle would have further impaired ultrasound visualization post-operatively. Performing the block intra-operatively prior to surgical closure allowed better exposure to the patient, unhindered by surgical dressing. This patient had immediate post-operative pain control with the TAP block and did not require opioids until 4 hours after completion of the TAP block. It is not clear why the sensory block duration was less the average TAP blocks. More case series and studies are needed to compare this approach with classical TAP over the skin .

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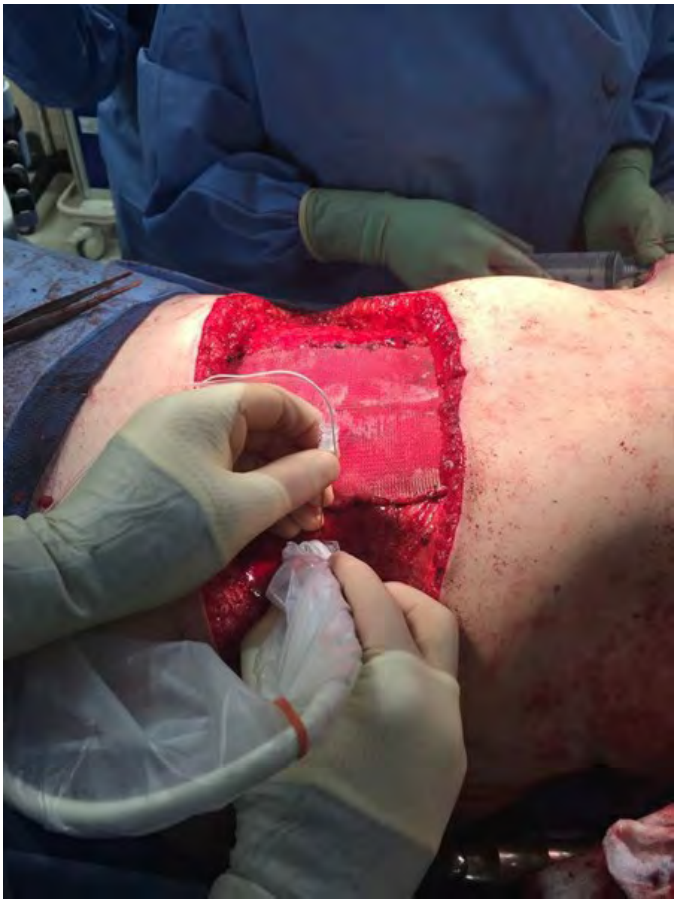

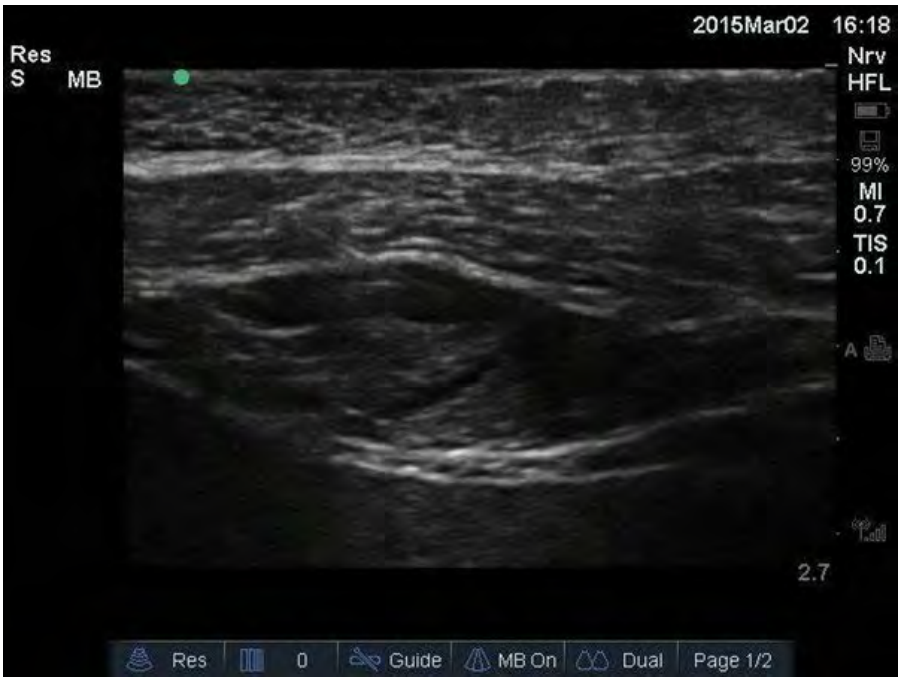

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1372
Medically Challenging Cases (report of up to 4 cases)

Role of Epidural in Fistulotomy

Daniel Roshan, Rena Beckerly
University of Illinios at Chicago

Introduction

This is a case report regarding the placement of an epidural in a non septic patient who developed sepsis during the procedure. We hope to bring attention to patients at higher risk of developing sepsis intraoperatively and weigh the increased risks of placing an epidural in such patients.

Results/Case report

Our patient is a 24 year old man with a history of Crohn's disease s/p partial colectomy, small bowel obstructions s/p lysis of adhesions that presented for an exploratory laparatomy for recurrent abdominal pain and diarrhea. CT Abdomen revealed a possible enterocolic fistula. The patient's vital signs were stable (HR 71, BP 129/76, RR 14, SaO2 98%, T: 37.3C). The patient's WBC was 8, Hgb 14.2, Plt 240. The basic metabolic panel was also within normal limits. A T8 epidural was placed preoperatively for expected midline abdominal incision. A test dose of 3ml of 1.5% Lidocaine and 1/200:000 epinephrine was administered and found to be negative. The patient was taken the the OR, induced, and intubated without any complications. During the operation the enterocolic fistula was found and during the fistulotomy the patient became significantly hypotensive to the systolic blood pressure of 60s and tachycardic to the 150s requiring a low dose epinephrine drip to maintain MAPs above 65. Of note, the epidural was not dosed with local anesthetics or narcotics. The surgery was completed and the patient was taken back up to the SICU still on pressors and started on broad spectrum antibiotics. The patient was weaned off pressors that evening and extubated. The epidural catheter was also removed for concern for possible seeding to the epidural space. The patient was transferred out of the ICU on POD2 and discharged from the hospital on POD 5.

Discussion

Epidurals are commonly placed for major abdominal surgeries to optimize pain control while minimizing narcotics usage. This strategy is especially useful for certain patient populations with certain significant comorbidities that are higher risk of post operative pulmonary complications from high dose narcotics use including OSA, COPD, and the morbidly obese. Our patient did not have a clear contraindication for epidural placement and did not appear septic. However, during the operation ligating the inflamed fistula likely caused a release of bacteria in the bloodstream resulting in sepsis. While placement of an epidural in the setting of sepsis is not an absolute contraindication, the development of an epidural abscess from seeding is a concern that would steer many providers from placing an epidural. Moreover, the sympathetic blockade from dosing an epidural with local anesthetics can exacerbate hypotension in patients that are already vasodilated from sepsis. This case brings to question if patients who are not actively septic but have the potential release of pathogens into the bloodstream from surgical intervention should have epidurals placed at all.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1375
Scientific abstract: Chronic pain

Lidocaine infusion as an alternative for the treatment of fibromyalgia

Juan Mora, Hagop Tabakian
University of Florida - Jacksonville

Introduction

Fibromyalgia is a recognized centralized pain syndrome characterized by chronic widespread pain often associated with fatigue, cognitive changes, mood and sleep disturbances. With a prevalence of 2-8%, it is most commonly seen in middle age females and its etiology is shared between a genetic component and environmental stressors such as acute pain, infections, trauma, psychological stress and/or psychiatric disorders.
Establishing a diagnosis of fibromyalgia can be challenging due that other similar diseases have to be ruled out first and patients will usually go through extensive workup until they finally are diagnosed. Currently the most accepted diagnosis criteria have been proposed by the American College of Rheumatology in 2010. The use of this tool combined with a clinical evaluation will establish the diagnosis of Fibromyalgia.
After the diagnose has been made, a multidisciplinary approach should be done. Non pharmacological therapies such as patient education, exercise and behavioral therapy have a high grade of evidence (A1) and the clinician should always attempt to use them.
Among the pharmacological options available the ones with the better results are tricyclic antidepressants, gabapentinoids, serotonin-norepinephrine reuptake inhibitors (SNRI) and y-Hydroxybutirate. Opioids, corticoids and NSAIDs are not effective in the treatment of fibromyalgia and sometimes their use can be detrimental for the patient.
Lidocaine, a sodium channel blocker has been proposed as a treatment alternative, but due to scant research and lack of consensus of dosages and infusion protocols. This option has not been widely used.

Results/Case report

30 years old female with PMH of obesity, migraines, epilepsy, SLE and Sjorgen's syndrome complaining of generalized pain 8/10 described as muscle and joint tightness combined with sharp pain that interferes with daily activities and sleep. Family history of chronic pain (mother, father and brother with chronic pain pathologies). Multiple procedures and surgeries in the past and diagnosis of fibromyalgia was made by 2 different rheumatologists. She had prior failure of treatment with gabapentinoids, SNRI, opioids, muscle relaxants and interventional pain procedures, but a previous successful lidocaine infusion procedure.
Patient was scheduled for lidocaine infusion 3.25mg/kg over 45 minutes, prior hydration and close monitoring of vital signs and telemetry. First infusion resulted in adequate reduction of pain from 7 to 4 that lasted one month. On a second scheduled lidocaine infusion patient had reduction of pain from 8 to 3. There were no adverse effects during the infusions.

Discussion

Fibromyalgia is a chronic pain pathology that is very particular in presentation and response to different treatments. Currently the recommendation is to start with a non-pharmacological approach followed by a trial of different medications. It becomes challenging when fibromyalgia is associated with other pathologies and proposed pharmacological treatments are not effective controlling the pain or they are not tolerated by the patient.
Lidocaine infusion can be low risk alternative that if used under a controlled setting can provide adequate pain relief for a period of time of approximately one month. Further studies are required to develop protocols and prove its efficacy.

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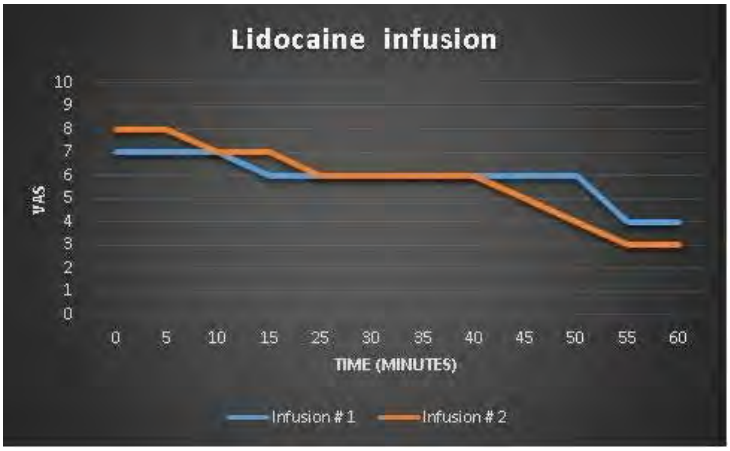

Lidocaine infusion

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1376
Medically Challenging Cases (report of up to 4 cases)

Neuraxial technique in parturient with a spinal cord stimulator

Stephen Turk, John Burgner
Virginia Commonwealth University

Introduction

Spinal cord stimulation is a therapeutic modality used in the treatment of chronic pain. It consists of stimulating electrodes implanted in the epidural space, an electrical pulse generator implanted in the lower abdominal area or gluteal region, conducting wires, and the generator remote control. Implantation of spinal cord stimulators are becoming more common and are occasionally placed in women of child-bearing age. This patient population requires special consideration for obstetricians and anesthesiologists when planning for delivery.

Results/Case report

36yo female G2P0010 at 40 weeks and 4 days presented to the Labor and Delivery unit for induction of labor due to oligohydramnios. The patient's past medical history was significant for two unknown lumbar back surgeries for chronic pain. Subsequently, the patient had a spinal cord stimulator placed at an outside hospital which was no longer in use. Additional history included asthma, 0.5 PPD tobacco use, and obesity.
The patient presented at night and had no documentation of the levels of her lumbar surgeries, whether she had hardware placed, or in what level the spinal cord stimulator was placed. The patient was offered IV analgesia for labor due to concern for neuraxial analgesia. Lumbosacral plain films were obtained which showed the SCS entering the epidural space in the T9-T10 interspace with the conducting wires tunneled around the right to the electrical pulse generator in the lower right abdomen. After discussing the risks and benefits of epidural placement, the patient consented to a lumbar epidural for labor analgesia. During the day, the epidural demonstrated to be patchy and poorly controlled the patient's pain. The patient required additional IV fentanyl boluses for analgesia.
Approximately 24 hours after admission, the decision was made by the obstetricians to proceed to C-section due to active phase arrest. With the poorly functioning epidural and patient desire to avoid general anesthesia, the decision was made to remove the existing epidural catheter and proceed with combined spinal-epidural with intrathecal bupivacaine for surgery and post-operative PCEA with fentanyl. A bilateral T4 level was obtained with the spinal dose, and the patient tolerated surgery well. Her postoperative course was uneventful with the epidural PCEA adequately controlling her post-operative pain. The epidural was removed on post-op day 1 with no complications, and the patient discharged home on post-op day 3.

Discussion

The anesthetic management of a parturient with a spinal cord stimulator presenting in labor ideally would involve a multidisciplinary approach involving the anesthesia team, OB team, and the pain specialist who implanted the SCS. In the case above, no specifics of the SCS were known to the anesthesia team upon patient presentation. Theoretical risks of epidural placement in a patient with a SCS include infection and damage to leads or conducting wires. Another consideration includes ineffective analgesia due to epidural scarring from SCS placement. Our case highlights the need for close communication between the obstetric team and anesthesia when these patients are identified so that records can be obtained and an anesthetic plan can be formulated in advance.

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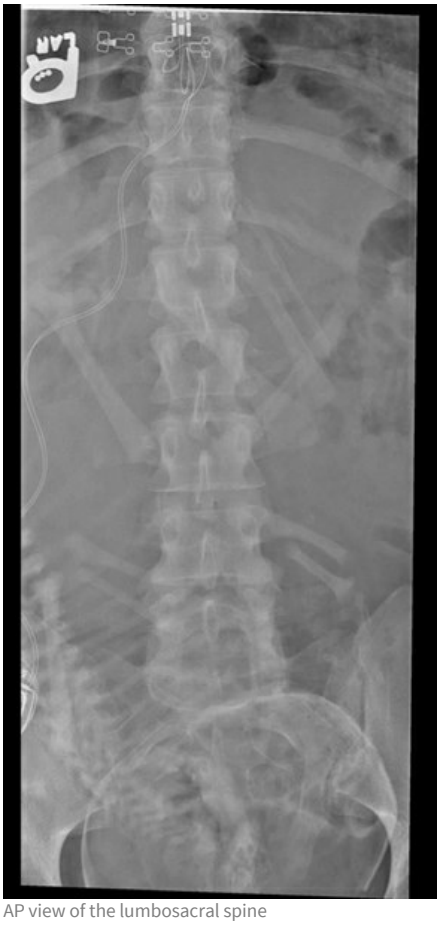
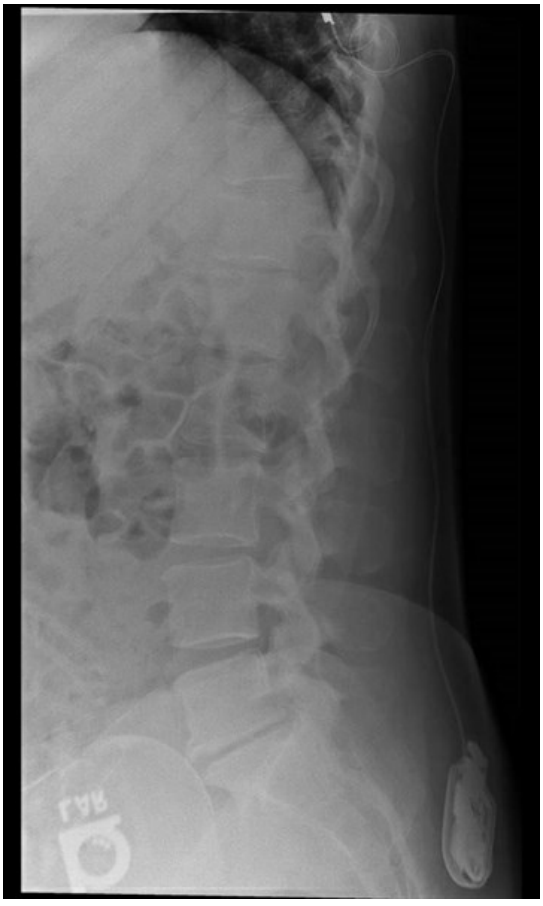


AP view of the lumbosacral spine



Lateral view of the lumbosacral spine

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
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New Orleans LA

Abstract: 1377
Medically Challenging Cases (report of up to 4 cases)

The perioperative pain management of CRPS after elective surgery of an affected extremity

Preetma Kooner, Katherin Peperzak
University of Washington

Introduction

Complex regional pain syndrome (CRPS) describes a variety of symptoms including allodynia, abnormal color, temperature, and sweat changes, and swelling, stemming from central sensitization and dysfunction of the autonomic system[1,2]. There is a paucity of data on the expected course for patients with pre-existing CRPS who are undergoing surgery on the affected region. Reports have been published on patients with CRPS receiving peripheral nerve blocks for their symptoms, but not as part of a perioperative course[3,4].

Results/Case report

DA is a 73 year old female with COPD and bipolar disorder newly diagnosed with CRPS by the Budapest Criteria during a preoperative evaluation. She underwent right total knee arthroplasty under epidural anesthesia 5 years prior, complicated by a peroneal nerve injury and compartment syndrome, secondary to prolonged tourniquet time of approximately 3 hours with concurrent high inflation pressures. On exam her right lower leg revealed severe equinovarus deformity with foot drop and was significantly darker and cooler than the left with diffuse hair and skin changes. She exhibited severe allodynia with light pressure throughout the right lower extremity, particularly between the first and second toe. Home medications included buproprion, duloxetine, and topiramate for bipolar disorder. After consultation with her psychiatrist, the patient's topiramate was increased from 50 mg daily to 100 mg twice daily with significant reduction of her baseline pain.

The patient underwent extensive ankle surgery and Achilles lengthening to correct the acquired equinovarus deformity. Tourniquet time was limited to 87 minutes. Postoperatively she received right sciatic and saphenous peripheral nerve catheters with ropivacaine 0.2% at 8ml/hr and 6ml/hr respectively. She also received scheduled acetaminophen, prednisone 40 mg x 5 days (for pulmonary function), duloxetine, buproprion, topiramate, and hydromorphone prn which she used sparingly (maximum 45 MEQ in 24 hours). Upon removal of the peripheral nerve catheters after 5 days the patient did experience increase in pain but was managed with low doses of opioids.

At follow-up 2 months post-discharge the patient noted her right lower extremity pain to be 30% better than it was prior to surgery, temperature and color were more similar between the lower extremities, and the patient was no longer utilizing opioid medication.

Discussion

In this case, not only was exacerbation of the patient's CRPS symptoms avoided, but she also experienced overall improvement in her pain. Optimizing pain control prior to surgery likely improved our ability to control her pain post-operatively. Additionally, multimodal pain management was utilized including peripheral nerve blocks, hydromorphone, acetaminophen, topiramate and duloxetine. Steroid use may have contributed to pain relief as literature suggests that patients with CPRS secondary to stroke benefit from steroid therapy.[5]

Based on our experience we recommend the following strategy:

- Seek expert consultation preoperatively to ensure optimization and provide counseling regarding risks of worsening pain
- Consider use of perioperative oral steroids, keeping in mind risks of steroid therapy
- Encourage surgeons to avoid or limit tourniquet duration
- Utilize peripheral nerve blockade
- Ensure multi-modal pain management with opioids, neuromodulators, SNRI/TCA, acetaminophen, and/or NSAIDS as appropriate

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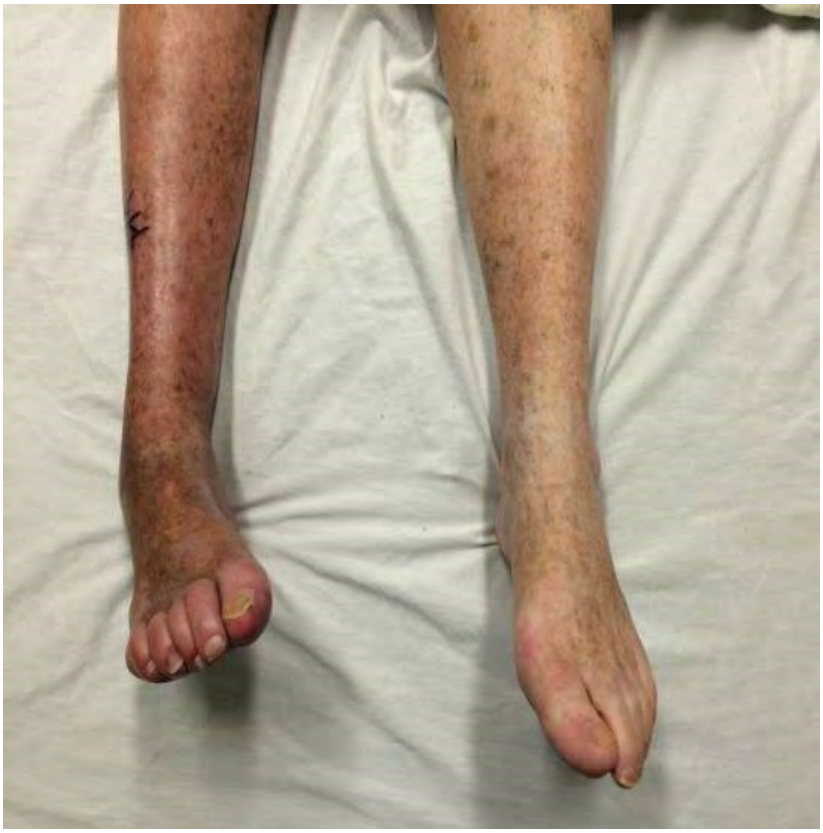

Figure 1: Pre-operative

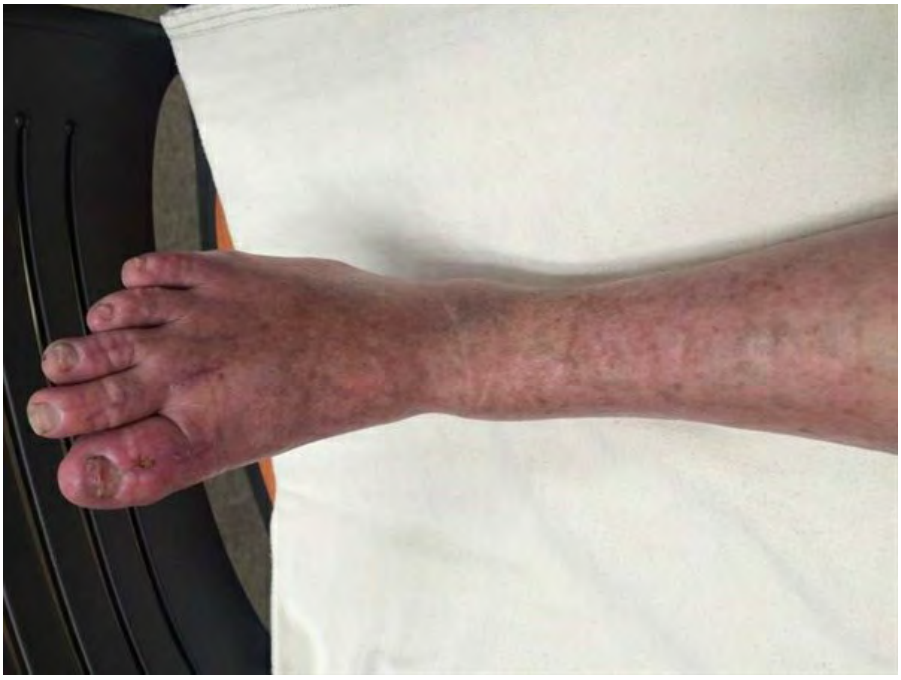

Figure 2: 2 months Post-operative

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1378
Medically Challenging Cases (report of up to 4 cases)

Regional Anesthesia for a Total Knee Arthroplasty on an Adult Patient with Spastic Diplegia and an Intrathecal Baclofen Pump

Erild Bojaxhi, David Salek, Roy Greengrass
Mayo Clinic

Introduction

In spastic diplegia, a type of Cerebral Palsy, the lower limbs of the patient are affected by spasticity and often painful contractures which ultimately result in muscle and joint breakdown requiring surgical corrections over time. Epidural anesthesia can safely be used for patients with CP (**2**), however it becomes more of a challenge and potentially risky if the patient is receiving intrathecal (IT) baclofen therapy. It was previously shown in a case series of 87 patients undergoing TKA that lumbar plexus and sciatic nerve blockade was an effective method of providing surgical anesthesia in 78% of patients, while 92% reported that it was easier to recover from a regional technique than a general anesthetic (**6**).

Results/Case report

We present a case of a 64 year-old woman with a history of spastic diplegia, a form of CP, scheduled for an elective second revision of a left knee arthroplasty with quadriceps tendon reconstruction. Upon reviewing the procedure report of the IT baclofen pump placement, the catheter entered the dural sac at L5 – S1 interspace and threaded cephalad to L1 – L2. A posterior approach to the left lumbar plexus block was performed. The patient was placed in the right lateral position with her left hip and knee flexed (Sims' position). Under aseptic technique, an 18 G stimulating Touhy needle was inserted at the perpendicular intersection of an intercristal line at the iliac crests (corresponding to L4 – L5), and a second line running though the posterior superior iliac spine (PSIS) and parallel to the spine. A quadriceps twitch was elicited via nerve stimulator at 0.55mA, and 20 cc of 0.5% ropivacaine was incrementally injected after negative aspiration of blood or cerebral spinal fluid (CSF). A 20 G soft tip catheter was then advanced though the needle with 3 cm left beyond the tip of the needle. The sciatic nerve was blocked while the patient was still in the right Sims' position using the posterior Labat approach (**15**). A line was drawn from the PSIS to the greater trochanter. At the midpoint, a perpendicular line running caudate is drawn measuring 4 cm, and marking the needle insertion site. Under aseptic technique, a 20G B. Braun stimulating needle was advance and elicited a plantar flexion of the foot at 0.46 mA. After negative aspiration, 15cc of 0.5% ropivacaine was incrementally injected thought the needle.

Discussion

A case series of 87 patients describes the efficacy of a lumbar plexus block combined with sciatic nerve blockade as a primary anesthetic and for postoperative analgesia for total knee arthroplasty (**6**). Luber et al. have previously concluded that the combined lumbar plexus and sciatic nerve block provided safe and effective anesthesia and analgesia. Additionally, analgesia provided by a lumbar plexus block is also prolonged with use of continuous sciatic peripheral nerve catheter resulting in lower opioid use and early recovery (**6**). In this case, a lumbar plexus and a sciatic nerve block was successfully utilized to provide anesthesia intra-op and a lumbar plexus catheter to provide analgesia postoperatively.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1380
Scientific abstract: Regional anesthesia

Fascia Iliaca block with liposomal bupivicaine for hip fractures prior to surgery

Yitzhak Belsh
Monmouth Medical Center

Introduction

Pain after a hip fracture is often severe. Analgesia and some anesthesia can be provided with a Fascia Iliaca Block (FIB). This involves placing local anesthetic into an anatomical compartment containing nerves from the lumbar plexus[1,2], allowing for less opioids and other analgesics to treat the pain. It is important to use sufficient volume for this block as it allows for cephalic spread and adequate distribution to the lumbar plexus. This block is also a good alternative to a lumbar plexus block, is easier to perform, and probably safer as well.

Liposomal bupivacaine uses depofoam technology to release bupivacaine over time. Depofoam is a multivesicular liposomal delivery technology that encapsulates drugs without altering their molecular structure and releases them over a desired period of time thus extending the effect of the local anesthetic up to 72-96hrs[3]. Its use in nerve blocks is an off label use.

Materials and methods (NA for case report)

After institutional review board approval, the records of five patients who received fasica iliaca blocks with liposomal bupivacaine after hip fracture were reviewed. Pain scores and opioid consumption were reviewed both before the block and for 72 hrs after the block. Use of adjuvant pain medications such as IV acetaminophen, ketorolac, and other NSAIDs were also be recorded.

Results/Case report

Here we present 5 cases using liposomal bupivacaine as an off-label procedure using a single shot fascia iliaca block for acute pain management after hip fractures. Nerve blocks were performed under ultrasound guidance (UG) using an in-plane approach to the fascia iliaca compartment. Pain scores were dramatically reduced for all our patients after the block. Liposomal bupivacaine provided prolongation of the peripheral nerve block beyond the usual 12-24hrs and lasted as long as 3 days.

Discussion

The cases presented show a new approach to an old technique that can help hip fracture patients. We describe ultrasound guided FIB performed with liposomal bupivacaine, used off label, that provides extended preoperative and post-operative pain control, lowers narcotic use, improves pain scores, and may facilitate faster discharge from hospitals as described in our cases.

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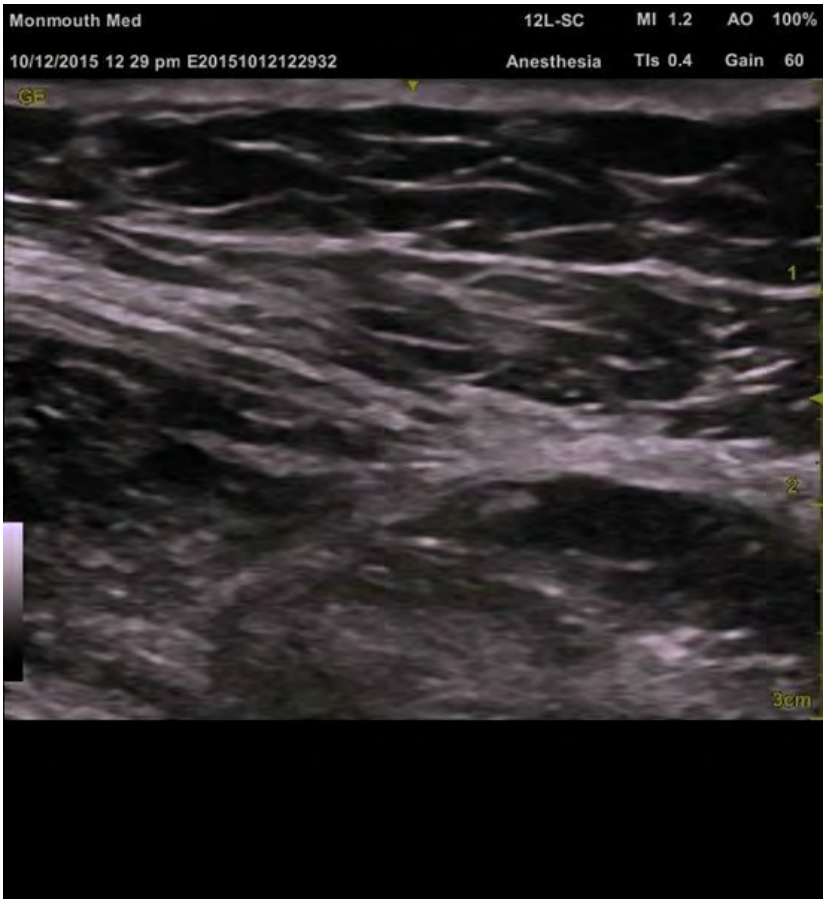
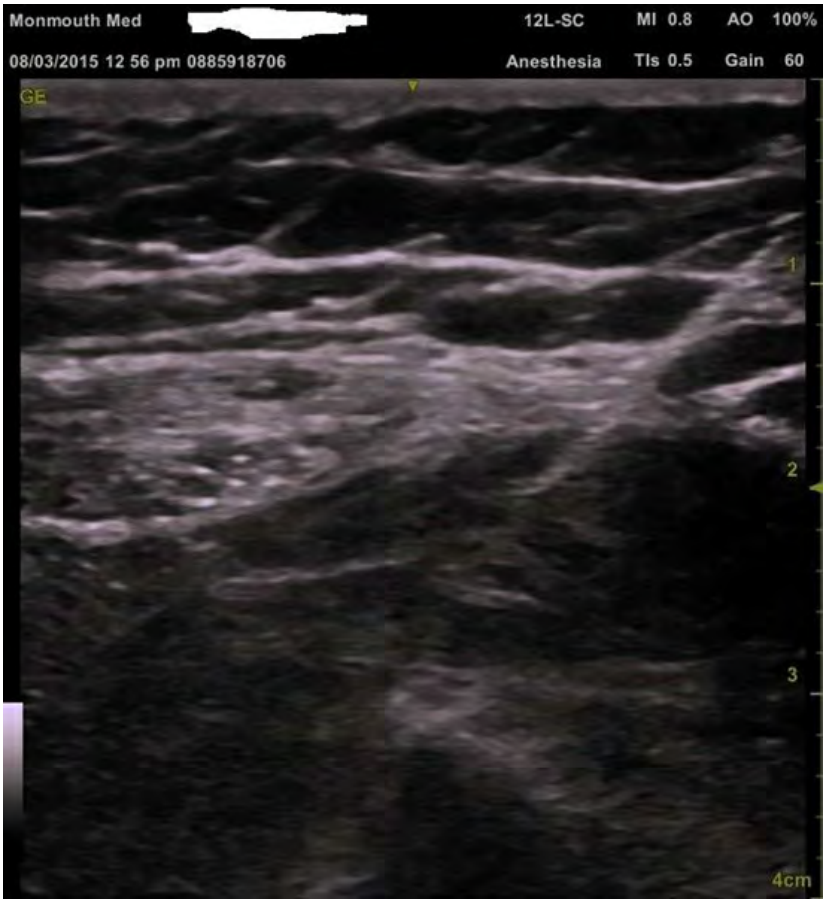


ultrasound picture of fascia iliaca.



Fascia Iliaca block with needle in view

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1381
Scientific abstract: Acute pain

Epidural Blood Patch for Spontaneous Intracranial Hypotension: A Case Report

Nigel Knox
Westchester Medical Center

Introduction

Spontaneous intracranial hypotension (SIH), is an uncommon cause of headache, usually manifests with postural headaches, and is most commonly caused by a leak of cerebral spinal fluid (CSF). It may present with or without other neurologic complaints. Magnetic resonance imaging (MRI) of the brain typically demonstrates diffuse pachymeningeal gadolinium enhancement, often with sagging of the brainstem, and, less commonly, with subdural fluid collections, enlargement of the pituitary gland, decreased ventricular size, or distended cerebral venous sinuses. After a trial of conservative management, treatment of choice is epidural blood patch (EBP). Surgery and fibrin glue are available when less invasive management fails and where a site of the leak can be identified.

Materials and methods (NA for case report)

The authors describe a 48 year old male with no significant past medical history or trauma to the spine who presented with 2 months of severe non-postural headaches , lethargy and progressive disability. The patient had an MRI that was notable for bilateral hygromas and had a negative leak work up. He was referred by neurosurgery for possible EBP.

Results/Case report

: The patient had an unremarkable past medical history and started having progressively severe headaches and lethargy over two months previous to presenting to the pain clinic. The patient returned from a road trip complaining of worsening severe headaches described as pressure on top of his head 100% of the time with no positional component and no vision changes, nausea, vomiting, incontinence, or other neurologic symptoms but with pathologic yawning and lethargy. The patient saw his primary care provider and had a negative computed tomography (CT) of the head. His headaches persisted and he was referred to neurosurgery after an MRI showing subdural fluid collections consistent with subdural effusions versus hematomas as well as diffuse pachymeningeal enhancement, sagging of the brainstem and effacement of the basilar cisterns. Workup for a coagulopathy, MRA, and MR myelogram of the spine for CSF leak were all negative. The patient was then referred to the pain clinic at Westchester Medical Center for evaluation and possible EBP. The decision was made to proceed with EBP, first lumbar, followed by consideration of thoracic / cervical locations and the patient underwent lumbar EBP under fluoroscopy. The following day the patient presented to the emergency department with nausea / vomiting and underwent repeat MRI. The patient's headache had largely subsided and repeat MRI demonstrated stable bilateral hygromas, decreased diffuse pachymeningeal enhancement, interval decrease in sagging of the brainstem and effacement of the basilar cisterns, interval increase in the size of the lateral ventricles, and interval decrease in size of the pituitary gland. The patient's nausea and vomiting resolved within a day and the patient's headaches had largely resolved, with marked improved function.

Discussion

Spontaneous intracranial hypotension is an uncommon cause of headache and may present with or without other neurologic complaints. Diagnosis is often delayed and EBP is the treatment of choice if conservative management fails. It is important for the pain management physician to be familiar with this entity, its variable presentation and treatments.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1385
Medically Challenging Cases (report of up to 4 cases)

Ultrasound Guided Suprascapular and Axillary Nerve Blocks for Postoperative Analgesia following Total Shoulder Arthroplasty in a Patient with Severe Restrictive Lung Disease

David Olsen, Jason Panchamia, Adam Amundson
Mayo Clinic

Introduction

We report a case of an ultrasound guided axillary nerve block (ANB) combined with a suprascapular nerve block (SSNB) for postoperative pain control in a patient with contraindications to interscalene brachial plexus block (ISB). We discuss management options and contraindications to regional analgesia for total shoulder arthroplasty (TSA).

Results/Case report

A 75-year-old female [ASA 3, height 159 cm, weight 57.1 kg] with a complex past medical history including severe restrictive interstitial lung disease requiring supplemental oxygen, pulmonary hypertension, and chronic pain on narcotics, presented for a TSA.

An ICU bed was reserved for postoperative monitoring because of the patient's tenous pulmonary status and concern for postoperative pain control. Furthermore, the anesthesia team felt that ISB was contraindicated given the risk of phrenic nerve block even with a low dose ISB. She therefore underwent a preoperative ultrasound guided SSNB and ANB. The SSNB approach was through the transverse scapular ligament into the suprascapular notch for the SSNB as described by Lee(1). The ultrasound guided ANB was performed by finding the circumflex artery as it transverses the quadrangular space posterior to the humerus as shown in Figure 1. Nerve proximity was confirmed with nerve stimulator. 10 ml of 0.5% bupivicaine with epinephrine 1:200000 was injected at each site. Patient noted decrease sensation over deltoid region of surgical extremity. The patient then underwent general endotracheal intubation and an uneventful surgery. In the PACU, the patient rated her pain control as excellent. She was placed on both a fentanyl PCA and her home oral oxycodone and dismissed to the surgical floor. Her pain levels remained within two points of her baseline pain (VAS 5/10).

Discussion

Interscalene brachial plexus block is considered the gold standard for pain control after TSA(2). However, temporary phrenic nerve blockade is possible even when using low dose ultrasound guided techniques(3). This can lead to approximately 25% reductions in forced vital capacity, forced expiratory volume at 1 s, and peak expiratory flow rates(4). While likely insigificant for healthy patients, these changes could cause respiratory compromise in some patients.

Given these limitations, alternatives to the ISB have been proposed (5-7). 70% of the shoulder joint innervation is via the suprascapular nerve, a branch of the superior trunk, making the SSNB a useful target for regional techniques (6). The axillary (circumflex) nerve, a branch of the posterior cord, innervated the majority of the remaining structures in the shoulder join with minor contributions from the lateral pectoral, the subscapular, and the musculocutaneous nerves. Blockade of the axillary nerve has been reported using landmark and nerve stimulator techniques(5). Only recently has ultrasound been reported for ANB following arthroscopic shoulder surgery(1,2). The combination of SSNB with ANB has better pain control than SSN alone (1).

This case demonstrates that ultrasound guided SSNB and ANB is an alternative approach to analgesia for patients with respiratory compromise undergoing major shoulder surgery.

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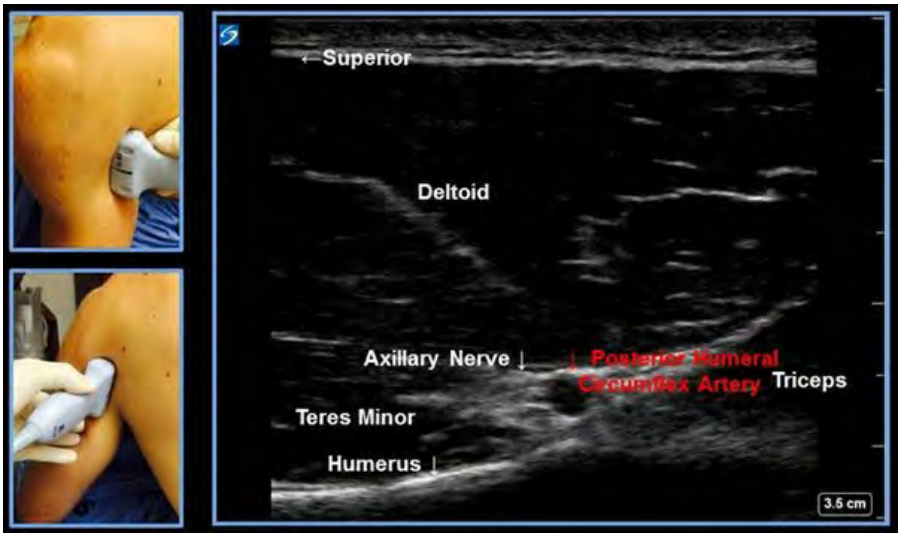

Figure 1: Ultrasound guided ANB. Probe orientation is parallel to humerus on posterior aspect of arm. Injection is in-plane with needle target just above posterior humeral circumflex artery.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1387
Scientific abstract: Acute pain

Experience with Epidural placement on Immunosuppressed Patients Status-post Transplant

Yar Yeap, John Powelson, John Wolfe
Indiana University Hospital

Introduction

Post-operative pain management in transplant patients undergoing incisional site herniorraphy is challenging. Historically, pain control is limited to oral narcotics due to epidural catheter infection risk in immunosuppressed post-transplant patients. The use of parental pain control methods is associated with systemic side effects (ileus, respiratory depression), which can limit dosage causing a decrease pain control, decrease patient satisfaction, and increase in ICU/hospital stay (Saber 2009).

Using expert guidance and sterile technique, epidural usage in transplant patients undergoing herniorraphy for pain control was introduced at Indiana University Hospital in 2013. This novel therapy appears to improve post-operative pain, decrease side effects of medications, and decrease length of hospital/ICU stay. We aim to study if introduction of epidural has led to better outcomes for the patient and hospital. Inadequate literature is published to date on use of epidural in immunosuppressed patients.

Materials and methods (NA for case report)

After obtaining IRB approval (protocol number 1412976834), we did a retrospective chart review of all solid organ transplant patients undergoing incisional hernia repair from January 1 of 2011 to the end of June 2015 at Indiana University Hospital. The investigation evaluate pain scores, narcotic use, time to first flatus and bowel movement, and side effects (nausea, vomiting, respiratory depression, pneumonia, and aspiration).

Results/Case report

The retrospective chart review covered a total of 154 patients. 98 patients fall under the no epidural group and 56 patients had received epidurals during those time period. We analyzed the median, mean, and max pain scores on all these patients on POD 1,2, and 3. Patients in the epidural group showed a significant decrease in pain scores. We also analyzed the narcotic usage on all these patients on POD 1,2, and 3. Patients in the epidural group showed a significant decrease in narcotic usage as well.

Discussion

Our retrospective chart review showed a significant improvement in pain scores and narcotic usage in patients receiving epidurals for hernia repair after solid organ transplant. No major side effects were noted in any of the patients in the epidural group. Aspiration increases morbidity and mortality in immunosuppressed patients, hence any methods that decreases narcotic usage and pain scores is beneficial in these patients. Our data support the usage of epidural in immunosuppressed patients after organ transplant surgery.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1388
Medically Challenging Cases (report of up to 4 cases)

Ultrasound-Guided Left Cervical Stellate Ganglion Block for Recurrent Ventricular Tachycardia (Electrical Storm)

Michael Ander
Loyola University Medical Center

Introduction

Recurrent Ventricular Tachycardia (RVT), or Electrical Storm (ES), is a relatively common cause of mortality and morbidity after myocardial infarction. ES is defined as three or more sustained episodes of ventricular tachycardia (VT) or ventricular fibrillation in a 24-hour period. These episodes must last greater than 30 seconds in duration, involve hemodynamic compromise, and require intervention to terminate.[1] We present a case in which left cervical stellate ganglion blocks (CSGBs) were performed under ultrasound guidance in order to alleviate ES in a patient requiring extracorpeal membrane oxygenation (ECMO) after myocardial infarction.

Results/Case report

A medically complex 54-year old male two weeks removed from anterior STEMI status post percutaneous revascularization and intra-aortic balloon pump placement (IABP) presented in the cardiovascular ICU with recurrent stable VT initially controlled by amiodarone and lidocaine infusions; however, the lidocaine had to be discontinued after the patient sustained a seizure. His condition further deteriorated when he progressed into sustained, hemodynamically unstable VT which required more than 20 defibrillations in a 24-hour period, multiple vasoactive infusions, multiple antiarrhythmic infusions, and the institution of ECMO.

Our Acute Pain Service was consulted by the cardiac electrophysiology (EP) service to provide left CSGBs in attempt to attenuate ES. On consecutive days, two single shot ultrasound-guided CSGBs were performed each attenuating the VT for approximately 12 hours. A left stellate ganglion catheter (SGC) was eventually placed, and a continuous infusion of ropivicaine was started. The patient experienced complete relief from unstable VT and no further defibrillations required. The catheter allowed for ECMO and IABP decannulation without the return of ES. The patient underwent tracheostomy and surgical ablation of the left cervical sympathetic ganglion on catheter day 12. The left SGC catheter removed immediately after surgery.

Discussion

The CSGB, or more appropriately called the cervical sympathetic trunk (CST), is a well-established intervention for sympathetically mediated disorders including multiple pain syndromes, cardiac arrhythmias, and vascular insufficiencies. The cervical stellate ganglion (CSG) is present in ~80% of the population and is located just anterior to the transverse process of the C7 vertebra and superior to the first rib. Along with the middle cervical ganglion, traversing fibers of the CSG are present at the level of C6, and are located anterolaterally to the belly of the longus colli muscle.[3]

Although traditionally described as a blind technique, the use of ultrasound guidance has led to lower volume of local anesthesia requirements, fewer hematoma creations, and a more rapid onset of Horner syndrome. Described complications of CSGB include unintentional esophageal and tracheal puncture, injury to the pleura and lung, recurrent laryngeal and phrenic nerve injury, thyroid gland trauma, infectious complications, epidural and intrathecal spread, intravascular injection of the carotid artery, jugular veins, or vertebral artery leading to seizure and cardiac arrest.[2,3,4]

ES is an important cause of morbidity and mortality in patients with recent ischemic cardiac injury. CSGB is a simple bedside procedure that may be a valuable tool for patients with ES. We report successful treatment of ES with ultrasound-guided CSGBs in an anticoagulated patient on ECMO.

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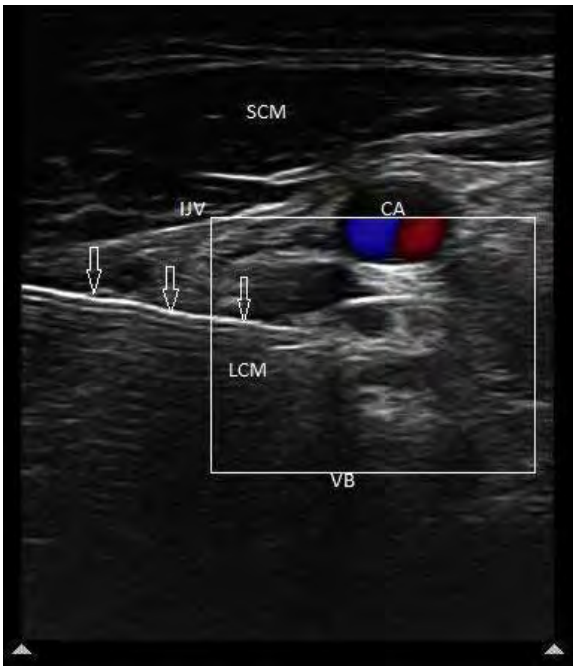
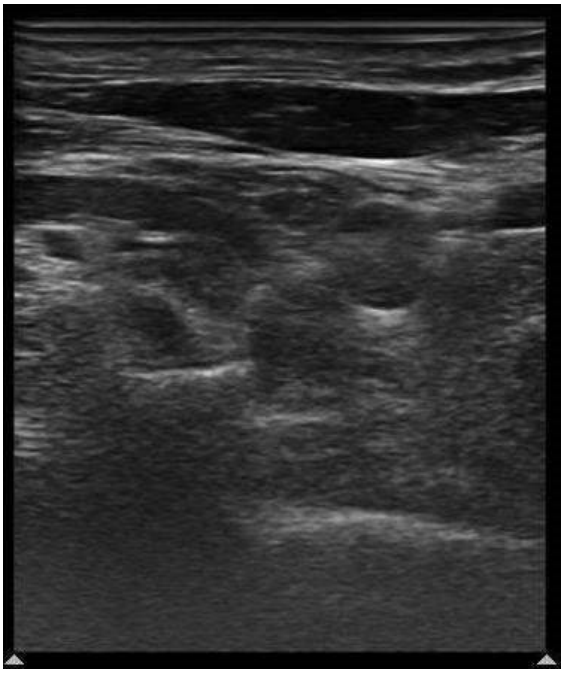


Figure 1. Block needle (arrowheads). VB, C6 vertebral body; LCM, longus colli muscle; IJV, internal jugular vein; CA, carotid artery; SCM, sternocleidomastoid muscle



Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1389
Medically Challenging Cases (report of up to 4 cases)

Interscalene Catheter Resulting in a Persistent Phrenic Nerve Palsy

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The Ohio State University Wexner Medical Center

Introduction

Interscalene blocks (ISB) are commonly used as an adjuvant therapy for shoulder surgery to optimize postoperative pain, decrease length of hospitalization and time in the postanesthesia care unit[1-3]. Transient phrenic nerve palsy following ISB can be anticipated in up to 100% of cases and is expected to resolve with nerve block resolution[4]. We present a case of prolonged phrenic nerve paresis (PPNP) following placement of an interscalene nerve catheter for a patient undergoing reverse total shoulder arthroplasty (TSA).

Results/Case report

A 76 year-old male of average body habitus with history of mild COPD, CAD/MI s/p PCI x3 and hypertension presented for reverse TSA in the beach chair position. Preoperatively an interscalene nerve catheter was placed under direct ultrasound guidance utilizing a posterior approach[5]. An initial bolus of 30cc of 0.5% Ropivacaine was used followed by a 2 day infusion of 0.2% Ropivacaine at 10ml/hour. The patient's surgical and hospital course were uneventful. On postoperative day two the catheter was removed, and he was discharged without significant complaints. Three weeks postoperatively, the patient presented to his PCP with dyspnea, diagnosed with bronchitis, and prescribed a course of antibiotics and an inhaler. Six weeks postoperatively, the patient was seen by a pulmonologist for continued dyspnea. A chest x-ray demonstrated an elevated right hemidiaphragm, which was confirmed by sniff test and chest CT. A neck CT incidentally showed degenerative changes in his cervical spine (C4-7) resulting in cervical spinal stenosis. PFTs showed a PImax 20% predicted and PEmax 31% predicted, consistent with respiratory muscle weakness. The patient followed with the pulmonologist until his dyspnea resolved without invasive treatment one year after surgery.

Discussion

The anatomic proximity of the brachial plexus and phrenic nerve leads to a nearly universal blockade of the phrenic nerve with large volume ISB; however, PPNP is rare. One single institution case-control series identified the frequency of PPNP to be 1 per 2069 single shot ISB for shoulder surgery[6]. Proposed mechanisms for PPNP suggest a compression neuropathy complicating an ISB[7-10]. Incidentally, TSA in the beach chair position without a regional block has been reported to result in a PPNP[11]. Ultimately a conclusive cause of PPNP cannot be determined without a pathological analysis of the phrenic nerve. Of note, the patient's interscalene catheter was performed with ultrasound guidance for nerve localization compared to the majority of previously published case reports of PPNP following ISB using nerve stimulation or paresthesia techniques. The only previously identified risk factor is cervical degenerative disc disease[6]. With limited identifiable risk factors for developing PPNP, providers should be vigilant in assessing unresolved dyspnea following an ISB. Chest X-ray, sniff testing, spirometry, nerve conduction testing, and electromyography can be used to diagnose phrenic nerve palsy, as well as assess respiratory improvement. The long course of the phrenic nerve and slow rate of nerve regeneration may allow for improvement of PPNP up to 24 months after initial injury[12]. Surgical decompression with or without nerve grafting has shown to improve 69% of PPNP cases that did not improved with conservative treatment[11].

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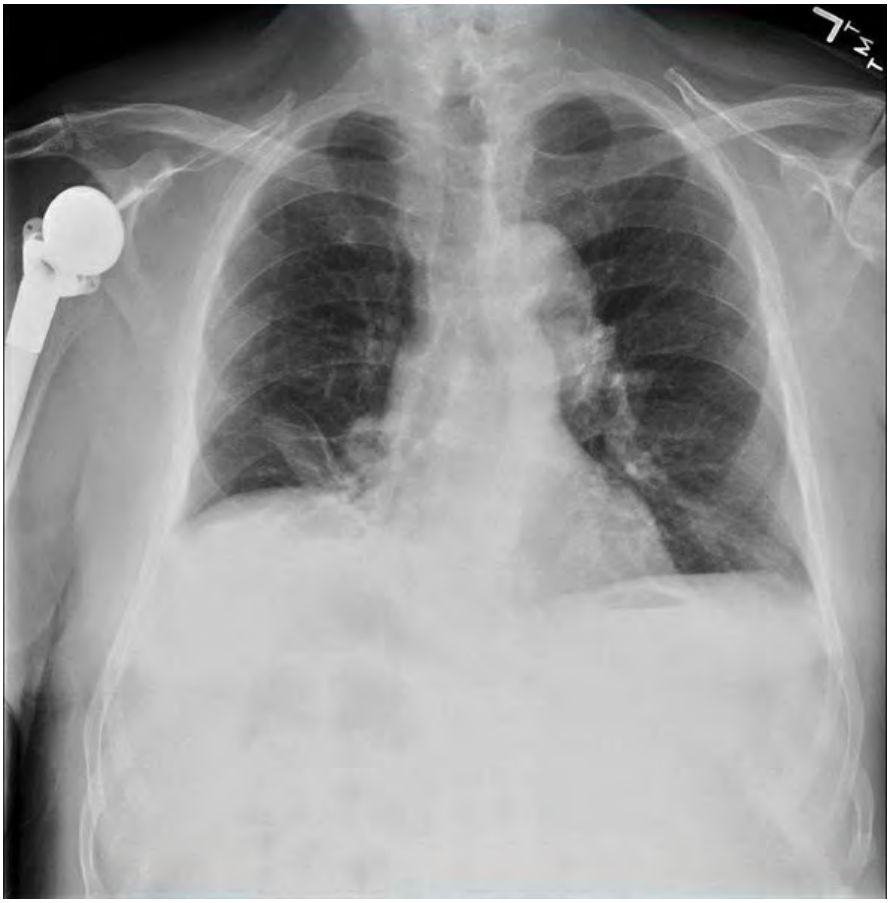
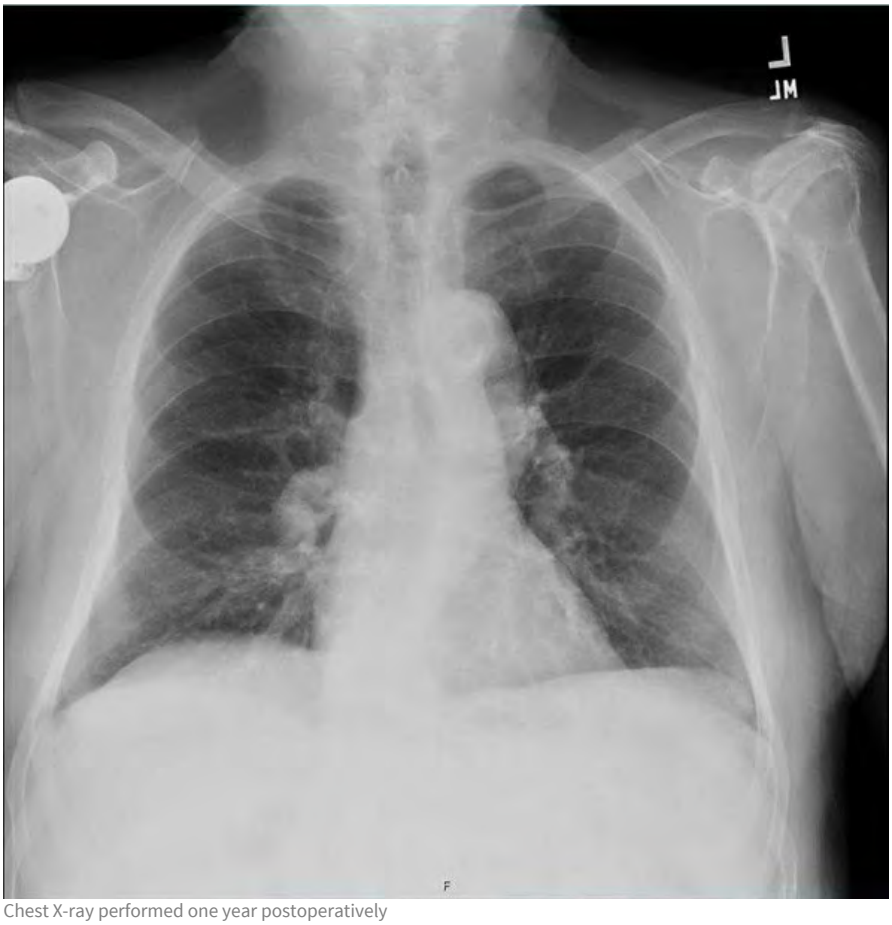


Chest X-ray performed six week postoperatively by the patient's Pulmonologist demonstrating a right elevated hemidiaphragm



Chest X-ray performed one year postoperatively

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1390
Scientific abstract: Regional anesthesia

Changes in regional anesthesia practice for upper limb surgery at an academic center: Eleven-year retrospective analysis

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Introduction

Over past eleven years brachial plexus blocks have become increasingly popular for surgical procedures involving upper limb.[1] The reasons for this include, easy availability of point of care ultrasound equipment, a greater emphasis on decreasing the post-operative pain, duration of hospital stays and associated costs.[2] Brachial plexus can be targeted at various levels along its course (interscalene, supraclavicular, infraclavicular and axillary) to provide reliable anesthesia and analgesia for upper limb and shoulder surgery. Each approach has advantages, disadvantages and roles in specific clinical situations. The aim of this study was to analyze how the clinicians' preference for a specific approach to brachial plexus block has changed over the last eleven-year-period.

Materials and methods (NA for case report)

We conducted a retrospective review of all brachial plexus blocks performed from April 2004 to April 2015 for upper limb surgeries in our institute. We specifically extracted data on the approach to brachial plexus block, use of continuous catheter technique and the duration of time needed to perform each of these procedures. The data was entered in a spreadsheet and the line diagrams were plotted. Descriptive statistics were performed on the time data.

Results/Case report

A total of 15,644 brachial plexus blocks were performed from year 2004 to 2015. This included 13,323 single injection blocks and 2,321 continuous catheter techniques. Figures 1 and 2 show the trends of approach to brachial plexus in the eleven-year-period. The time needed to perform each approach of the single injection block is shown in Table 1.

Figure 1: Number of single injection blocks

Figure 2: Number of continuous catheter techniques

Table 1. Median time taken to perform the blocks (minutes)

	2007-08	2013-14
Axillary	15.5	18.0
Infraclavicular	20.5	13.5
Supraclavicular	8.5	16.0
Interscalene	17.0	16.0

Discussion

Axillary brachial plexus block was the most popular brachial plexus block before availability of ultrasonography. However, with availability of ultrasound imaging supraclavicular and interscalene approaches are gaining popularity.

When looking at continuous catheter techniques, the use of interscalene catheters has gained popularity over years. The axillary brachial plexus block catheter has become extinct. The infraclavicular catheter still enjoys a steady popularity but there has been a slow rise in numbers of supraclavicular continuous catheter.

Median time needed to perform the infraclavicular brachial plexus block has reduced with use of ultrasound. Whereas, median time for performing supraclavicular brachial plexus block has increased. Finally, median time needed to perform axillary brachial plexus block and interscalene block have shown little change over years.

This review highlights the changing trends for upper limb peripheral block in our institution and may reflect a global trend. These changes are most likely attributable to the widespread availability of point-of-care ultrasonography. This information may help us plan educational and resource infrastructure for providing regional anesthesia services.

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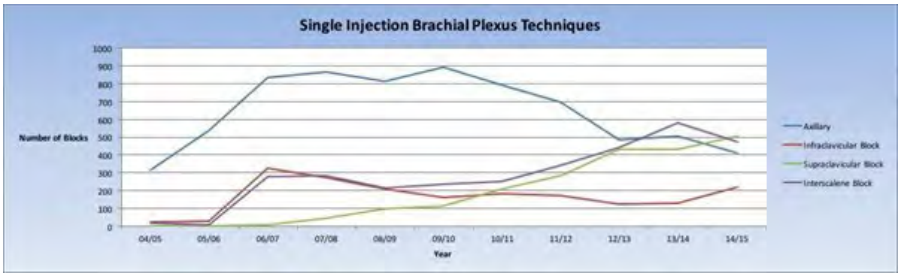

Figure 1: Number of single injection blocks

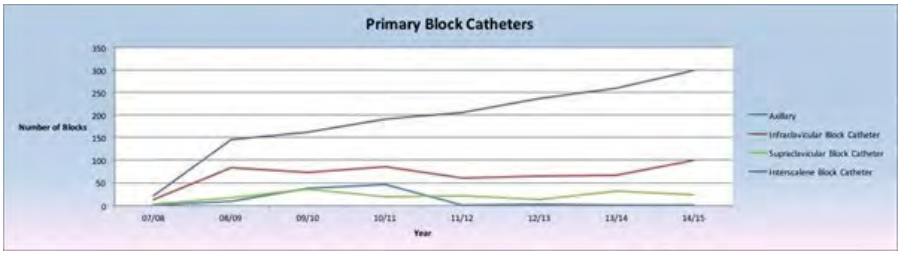

Figure 2: Number of continuous catheter techniques

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1391
Scientific abstract: Regional anesthesia

Delayed presentation of pneumothorax following placement of interscalane continuous infusion catheter.

Jasmit Brar, Danielle Gluck, Stephanie Cheng, Tiffany Tedore
Weill Cornell Medicine

Introduction

Interscalene brachial plexus blockade is a commonly used anesthetic technique for upper extremity surgery. Ultrasound guidance has become the preferred method for placement of interscalene blocks and nerve catheters. Complications of interscalene catheters include infection, kinking, displacement, and rare complications including vascular injection, subdural injection, or pneumothorax [1]. This is a case of delayed pneumothorax after interscalene catheter placement. Patient approval was obtained for presentation.

Results/Case report

A 79 year-old female with a history of hypertension, hyperlipidemia, prior MRSA infection, and status post right humerus open repair and internal fixation (ORIF) 3 months prior, presented for right humerus removal of hardware and revision ORIF. The patient underwent ultrasound-guided interscalene block and catheter placement via in-plane approach. Moderate sedation was administered with midazolam 2mg, fentanyl 100 mcg, and low dose propofol infusion. The right brachial plexus was identified and a 17-gauge nerve block needle was used to inject 20 mL of 1.5% mepivacaine. A 19-gauge peripheral nerve catheter with a removable stimulating wire and metal tip was inserted with needle exit observed under ultrasound. Catheter tip was visualized with saline injection and tunneled to 9 -10 cm at the skin. Surgical anesthesia was confirmed without apparent complications. Total anesthesia duration was 6 hours with an uncomplicated intraoperative course. No boluses were administered via catheter. Post-operative analgesia was maintained with ropivacaine 0.2% (4mL/hour).

On postoperative day (POD) 1, the patient was evaluated by the acute pain service with complaints of poor pain control. She received a bolus of 10mL of 0.2% ropivacaine with improvement in pain, and the catheter infusion rate was increased to 8mL/hour. Approximately 26 hours post-operatively, the patient was evaluated for right-sided chest pain and dyspnea. She was hemodynamically stable on 2L nasal cannula, with bilateral breath sounds and crackles with expiratory wheezes. ECG remained unchanged. Chest radiograph revealed "hazy opacities, probable pleural effusions versus atelectasis" (Figure 1). The patient received albuterol treatment with improvement in symptoms.

On POD 2, the patient continued to have dyspnea and tachypnea with diffuse expiratory wheezes. Chest computerized tomography demonstrated a moderately large right anterior pneumothorax. Cardiothoracic surgery was consulted and a right-side chest tube was placed, with resolution of pneumothorax. On POD 3 the peripheral nerve catheter was removed, and on POD 6 the chest tube was removed. The patient was discharged to subacute rehabilitation on POD 10.

Discussion

Pneumothorax is a rare complication of interscalene blocks with case reports typically describing pleuritic chest pain and dyspnea in the immediate post-operative period [2]. Technical considerations including stiffer catheters, catheter migration, and over-threading may contribute to complications, as may have occurred in this case. Bryan et al demonstrated a 98% success rate of 144 consecutive ultrasound-guided interscalene catheter placements with a pneumothorax incidence of 0.7% [3]. A retrospective analysis of 509 consecutive interscalene catheter placements revealed an adverse event rate of 6.7%, the majority of which included insufficient analgesia with or without catheter dislocation and 1 event of ‘secondary’ pneumothorax without intervention (0.2%) [4]. Interscalene blocks and continuous catheter infusion continue to be effective and safe for upper extremity surgery.

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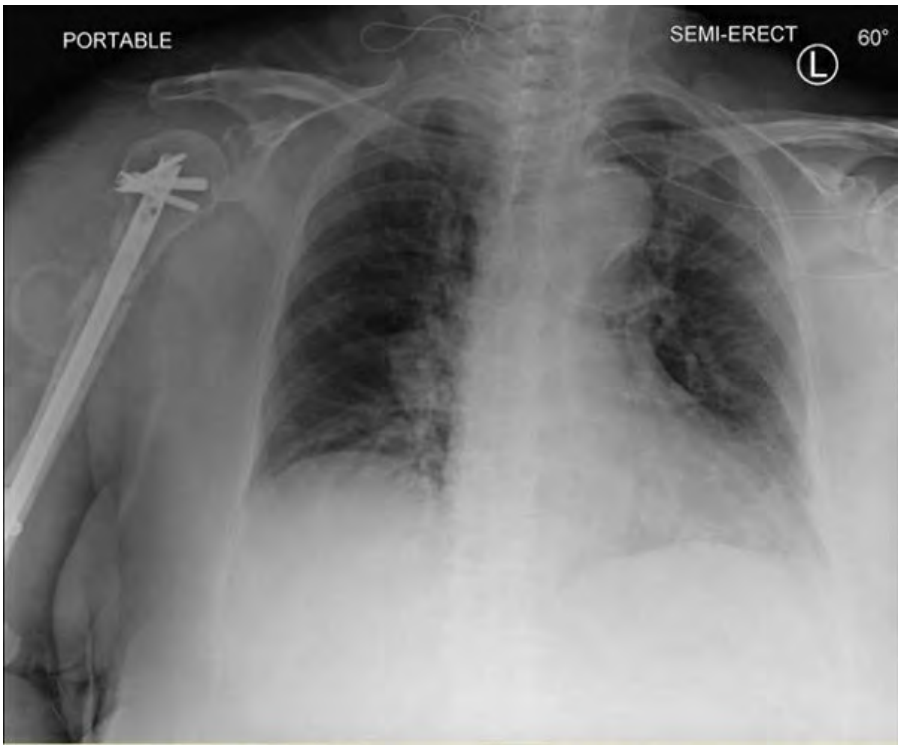

Figure 1: Chest radiograph on POD1.

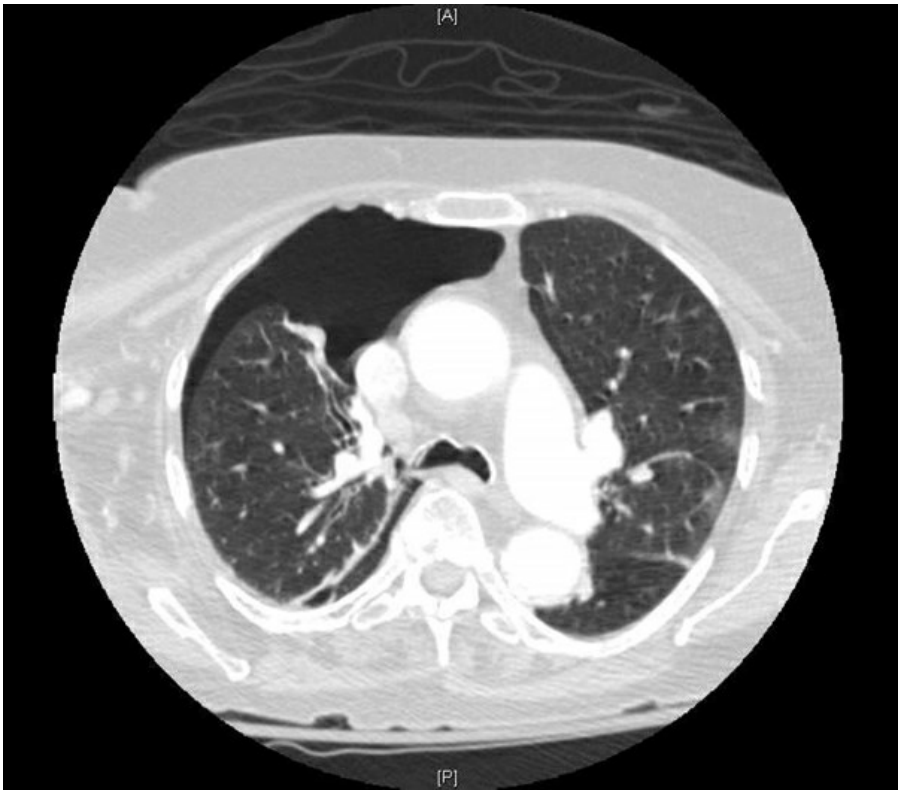

Figure 2: Chest computerized tomography demonstrating moderate right pneumothorax.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1392
Scientific abstract: Regional anesthesia

Impact of Local Infiltration Analgesia on Pain Scores and Opioid Use Following Total Knee Arthroplasty: An Interim Pilot Study

Amanda Kumar, Brendan Carvalho, Lindsey Vokach-Brodsky, Stuart Goodman, Katherine Hwang, Jean-Louis Horn
Stanford University School of Medicine

Introduction

Local infiltration analgesia (LIA) is used at several centers as an adjunct to optimize pain control while promoting early mobilization in total knee arthroplasty (TKA) patients. However, there has been limited study of the use of LIA in combination with peripheral nerve blocks with differing outcomes [1-3]. The aim of this pilot study was to evaluate the therapeutic effect size of LIA and to determine appropriate sample size for a follow-up large outcome-based study to assess the benefit of LIA when combined with adductor canal catheter (ACC).

Materials and methods (NA for case report)

After receiving IRB approval with waiver of informed consent, we conducted a pilot retrospective cohort analysis of 36 opioid-naïve primary unilateral TKA patients, comparing those who received ACC alone versus ACC in combination with LIA. Only patients who received a general anesthetic without a spinal intra-operatively were included. The primary outcome is opioid use on post-operative day (POD) 0. Secondary outcomes will include opioid use and pain scores throughout the operative stay, length of stay, perioperative delirium, post-operative nausea and vomiting, acute kidney injury, perioperative cardiopulmonary complications, stroke, venous thromboembolism, surgical wound infection, and Western Ontario and McMaster Universities Arthritis Index (WOMAC) functional scores. Previous studies have shown that ACC have reduced opioid consumption by 26% compared to placebo [4]. We hypothesize that LIA will further decrease opioid consumption by 15%.

Results/Case report

The mean ± standard deviation opioid consumption (in intravenous morphine equivalents) on POD 0 was 59.4 ± 16.8 mg for the ACC group and 54.3 ± 21.3 mg for the ACC + LIA group. Secondary outcome measures are outlined in Table 1. Functional outcomes as measured by the WOMAC score improved over time for both groups, but were not significantly different (Figure 1). A sample size based on the primary outcome of opioid use on POD 0 determined that we require 699 patients in the follow-up outcome study (Power 80%, Alpha 0.05, two-tailed t-test).

Discussion

Our pilot interim analysis indicated that LIA has a modest therapeutic effect size. The sample size of 700 derived from this analysis will be used to guide the full cohort study to assess if there is a meaningful benefit with the addition of LIA to ACC in patients undergoing TKA.

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Tables/images

	ACC Only (n=12)	ACC + LIA (n=24)
Opioid Use#		
POD 0	59.4 (16.8)	54.3 (21.3)
POD 1	29.2 (17.4)	40.0 (56.4)
POD 2	17.3 (12.9)	22.0 (44.6)
Total	106.0 (38.9)	116.4 (106.4)
Pain Scores$		
PACU	7.0 (2.8)	3.5 (4.0)
POD 0	6.7 (2.9)	5.4 (3.4)
POD 1	6.0 (2.2)	5.7 (2.7)
POD 2	5.4 (2.5)	5.1 (2.5)
Length of Stay	3.2 (0.4)	3.4 (1.1)

Opioid use in milligrams of IV morphine equivalents.
$ Maximum pain score assessed by 11-point visual analog scale.

Table 1. Outcomes

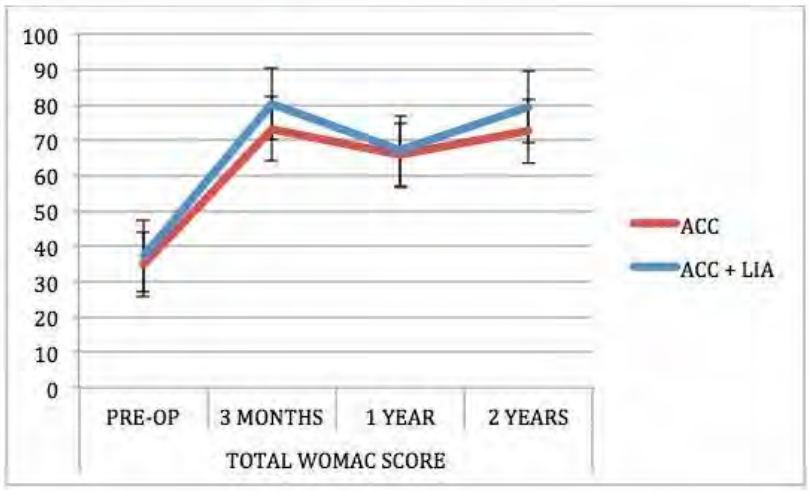

Figure 1. Western Ontario and McMaster Universities Arthritis Index (WOMAC) score at various intervals pre- and post-operatively.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1393
Medically Challenging Cases (report of up to 4 cases)

Successful neuraxial anesthesia for cesarean delivery in a patient with severe oral and neck arteriovenous malformations

Jack Diep, Kartik Dandu, Antonio J Gonzalez-Fiol
Rutgers New Jersey Medical School

Introduction

Oral and neck arteriovenous malformations (AVMs) can pose significant risks for airway compromise during neuraxial or general anesthesia. AVMs are highflow lesions and have a propensity to bleed, which may be life-threatening. Accelerated growth of these lesions occurs during pregnancy from elevated hormonal levels.

Here we present the case of a 24-year-old female with severe oral and neck AVMs who underwent a successful cesarean delivery under neuraxial anesthesia.

Results/Case report

A 24-year-old G3P2002 (5'2", 195 lbs, BMI 35.73 kg/m^2) with an estimated gestational age of 39 weeks presented to the labor and delivery unit for a repeat cesarean section. Her past medical history was significant for endoscopic sinus surgery and tracheostomy, with subsequent decannulation. On exam, the patient was obese with a large neck diameter, short thyromental distance, and a Mallampati score of IV. She had significant lingual and lower lip, as well as bilateral neck AVMs. Her most recent MRI demonstrated multifocal airway stenosis at the oropharynx and the larynx secondary to her AVMs.

The patient was taken to the operating room with plans for a combined spinal and epidural (CSE) placement. The difficult airway cart, video laryngoscope and additional anesthesia personnel were present. An otolaryngologist was on standby for an emergent tracheostomy if needed. The CSE was performed without difficulty and the patient underwent a cesarean delivery without complications. A healthy baby girl was delivered. The patient's postoperative course was uneventful and she was discharged home two days later.

Discussion

Our case demonstrates that a repeat cesarean delivery can be performed safely under combined spinal epidural anesthesia in a patient with severe oral and neck AVMs. Anesthesiologists should be prepared for alternative techniques and emergent airway equipment and personnel should be made available. Accelerated growth of AVMs during pregnancy can put them at risk for ulceration, rupture or hemorrhage. A vascular surgery or otolaryngology consult is essential early in pregnancy, to evaluate lesions and to determine if devascularization or removal of AVMs are necessary. Preoperative imaging and an elective tracheostomy prior to cesarean delivery may be warranted in patients with unstable AVMs or in patients with signs of airway obstruction.

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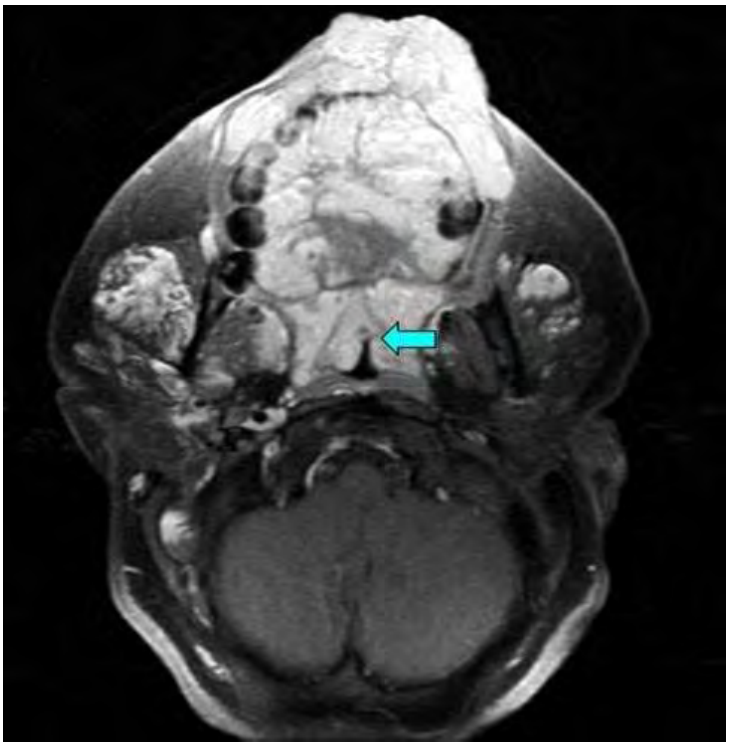

Fig 1. Axial T1 post contrast MRI head demonstrating vascular malformation of the lower lip, tongue, and oropharyngeal stenosis. Narrowest point of oropharyngeal stenosis measuring 10 mm x 3 mm (blue arrow).

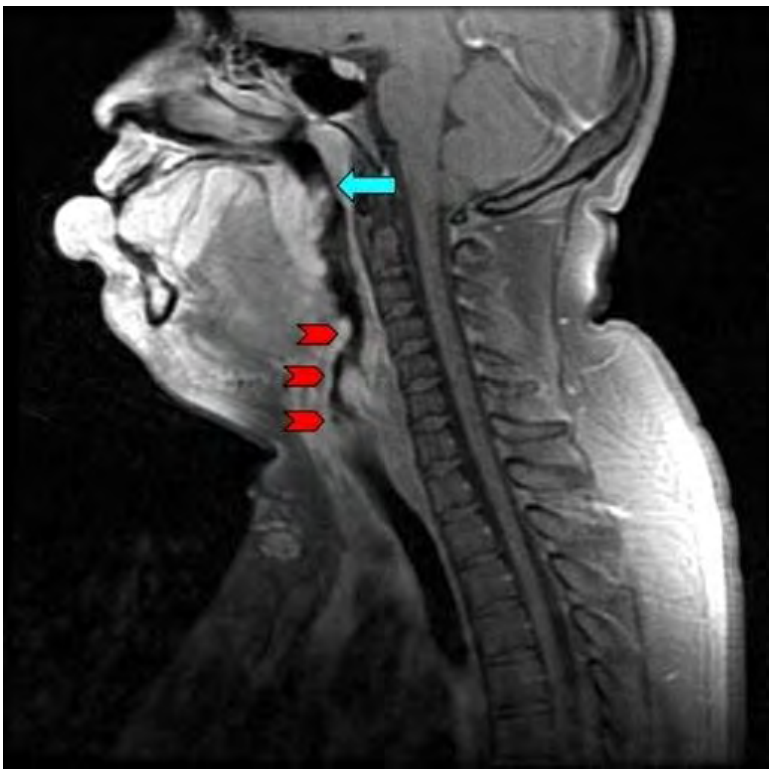

Fig 2. Sagittal T1 post contrast MRI. Vascular malformation of the lower lip, tongue, and aerodigastric tract to the larynx. Multifocal stenosis of airway (red arrows). Narrowest point of oropharyngeal stenosis measuring 10 mm x 3 mm (blue arrow).

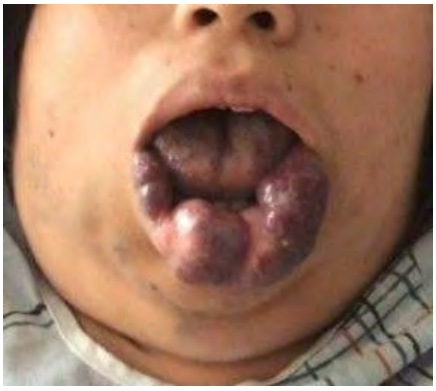

Fig 3. Patient's tongue and lower lip with significant AVMs, as well as bilateral neck edema.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1394
Scientific abstract: Regional anesthesia

The Impact of Neuraxial versus General Anesthesia on the Incidence of Postoperative Surgical Site Infections Following Knee or Hip Arthroplasty: A Meta-Analysis

Andres Zorilla Vaca, Michael C. Grant, Vineesh Mathur, Jinlei Li, Christopher L. Wu
The Johns Hopkins Hospital

Introduction

Recent studies have yielded conflicting results on the association between anesthesia technique and incidence of postoperative surgical site infections (SSI) after knee arthroplasty (KA) and hip arthroplasty (HA). Our group conducted a meta-analysis of all available studies to further clarify this potential association.

Materials and methods (NA for case report)

MEDLINE, EMBASE and Google Scholar were searched for studies (1990-2015) that assessed the association between the anesthesia technique and SSI after KA or HA. The adjusted measures of association were extracted and then transformed in Cohen's *d*. A meta-analysis was performed to estimate the pooled adjusted odds ratio (aOR) using a random effects model. Subgroup analyses and meta-regression were conducted to explore any potential source of heterogeneity and bias.

Results/Case report

Of the initial 435 records, 13 studies (n = 331,564) met the inclusion criteria. The use of neuraxial anesthesia was associated with a significant reduction in incidence of postoperative SSI for all arthroplasties (KA and HA) studied (aOR = 0.91; 95% CI: 0.86 to 0.96; P < 0.001; I^2 = 43.5%) compared to general anesthesia when using adjusted data (**Figure 1**). Subgroup analyses showed a reduction in incidence of postoperative SSI for KA (aOR = 0.91; 95% CI: 0.88 to 0.96; P < 0.001; I^2 = 0%), but not for HA (aOR, 0.91; 95% CI, 0.83 to 1.00; P = 0.057; I^2 = 60.5%) **(Figure 2)**. Funnel plot revealed no potential publication bias **(Figure 3)**.

Discussion

Synthesis of the existing evidence supports the overall beneficial effects of neuraxial anesthesia in decreasing the development of SSI after joint arthroplasty (KA and HA) although when examining the procedures separately, this benefit may be more apparent for KA but not HA.

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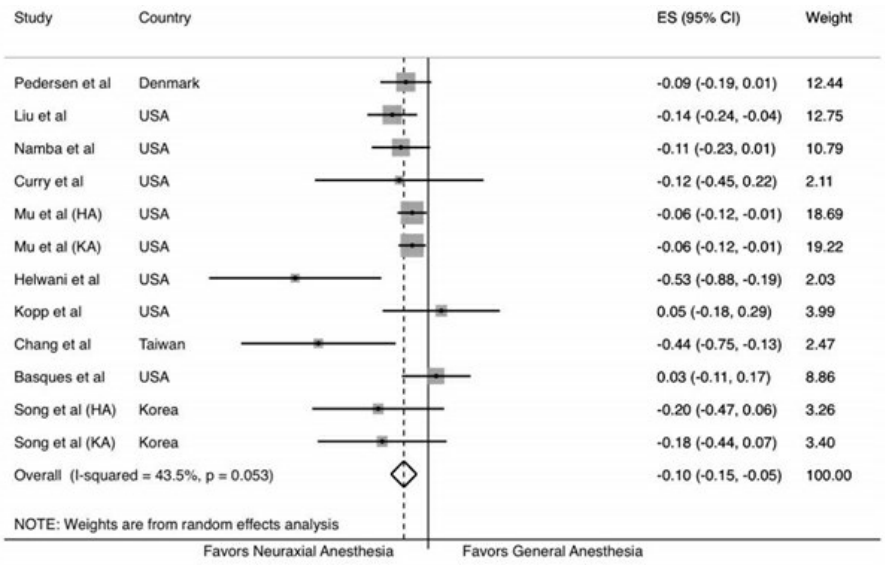

Figure 1. Forest plot for comparison (using adjusted data) of the association between the anesthetic technique and surgical site infection after arthoplasties.

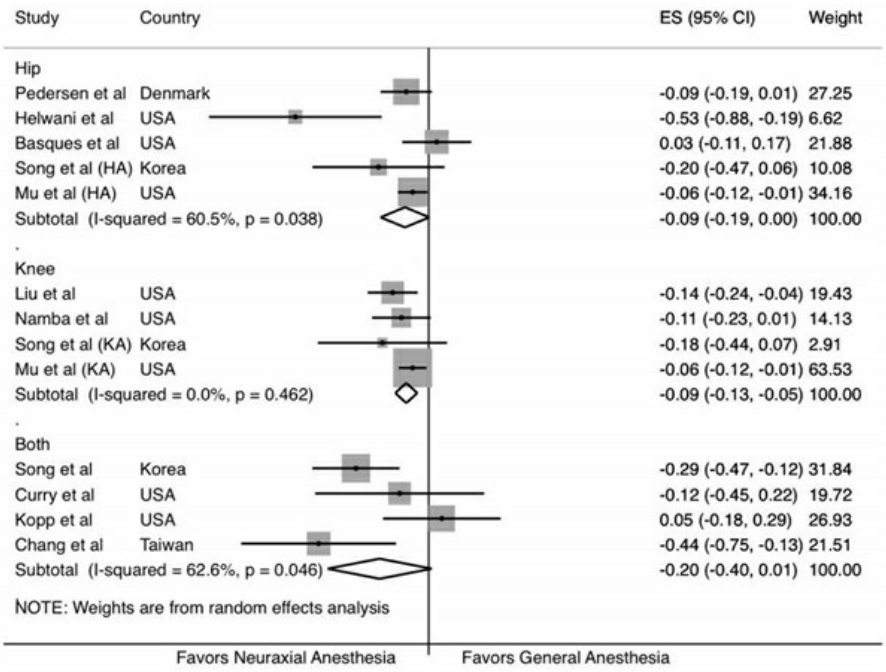

Figure 2. Forest plot for subgroup comparison (using adjusted data), by the type of arthroplasty.

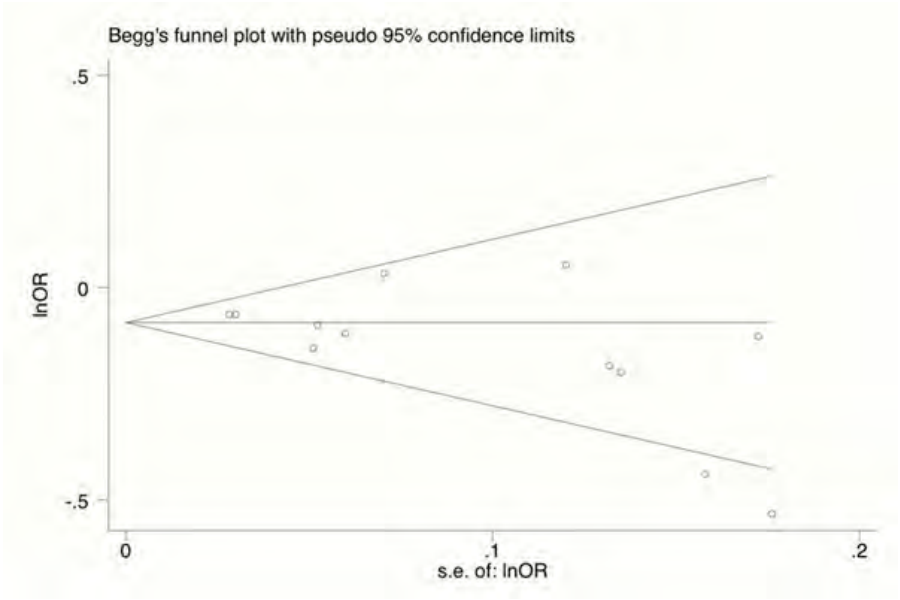

Figure 3. Trimmed and filled funnel plot for studies (n = 13) (Begg's P = 0.06).

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1395
Scientific abstract: Regional anesthesia

Incidence of Peripheral Nerve Injury Following Lower Extremity Nerve Block

Allison Capossela, Sarah Ortolan, George Go, Nigel Sharrock
Hospital for Special Surgery

Introduction

Postoperative nerve injury (PNI) is a major complication following the use of peripheral nerve blocks; however, there is still limited data on this topic. This study details rate of PNI following four different lower extremity blocks performed over a 10 year period at a single institution.

Materials and methods (NA for case report)

A database of all perioperative nerve blocks has been prospectively collected in our department since 1996. Beginning in 2005, all cases of potential PNI referred to the department by full-time, hospital based orthopedic surgeons or by patients directly were recorded as part of a quality assurance (QA) program. Cases of complications were analyzed by a QA process and characterized as either not due to the nerve block (they were excluded) or likely secondary to the peripheral block (herein designated as PNI). Rates of PNI were analyzed for each of the following lower extremity blocks: lumbar plexus, femoral, popliteal and saphenous. The type of surgery, use of ultrasound or nerve stimulation and the year that the blocks were performed were all recorded. Ultrasound-guided blocks were introduced in our department's practice between 2007 and 2008. Institutional Review Board (IRB) approval was obtained for this study (IRB # 2013-121)

Results/Case report

The rates of PNI varied between nerve blocks (Table 1). Rates varied from 2 per 10,000 for lumbar plexus block to 14 per 10,000 for saphenous blocks ($p<0.05$). The rate of complications with ultrasound-guided blocks was 27 of 26,751 blocks (10 per 10,000) and 23 of 36,744 using nerve stimulation (6 per 10,000). However, the rate of PNI using ultrasound and peripheral nerve stimulation were similar with femoral block (7 per 10,000 vs. 8 per 10,000, respectively) and popliteal nerve block (8 per 10,000 vs. 10 per 10,000, respectively).

Discussion

This is the largest study reporting on rates of PNI following lower extremity nerve blocks. It demonstrates that rates of PNI vary between different nerve blocks and the use of ultrasound has not resulted in a reduction of rates of PNI.

Nerve Block	# PNI	Actual Cases	# per 10,000
Lumbar Plexus	1	4,910	2
Femoral	19	32,187	6
Popliteal	11	13,002	9
Saphenous	19	13,396	14
Overall	**50**	**63,495**	**8**

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1399
Scientific abstract: Chronic pain

The Potential Protective Effects of Pioglitazone on Nucleus Pulposus Cells

Daniel Roshan, Shoeb Mohiuddin, Khalid Malik, Doug Feinstein
University of Illinios at Chicago

Introduction

Degeneration of the intervertebral disks is a significant pathological phenomenon implicated in the development of symptomatic back pain. Nucleus Pulposus (NP) cells play an integral role in maintaining the integrity of the extracellular matrix of the intravertebral discs and their death is an irreversible step in the development of disc deterioration. While the exact mechanism by which cell death occurs is unclear, mitochondrial mediated apoptosis of intravertebral disc cells as a result of mechanical stress has been demonstrated in several studies and may play a key role in this process (1-3). Pioglitazone, a PPARγ agonist used to treat Type 2 Diabetes, has been shown to attenuate oxidative stress, mitochondrial dysfunction, and apoptosis in neurons and cardiac myocytes (4, 5). The aim of our study is to assess if pioglitazone can confer the same protective effects on NP cells.

Materials and methods (NA for case report)

Sprague-Dawley rats' lumbar intervertebral discs were identified and nucleus pulposus material is extracted under sterile conditions. Primary NP cells are prepared by brief treatment with collagenase, and cultured in complete media. Oxidative stress is induced by treating cells with H202 (300 uM) for up to 6 hours. Cytoprotective actions of pioglitazone are tested for by treating cells with pioglitazone (0, 50, or 100 uM), beginning 1 hour prior to, simultaneious with, and 1 hr after exposure to H202. NP cell viability is examined at different times (6, 12 and 24 h) subsequent to the addition of H2O2 by measurement of LDH release and MTT assays. The mRNA levels of genes implicated in cell death (including inducible nitric oxide synthase (iNOS), caspase-3, B-cell lymphoma (Bcl)-2, type II collagen and aggrecan) are measured after different times by real time quantitative PCR. Comparisons are made by unpaired, non-parametric T-tests between control and pioglitazone treated groups.

Results/Case report

This study is currently in progress. Initial cell isolation from rat IVDs shows that the timing of collagenase treatment is critical to obtain viable NP cells.

Discussion

Low back pain (LBP) is a widely prevalent morbidity in society and while the exact mechanism of disc degeneration continues to elude researchers intervertebral disc cell apoptosis has been implied as a potential cause (1-3). Rannou et al demonstrated that mechanical loading induced disc cell death via a caspase-9 apoptic pathway (1). A variety of key events in apoptosis involve mitochondria, including the release of several apoptogenic factors, changes in electron transport, loss of mitochondrial transmembrane potential and altered cellular oxidation reduction (4-6). PPARγ agonists have been shown to maintain the integrity of the mitochondria by increasing mitochondrial biogenesis, preventing mitochondrial swelling, and attenuating ROS production which prevents the dissipation of mitochondrial membrane potential (4, 5, 7). In this study we hope to be able to demonstrate that rat NP cells treated with pioglitazone, a PPARγ agonist, will be protected from H2O2 induced cell apoptosis.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1400
Scientific abstract: Acute pain

Preliminary Analysis of Opioid Use and Pain Scores in Combat Injured Patients Receiving Ketamine Infusion = 48 Hours

Sandeep Dhanjal, Michael Kent, Kristine Lyons, Winifred Rojas, Andrew Lizek, Joseph DeCicco
Walter Reed National Military Medical Center

Introduction

Acute pain secondary to combat related polytrauma is often severe. Multimodal analgesic regimens have been associated with improved pain control in these patients[1]. Ketamine, an NMDA antagonist, has been effectively utilized to reduce opioid consumption and treat post-operative pain when administered though intraoperative and postoperative intravenous infusions[2,3]. In this retrospective study, we observed the opioid consumption and pain scores in patients who received intravenous ketamine following polytraumatic injuries while serving in Operation Iraqi Freedom(OIF) and Operation Enduring Freedom(OEF).

Materials and methods (NA for case report)

After obtaining IRB approval, we conducted a preliminary analysis of an ongoing chart review of patients from 2007 to 2014, who were injured by blast and non-blast injuries in OIF or OEF and subsequently treated with ketamine. The study population included service members able to report pain scores and prescribed a ketamine infusion for at least 48 hours. Pain scores and opioid consumption were reviewed starting 24 hours prior to the initiation of the ketamine infusion and during the first 48 hours after ketamine had been initiated. Repeated measures ANOVA was conducted for averaged pain scores and opioid consumption. If significance was obtained, a trend analysis was then performed to assess nonlinear patterns (up to cubic polynomial for 4 repeated measures and quadratic for 3 repeated measures). Demographic data was analyzed with descriptive statistics. We hypothesized that there would be a significant decrease in opioid consumption, but not pain scores, after initiation of the ketamine infusion.

Results/Case report

Thirty patients were included in this preliminary analysis. Prior to ketamine, the mean opioid consumption in morphine equivalents was 222 (±160) mg. During the first 24 hour period after the ketamine infusion had been started, the mean opioid consumption was 186 (±110) mg, and 212 (±122) mg during the following 24 hour period. Significance was not obtained for the three repeated measures for the total opioid consumption ($p=0.20$). Even though the omnibus (i.e., overall) test is not significant, the quadratic (polynomial to 2nd power) nonlinear contrast is significant: $F(1,29) = 5.07$, $p = .032$ ($\eta 2 = .149$).

For pain scores, the mean pain score was 4.5 (±1.7) during the 24 hour period prior to the institution of ketamine. During the first 24 hr period after the ketamine institution, the mean pain score was 3.99 (±1.7), and was 4.4 (±2.0) during the following 24 hour period. Again, significance was not obtained for three repeated measures for average pain score ($p=0.21$). Even though the omnibus (i.e., overall) test is not significant, the quadratic (polynomial to 2nd power) nonlinear contrast is significant: $F(1,29) = 4.50$, $p = .043$ ($\eta 2 = .143$).

Discussion

In this preliminary analysis, intravenous ketamine infusion, when administered to patients who have sustained combat related injuries, was not associated with a statistical significant decrease in opioid consumption or pain scores in the first 48 hours from the beginning of the infusion. However, results suggest that a trend towards decreased pain scores and opioid consumption does exist between the 24 hours before the initiation of the ketamine infusion to 24 hours after infusion was initiated.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1402
Medically Challenging Cases (report of up to 4 cases)

Safe labor analgesia for maternal transposition of great vessels with severe pulmonary stenosis

Timothy Bednar, Nevinson Sam, Adam Romman
University of Texas Medical Branch Galveston

Introduction

Normal physiologic changes during pregnancy include increased circulatory volume and cardiac output. In women with a systemic right ventricle (RV), pregnancy has been reported to result in worsening RV function and NYHA class as well as higher rate of preterm and low birth weight newborns[1]. Studies pertaining to a safe anesthetic management and their outcomes for patients with congenitally corrected transposition of the great arteries (ccTGA) and dextro-TGA following atrial (physiologic) are limited. The following report is on our anesthetic approach in this situation and the resulting outcome.

Results/Case report

We report here a case of a 22 year old G1P0 from the Philippines with a medical history of ccTGA, dextrocardia, and pulmonic stenosis who presented during pregnancy. On evaluation at 29w6d, she denied having any knowledge of corrective surgery and had been asymptomatic for the last 5 years. During pregnancy, she reported new symptoms of dyspnea on exertion with walking one flight of stairs and four pillow nocturnal orthopnea. TTE showed preserved RV (systemic) function and severe pulmonic stenosis. She was admitted at 29w6d due to her symptomatic pregnancy and experienced hypertensive episodes with no evidence of preeclampsia and not requiring antihypertensives. After consultation with cardiology and maternal fetal medicine, we planned to hold off labor augmentation unless preeclampsia with severe features developed until 37 weeks.

Due to her high risk for cardiac decompensation, a perfusion team was available at delivery. Our anesthetic management included placement of an early CSE for pain management. Duramorph 200mcg was given intrathecally and 0.0625% bupivacaine with fentanyl 3mcg/mL was started through the epidural at 8mL/hr. An arterial line was placed for hemodynamic monitoring with slow titration of fluid. Her epidural rate was decreased to 4mL/hr as a caution to avoid hypotension. If the patient's shortness of breath become worse during labor or was associated with desaturations then we would have a low threshold for cesarean section.

Her vaginal delivery involved a third degree laceration. She was taken to the OR for a wound closure. Intraoperative management included epidural augmentation with 0.25% bupivacaine 6mL one time bolus, limiting intravenous fluid, and preparation for pharmacologic hemodynamic support if necessary. Her perioperative course was uneventful. Despite recommendation for surgical correct of her pulmonic stenosis, she refused any intervention.

Discussion

Pre-pregnancy counseling for ccTGA should include the possibility of worsening cardiac function. Evaluation should include thorough history and physical examination and echocardiograpy with special focus on any signs of symptoms of heart disease and potential need for surgical correction. Management during pregnancy includes close monitoring for new cardiac symptoms, RV dysfunction, and development of arrhythmias[2]. Diuretics may be needed for fluid overload and a pacemaker may be considered if AV block develops or worsens. Antiarrhythmics should be used with caution due to the increased risk of AV block[2]. Anesthetic management during delivery includes close hemodynamic monitoring and slow titration of neuraxial anesthesia. Vigilance must be maintained after delivery as a contracting uterus and may lead to volume overload[4].

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1403
Scientific abstract: Regional anesthesia

Evaluation of Supraclavicular, Suprascapular, and Interscalene Nerve Blocks for Outpatient Shoulder Surgery

Shin-e Lin, Stanley Yuan, Neil Hanson, Raymond Joseph, David Auyong
Virginia Mason

Introduction

Brachial plexus blocks, such as interscalene and supraclavicular blocks, are often placed for postoperative analgesia in shoulder surgeries but can be associated with diaphragmatic paralysis [1,2]. Of the three nerves innervating the glenohumeral joint, the suprascapular nerve is responsible for 70% of shoulder joint innervation [3,4]. Hence, blocking this nerve alone may provide significant analgesic benefit but with fewer associated side effects. To date, no study has evaluated differences in analgesia and lung function between the interscalene, supraclavicular, and suprascapular nerve blocks for shoulder surgery. We present here a prospective, blinded, randomized trial comparing pain, opioid consumption, and pulmonary function following single-injection interscalene, supraclavicular, and suprascapular blocks for outpatient rotator cuff repair (RCR) surgery.

Materials and methods (NA for case report)

113 ASA Class I-III subjects undergoing RCR surgery were enrolled and randomized into one of three groups: ISB (interscalene block), SCB (supraclavicular block), or SSB (suprascapular block). Vital capacity (VC) determined via spirometry was measured prior to placement of a block. All nerve blocks were performed with an ultrasound-guided, in-plane technique using a 17-gauge Tuohy epidural needle. Fifteen milliliters of 0.5% Ropivacaine was incrementally injected adjacent to the target nerve site prior to the placement of a 19-gauge catheter. As the focus of this study was the assessment of the bolus injection of local anesthetic, continuous infusions through the catheter did not commence until all study assessments were done in the Post-Anesthesia Care Unit (PACU).

The intraoperative course was managed by a separate, blinded anesthesia team. All patients received general anesthesia maintained with Sevoflurane at ≤1 MAC. Intravenous fentanyl was given in 25 mcg increments for either 1) increased baseline of heart rate by 10 beats per minute or 2) systolic blood pressure by 20 mmHg in response to surgical stimulus. Post-operatively, pain scores (resting and maximum), opioid consumption, and VC were recorded by a blinded investigator.

Results/Case report

PACU pain score at rest, our primary endpoint, was evaluated one hour postoperatively and was not significantly different between the three groups (Figure 1). Maximum pain score and opioid consumption (PACU + intraoperative) showed no statistical difference between the three groups. However, the block location did have a significant impact on pulmonary function. The percentage of VC preserved following placement of the block was significantly higher in the SSB group in comparison to the other two groups (Figure 1).

Discussion

There have been no prior studies directly comparing the analgesic effect of interscalene, supraclavicular, and suprascapular blocks in outpatient shoulder surgery. Our data is the first to show that a selective suprascapular block has equivalent analgesia to interscalene and supraclavicular blocks but without the concomitant compromise in pulmonary function. Suprascapular blocks have been described as requiring supplemental axillary nerve blocks to provide adequate postoperative analgesia. However, our results suggest that an axillary nerve block ultimately may not be necessary to provide adequate analgesia for RCR surgeries. Suprascapular blocks appear to be a promising alternative to interscalene blocks especially in at-risk pulmonary populations undergoing outpatient shoulder surgeries.

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Tables/images

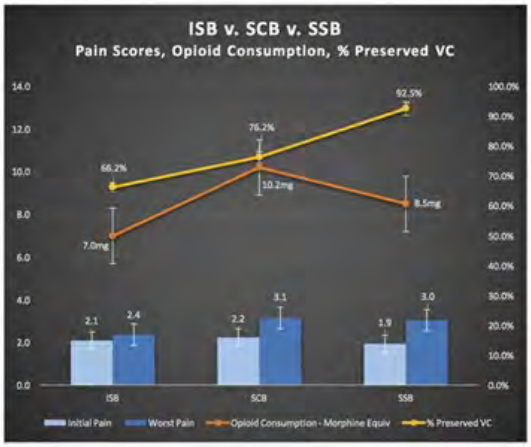

Figure 1. Effects of interscalene (ISB), supraclavicular (SCB), and suprascapular (SSB) single-injection blocks on PACU pain scores, total opioid consumption, and percentage of vital capacity (VC) preserved.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1404
Medically Challenging Cases (report of up to 4 cases)

A Novel Approach to Continuous Brachial Plexus Catheter Management Using Patient-Controlled, Demand-Only Dosing in a Patient with Extreme Obesity

Adam W. Meier, Neil A. Hanson, David B. Auyong
Virginia Mason Medical Center

Introduction

Brachial plexus blocks provide excellent postoperative analgesia after shoulder surgery however, they also cause phrenic nerve paralysis leading to clinical dyspnea in up to 10% of patients.[1] Obese surgical patients with underlying restrictive lung disease may be at higher risk of block-related respiratory dysfunction. We present a novel approach for perineural catheter management using short-acting local anesthetics and demand-only dosing in a patient with extreme obesity.

Results/Case report

A 53 year-old, 219 kg (BMI= 82 kg/m^2) woman was scheduled for open reduction and internal fixation of proximal humerus fracture with rotator cuff repair. A continuous supraclavicular brachial plexus catheter was placed using an in-plane ultrasound-guided technique with a 17G Tuohy needle and a 19G flexible catheter. An initial bolus of 15mL of 2% chloroprocaine was administered during block placement causing moderate dyspnea and anxiety. Induction and maintenance of general anesthesia were unremarkable. Total intraoperative opioids were limited to 100 micrograms of IV fentanyl. No additional local anesthetic was dosed via the catheter intraoperatively. The patient was extubated without difficulty at the completion of the surgery. In the recovery room, she had severe pain despite IV and oral opioid analgesics. Demand-only dosing via the supraclavicular catheter with 2mL of 0.2% ropivacaine every 6 hours was started with significantly improved analgesia reported. The demand-only catheter dosing system decreased the patient's pain scores from 10/10 to 4/10. Prior to PACU discharge, diaphragmatic excursion was measured by ultrasound and found to be equal (6.3cm) bilaterally. To allow for outpatient management, the pump was modified to 1% chloroprocaine with demand-only 2mL bolus with a 30-minute lockout. Ultrasound evaluation revealed similar diaphragmatic function bilaterally. Our patient was discharged home on postoperative day (POD) 2. She required fewer demand doses over the following days and eventually removed her catheter on POD 6 without complication.

Discussion

This case highlights several important management decisions in the care of a patient with extreme obesity having shoulder surgery. Several adaptations to this patient's care were made in the attempt to minimize the associated risks of phrenic nerve paralysis and opioid-induced hypoventilation. First, we chose to place a supraclavicular catheter rather than an interscalene catheter. Though more common for shoulder surgery, the interscalene block is associated with up to 100% phrenic nerve paralysis compared to 50% of patients with a supraclavicular block.[2] Second, the rapid onset and short duration of chloroprocaine preoperatively allowed us the ability to assess for a clinical dyspnea related to phrenic nerve paralysis without further complicating respiratory function during extubation. Finally, we hypothesized that with patient-controlled, demand-only dosing with small volumes, the nerve block would be used only when necessary, decreasing the chance of excess local anesthetic spread to the phrenic nerve causing clinical dyspnea. This technique proved to be safe and effective for this patient. She had no pulmonary sequelae from our unique postoperative perineural catheter regimen. This technique allowed for an expedited discharge, while limiting the detrimental effects of systemic opioids.

References

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[2] Mak PH et al. Incidence of Diaphragmatic Paralysis Following Supraclavicular Brachial Plexus Block and Its Effect On Pulmonary Function.

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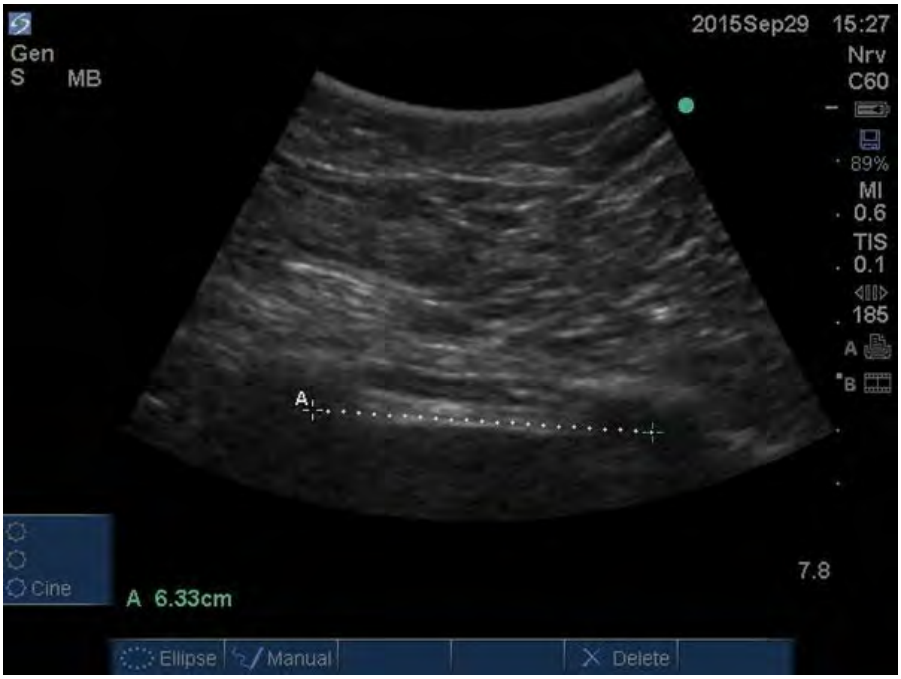
Tables/images



Postoperative diaphragmatic excursion scan, operative side

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1405
Scientific abstract: Regional anesthesia

ADDUCTOR CANAL BLOCK FOR TOTAL KNEE ARTHROPLASTY: A RANDOMIZED, DOUBLE BLIND PLACEBO CONTROLLED TRIAL

Sarah Clark, Mark Kendall, Antoun Nader
Northwestern University, Feinberg School of Medicine

Introduction

The main goal of a single shot adductor canal block is to provide postoperative analgesia for patients undergoing total knee arthroplasty (TKA). However, randomized control trials evaluating the opioid sparing benefits and the pain burden following TKA are limited. The purpose of this study was to assess postoperative outcomes following ultrasound-guided single injection adductor canal block compared to an ultrasound-guided sham block for patients undergoing TKA.

Materials and methods (NA for case report)

Following IRB approval, written informed consent was obtained by adult patients (>18 y/o) undergoing elective TKA under spinal anesthesia. All patients received previously investigated intraoperative local infiltration analgesia as part of their pain management.[1] Subjects were randomized into Group 1 (USG-adductor canal blockade with 10 mL of 25% bupivacaine) or Group 2 (USG-sham blockade with 10 mL of preservative free normal saline). All blocks were placed pre-operatively. Patients received scheduled and PRN oral analgesia and IV narcotic for breakthrough pain only. Research personnel blinded to group allocation recorded pain scores and opioid consumption every six hours. Pain burden defined as the area under the numeric rating score for pain for the first 36 hours was calculated using the trapezoidal method. Morphine Equivalents in the postoperative period were compared between groups using the Kruskal–Wallis test.

Results/Case report

40 (28 F/12 M) subjects were studied. Area under the curve pain scores at rest were decreased in group 1 (71 score·h (37 score·h to 120 score·h) compared to group 2 (131 score·h (92 score·h to 161 score·h), difference -60 score·h (-93 to -14), P=0.009. Postoperative opioid consumption was reduced in group 1 (143 mEq (118 to 184) vs group 2 (180 mEq (148 to 255, difference -38 mEq (-98 to -5, P=.026). There were no adverse events and no in-hospital falls.

Discussion

Adductor canal blockade effectively reduces pain and opioid requirement in the immediate post-operative period following TKA. Adductor canal blockade is a safe and effective pain management adjunct for patients undergoing TKA.

References

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Tables/images

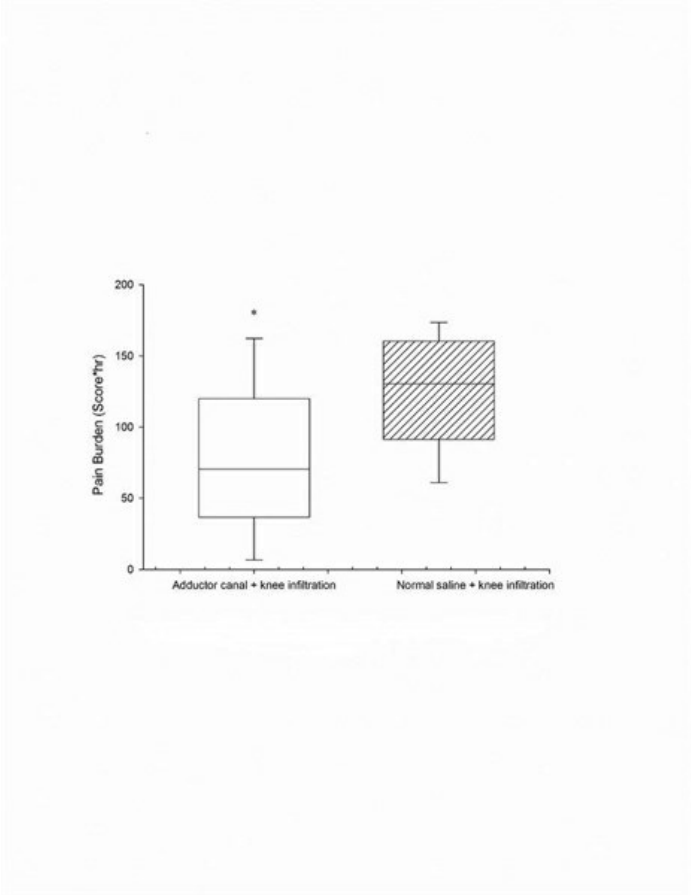

Figure 1 Pain Burden reported during the acute postoperative period

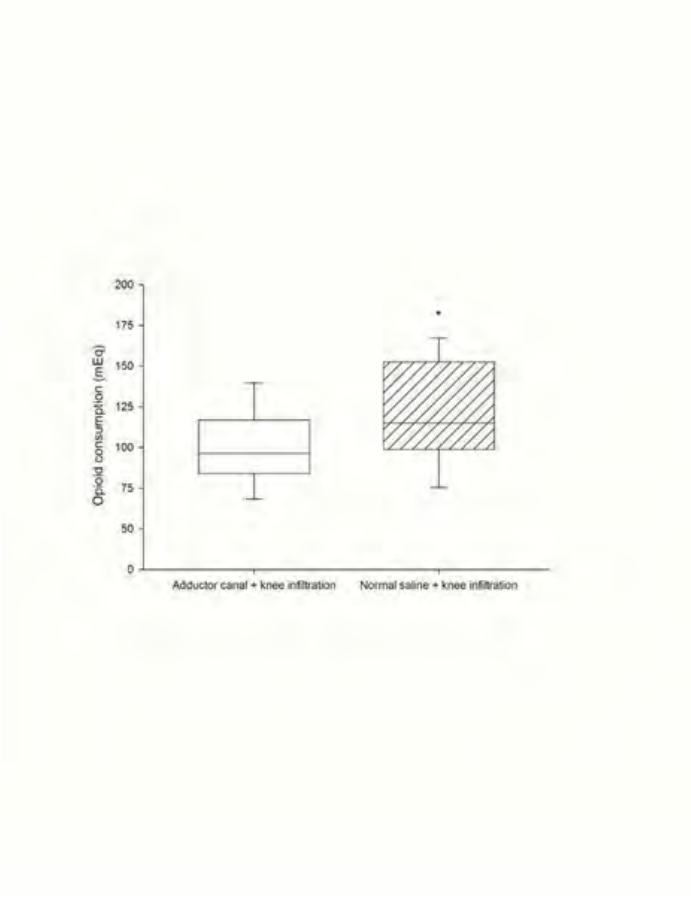

Figure 2 Opioid Consumption in the acute postoperative period

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1407
Scientific abstract: Acute pain

Implementation of a multimodal analgesic protocol and its effect on baseline pain score assessment and patient analgesia

Alberto Ardon
University of Florida

Introduction

Multimodal analgesia protocols utilizing acetaminophen, celecoxib, gabapentin and peripheral nerve catheters have previously been shown to be effective in improving postoperative analgesia among arthroplasty patients, as well decreasing the risk of adverse side effects secondary to opioids. While these advantages are well known, the effect of such a protocol on the effective assessment of baseline preoperative pain has not been examined. The primary purpose of this study was to assess the possible influence of a multimodal protocol on assessment of baseline pain scores.

Materials and methods (NA for case report)

After institutional review board approval, a total of 98 patient charts were reviewed for this study: 49 patients before and after protocol initiation, respectively. At a tertiary care academic hospital, a multimodal analgesic protocol standardizing non-opioid analgesics was introduced for hip and knee arthroplasties. The introduction of the protocol included educational sessions encouraging evaluation of preoperative baseline pain scores and opioid use; prompts in anesthesia and surgery electronic documentation were also introduced. The primary outcome measure was the rate of baseline pain score assessment. Secondary outcome data included rate of preoperative opioid use assessment, mean postoperative pain scores and length of stay. Data were collected until postoperative day 2 (POD2).

Results/Case report

Preoperative assessment of baseline pain increased from 45% to 84% (p=0.0001), but assessment of preoperative opioid use did not improve (73% vs 65%, p=0.36). Adherence to acetaminophen, celecoxib, and gabapentin was 98%, 86%, and 96%, respectively. After institution of the multimodal analgesia protocol, there was a significant decrease in mean pain scores on POD 1 (5.37 vs 4.32, p=0.01) and POD 2 (5.45 vs 4.25, p=0.01). A decrease in worst pain scores was also observed on POD 0 (7.82 vs 6.67, p=0.049) and POD 1 (8.33 vs 7.24, p=0.017). Length of stay did not decrease significantly (5.2 days vs 3.8 days (p=0.07).

Discussion

Adherence to the use of non-opioid analgesics was high. The introduction of the multimodal protocol and its associated educational efforts improved assessment of preoperative baseline pain but did not significantly affect assessment of preoperative opioid use in this cohort, most likely because of a high rate of pre-intervention documentation. Postoperative pain scores decreased as expected. Future studies should be done to prospectively verify these results.

References

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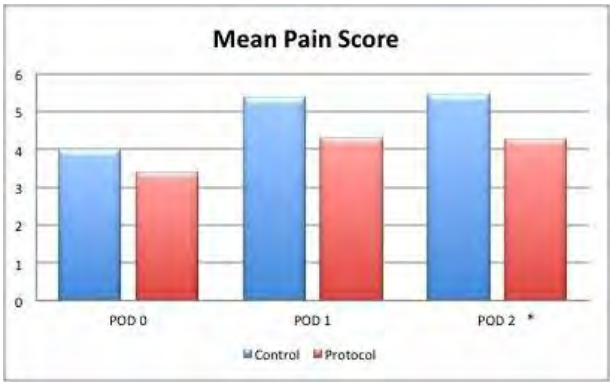
Tables/images

Baseline Characteristics [mean (SD) when applicable]				
		Control	Protocol	P-value
Age		57.4 (10.1)	61 (9.5)	0.07
Gender	Male	46.9%	34.7%	0.22
	Female	53.1	65.3	
ASA (median)		3	3	0.45
Surgery	TKA	67.35%	61.22%	0.53
	THA	32.65	38.78	
Primary or Revision*	Primary	70.27%	70.97%	0.03
	Revision	30.61	12.24	
Regional Technique	Catheter	79.59%	91.84%	0.07
	Single shot	10.2	6.12	
	Intrathecal opioid	0	2.04	
	No block	10.2	0	
Baseline creatinine		0.92 (0.31)	0.88 (0.23)	0.52
Mean highest creatinine		1.05 (0.37)	1.03 (0.37)	

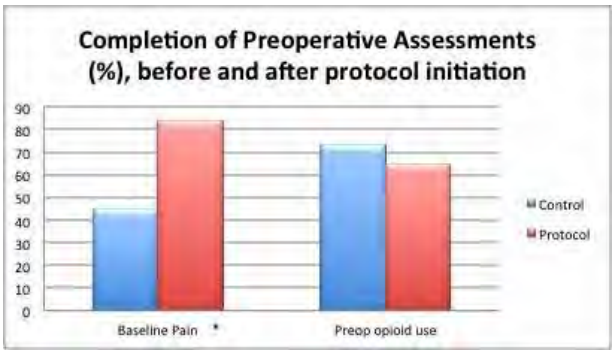
Baseline characteristics

Primary and Secondary Outcomes [mean (SD) when applicable]				
		Control (n=49)	Protocol (n=49)	P-value
Baseline pain score assessed?*	Yes	45%	84%	0.0001
	No	55.1	16.33	
Baseline pain score (if available)		5.96 (2.61)	7.29 (1.69)	0.04
Preoperative opioid use assessed?	Yes	73%	65%	0.36
	No	27	35	
Preoperative opioid use (if available)	Yes	61%	47%	0.36
	No	12	18	
	NA	27	35	
Discharge Day		5.2 (4.67)	3.84(2.31)	0.071
Mean Pain Score	POD 0	3.99 (1.98)	3.39 (2.67)	0.21
	POD 1*	5.37 (1.55)	4.32 (2.33)	0.01
	POD 2*	5.45 (1.9)	4.25 (2.19)	0.01
Worst Pain Score	POD 0*	7.82 (2.5)	6.67 (3.13)	0.049
	POD 1*	8.33 (1.53)	7.24 (2.67)	0.017
Adherence to protocol	Acetaminophen		98%	
	Celecoxib		86%	
	Gabapentin		96%	

Outcomes



Mean Pain Scores



Completion of Preoperative Assessments

Primary and Secondary Outcomes, controlling for primary surgery [mean (SD) when applicable]				
		Control (n=34)	Protocol (n=43)	P-value
Baseline Pain Score Assessed?*	Yes	47.06	86.05%	0.0002
	No	52.94	13.95	
Baseline pain score (if available)		5.63 (2.75)	7.27 (1.71)	0.043
Mean Pain Score POD1*		5.30 (1.51)	4.31 (2.40)	0.03
Mean Pain Score POD2*		5.24 (1.82)	4.29 (2.17)	0.04
Worst Pain Score POD0		7.92 (2.48)	6.86 (3.15)	0.11
Worst Pain Score POD1*		8.27 (1.46)	7.02 (2.76)	0.014

Outcomes controlling for primary surgery

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1408
Medically Challenging Cases (report of up to 4 cases)

Peripheral and Neuraxial Nerve Blockade in Charcot Marie Tooth Disease

Kristopher M. Schroeder, Tamara Chambers, John Shepler
University of Wisconsin School of Medicine and Public Health, Department of Anesthesiology

Results/Case report

A 69 year old woman with a past medical history significant for Familial Neuropathy (Charcot Marie Tooth Disease (CMTD)) with resulting severe atrophy of intrinsic foot and hand muscles presented for total knee arthroplasty (TKA). Complicating the usual management of patients presenting for TKA (adductor canal blockade (ACB) and spinal anesthesia) was that this patient reported a history of severe PONV, numerous opioid intolerances, L4/5 spinal fusion and persistent sensory loss on the operative leg in the saphenous distribution following a previous attempt at Baker's cyst drainage.

Following literature review and an extensive conversation with the patient regarding potential and unknown risks associated with the provision of regional/neuraxial anesthesia in patients with preexisting nerve disease, the decision was made to proceed with an opioid sparing multimodal analgesic technique including preoperative acetaminophen, ACB, spinal anesthesia and periarticular bupivacaine. ACB was achieved in standard fashion in the mid-thigh utilizing ultrasound-guidance to deposit 20 ml 0.25% bupivacaine antero-lateral to the superficial femoral artery and beneath the sartorius muscle. Spinal anesthesia was accomplished via injection of 12.5 mg of isobaric 0.5% bupivacaine at the L3/4 interspace. Midazolam, fentanyl and propofol ensured adequate patient comfort throughout the surgical procedure.

Following an uneventful surgical course, the patient reported a total duration of spinal anesthesia of 5 hours. Duration of ACB was difficult for the patient to determine but appeared to continue well into POD 1. Scheduled acetaminophen and prn morphine provided adequate analgesia and she was discharged home on POD 2 following an uneventful postoperative course.

Discussion

CMTD represents a spectrum of disabilities ranging from mild to severe sensory, motor and autonomic neuropathy. There exists significant concern and little evidence describing the safe administration of regional/neuraxial anesthesia in these patients. This case is interesting in that the patient had combined lesions from both her CMTD and from a traumatic lesion. While it is possible that this secondary lesion represented an increased susceptibility to nerve injury, the risk posed by this secondary insult is unknown.

Given the limited data available to guide clinical care, it would seem advisable to limit the potential risk associated with regional/neuraxial techniques in CMTD patients. Epidural anesthesia may be a potentially safer alternative to spinal anesthesia. Utilization of ultrasound guidance, using the lowest dose and concentration possible of local anesthetics and avoiding the use of epinephrine additives may increase safety. Finally, administration of relatively specific sensory nerve blocks (i.e. ACB) may be a safer alternative to more proximal nerve blockade.

In patients with preexisting neurologic disease, it is imperative to have a thorough conversation with patients regarding the potential risks and benefits associated with the provision of regional/neuraxial anesthesia. It is also critical that cases such as these continue to be reported and consideration should be given to the creation of a centralized database where outcome data from a variety of institutions can be collected in patients with rare neurologic conditions. This information could prove vitally important when obtaining consent from patients for these types of procedures.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1413
Scientific abstract: Acute pain

Non-medical factors effecting transition from APS to chronic pain service.

Nathan Lamborn, Melanie Donnelly
University of Colorado School of Medicine

Introduction

The principle of patient centered care dictates that a patient should help decide the progression of medical care, especially towards the end of life. This case demonstrates how insurance rules and lack of inpatient services can leave a patient with terminal cancer pain few options. A study in 2000 showed that being free from pain is the most important attribute to a patient at the end of life (1). Pain management anesthesiologists often play a large role in managing chronic pain at the end of life.

Materials and methods (NA for case report)

NA

Results/Case report

A 66 year-old female with a history of leiomyosarcoma and bone metastasis presented with femoral neck fracture and failed femur nailing. Orthopedic surgery recommended a hip and proximal femur replacement. A patient-controlled analgesia pump (PCA) was started. On day two, goals of care were identified, including symptom control, more mobility, and time with family. On day three, the Acute Pain Service (APS) was consulted for epidural placement to improve pain control. A lumbar epidural was placed reducing pain from 7/10 to 1/10. On day eight the patient decided to proceed with chemotherapy instead of surgery. For insurance purposes this made her a non-palliative care status. With pain managed, the patient wished to be discharged to acute rehabilitation. The APS placed a tunneled epidural catheter for discharge. Insurance then determined that they would not pay for management of the catheter (outside of hospital) because she was not a hospice patient, though at that point one of the rehabilitation physicians had offered to assist with epidural management since none of the pain physicians were privileged to manage this in the rehab unit. The chronic pain clinic does not offer inpatient services thus could not assist. On day 16, the patient reluctantly had her tunneled epidural removed. Hospital day 23 the patient discharged home with a PCA.

Discussion

This case demonstrates how non-medical forces can dictate medical decision making impacting patients' end of life course. The first challenge was finding a provider to manage an epidural in the acute rehabilitation unit. The APS team is not privileged to do so, and the provider ultimately found was someone who would need to be in communication with APS to assist with management. There was also no inpatient chronic pain service to assist with management. The APS briefly considered the possibility of asking chronic pain to place a neuraxial infusion pump, but the service does not offer this modality for pain control. This is a bit unusual according to a study in 2000 which showed that only 15% of responding pain fellowship programs do not implant neuraxial infusion pumps (2). Insurance rules also played a large role in determining the plan for this patient. Once a provider was found to take responsibility for the epidural in rehab, insurance determined that they would not cover this service since the patient wasn't considered palliative. The end result of navigating these non-medical forces was the patient spending almost two weeks longer as an inpatient delaying rehabilitation preventing her from pursuing her stated goals of care.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1415
Scientific abstract: Acute pain

Electronic Procedural Consent Templates for Acute Pain Procedures

Robert S. Weller, Daryl Henshaw, J Douglas Jaffe, J Wells Reynolds, Sean Dobson
Wake Forest School of Medicine

Introduction

The process of informed consent is well-described in the medical literature. Required elements include a description of the proposed procedure along with its risks and benefits, potential alternatives with associated risks and benefits, and the patient's comprehension and assent (1). The Center for Medicare and Medicaid Services (CMS) requires "a properly executed informed consent form in the patient's medical record before surgery, except in emergencies." (2) Significant institutional variability exists, however, with regard to the use and format of a separate anesthesia consent form (3).

Since surgical anesthesia is facilitative rather than the primary intervention, and acceptance of some method of anesthesia is implicit, consent for anesthesia is sometimes included in the surgical consent form. This is in contrast to obtaining consent for procedures performed by an acute pain service, which typically are distinct, therapeutic, procedural interventions. Thus, this consent process is equivalent to obtaining consent for surgery, with required elements noted above, and recognition of the patient's right to decline such intervention.

Materials and methods (NA for case report)

An email inquiry was sent to Regional Anesthesia Fellowship Directors in 2014 to inquire if a specific procedural consent form was employed for acute pain interventions. Responses varied from the use of no consent form, to the use of the typical surgical anesthetic consent form, to the completion of a blank institutionally-approved procedural consent form. No department responded that a consent form specific to acute pain procedures was utilized. At Wake Forest School of Medicine, a distinct surgical anesthesia consent form is used to document a description of the risks of various anesthetic options, (4), and this had also been used for acute pain procedures. This form, however, did not sufficiently characterize the consent process for a non-surgical, acute pain intervention. For example, the section on nerve block did not list the potential risks of multi-day continuous infusions, and the section on epidural anesthesia did not address risks, benefits and alternatives of epidural blood patch.

We identified 6 common acute pain management procedures. Seven RAAPM faculty developed a list of both common and rare potential complications and side effects for each procedure. Templates were created for each procedure with subcategory selections (Table 1), and were accessible via the pre-procedure navigator in the electronic medical record. Once populated, the form is electronically signed by the physician, and after consent discussion, the patient may sign the form manually after printing, or electronically via signature pad.

Results/Case report

Table 1. Acute Pain Procedural Consent Templates

1. Continuous Epidural Block (thoracic, lumbar)
2. Continuous Paravertebral Block (thoracic, lumbar) (right, left)
3. Nerve Block (continuous, single-shot) (right, left) (supraclavicular, interscalene, infraclavicular, femoral, psoas, adductor canal, sciatic, other)
4. Epidural Blood Patch
5. Lumbar Intrathecal Drainage Catheter
6. Abdominal Wall (Truncal) Block

Discussion

These consent templates have been in use since February 2015. We feel this has standardized the consent process with a more complete and

consistent listing of the benefits and potential risks than was achieved with our previous method using the surgical anesthesia consent form. Examples (Fig 1, 2).

References

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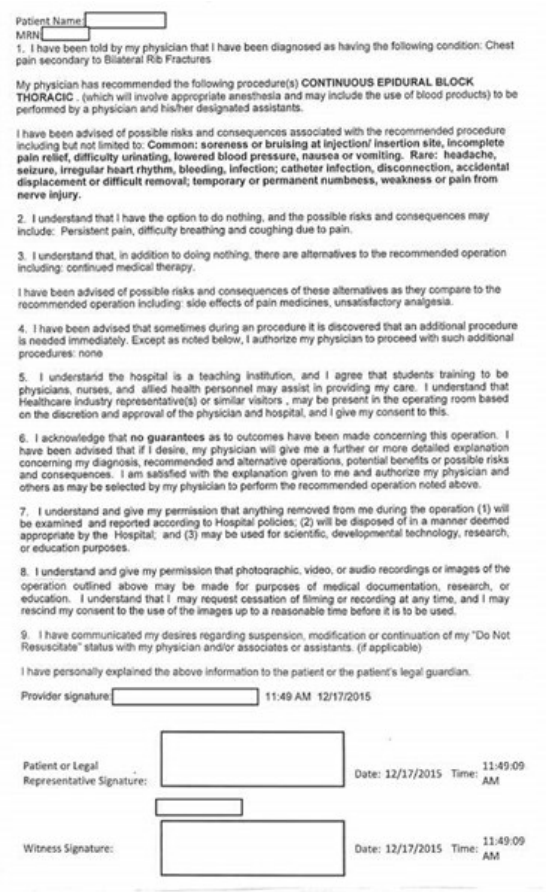
Tables/images



Patient Name:
MRN:

1. I have been told by my physician that I have been diagnosed as having the following condition: Chest pain secondary to Bilateral Rib Fractures

My physician has recommended the following procedure(s) **CONTINUOUS EPIDURAL BLOCK THORACIC** . (which will involve appropriate anesthesia and may include the use of blood products) to be performed by a physician and his/her designated assistants.

I have been advised of possible risks and consequences associated with the recommended procedure including but not limited to: **Common: soreness or bruising at injection/ insertion site, incomplete pain relief, difficulty urinating, lowered blood pressure, nausea or vomiting. Rare: headache, seizure, irregular heart rhythm, bleeding, infection; catheter infection, disconnection, accidental displacement or difficult removal; temporary or permanent numbness, weakness or pain from nerve injury.**

2. I understand that I have the option to do nothing, and the possible risks and consequences may include: Persistent pain, difficulty breathing and coughing due to pain.

3. I understand that, in addition to doing nothing, there are alternatives to the recommended operation including: continued medical therapy.

I have been advised of possible risks and consequences of these alternatives as they compare to the recommended operation including: side effects of pain medicines, unsatisfactory analgesia.

4. I have been advised that sometimes during an procedure it is discovered that an additional procedure is needed immediately. Except as noted below, I authorize my physician to proceed with such additional procedures: none

5. I understand the hospital is a teaching institution, and I agree that students training to be physicians, nurses, and allied health personnel may assist in providing my care. I understand that Healthcare industry representative(s) or similar visitors , may be present in the operating room based on the discretion and approval of the physician and hospital, and I give my consent to this.

6. I acknowledge that **no guarantees** as to outcomes have been made concerning this operation. I have been advised that if I desire, my physician will give me a further or more detailed explanation concerning my diagnosis, recommended and alternative operations, potential benefits or possible risks and consequences. I am satisfied with the explanation given to me and authorize my physician and others as may be selected by my physician to perform the recommended operation noted above.

7. I understand and give my permission that anything removed from me during the operation (1) will be examined and reported according to Hospital policies; (2) will be disposed of in a manner deemed appropriate by the Hospital; and (3) may be used for scientific, developmental technology, research, or education purposes.

8. I understand and give my permission that photographic, video, or audio recordings or images of the operation outlined above may be made for purposes of medical documentation, research, or education. I understand that I may request cessation of filming or recording at any time, and I may rescind my consent to the use of the images up to a reasonable time before it is to be used.

9. I have communicated my desires regarding suspension, modification or continuation of my "Do Not Resuscitate" status with my physician and/or associates or assistants. (if applicable)

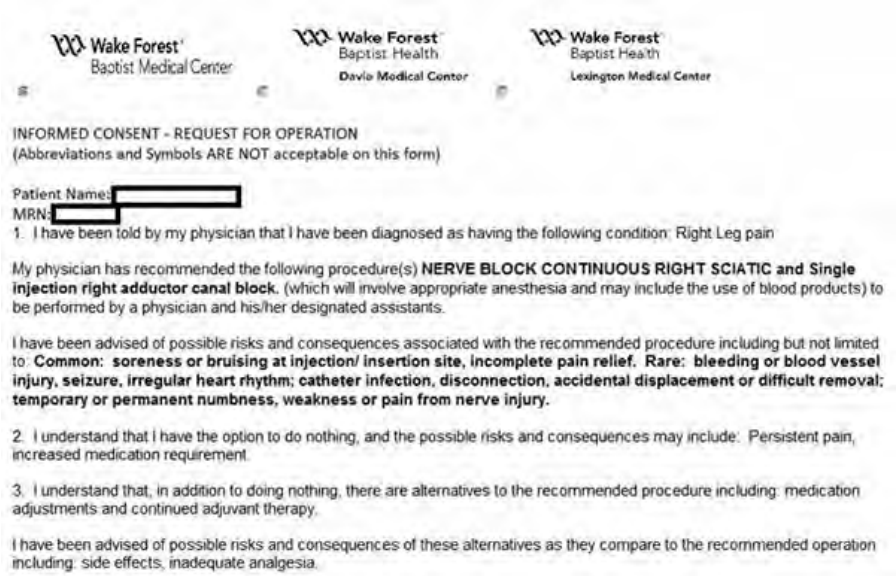
I have personally explained the above information to the patient or the patient's legal guardian.

Provider signature: 11:49 AM 12/17/2015

Patient or Legal Representative Signature: Date: 12/17/2015 Time: 11:49:09 AM

Witness Signature: Date: 12/17/2015 Time: 11:49:09 AM

Figure 1. Example of Completed Thoracic Epidural Consent Form in a Trauma Patient with Bilateral Rib Fractures



Wake Forest Baptist Medical Center | Wake Forest Baptist Health Davie Medical Center | Wake Forest Baptist Health Lexington Medical Center

INFORMED CONSENT - REQUEST FOR OPERATION
(Abbreviations and Symbols ARE NOT acceptable on this form)

Patient Name: [redacted]
MRN: [redacted]
1. I have been told by my physician that I have been diagnosed as having the following condition: Right Leg pain

My physician has recommended the following procedure(s) **NERVE BLOCK CONTINUOUS RIGHT SCIATIC and Single injection right adductor canal block.** (which will involve appropriate anesthesia and may include the use of blood products) to be performed by a physician and his/her designated assistants.

I have been advised of possible risks and consequences associated with the recommended procedure including but not limited to: **Common: soreness or bruising at injection/ insertion site, incomplete pain relief. Rare: bleeding or blood vessel injury, seizure, irregular heart rhythm; catheter infection, disconnection, accidental displacement or difficult removal; temporary or permanent numbness, weakness or pain from nerve injury.**

2. I understand that I have the option to do nothing, and the possible risks and consequences may include: Persistent pain, increased medication requirement.

3. I understand that, in addition to doing nothing, there are alternatives to the recommended procedure including: medication adjustments and continued adjuvant therapy.

I have been advised of possible risks and consequences of these alternatives as they compare to the recommended operation including: side effects, inadequate analgesia.

Figure 2. Example of Completed Consent Form for Continuous Sciatic Block in a Patient with Lower Extremity Injury

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
Material Research Support from I-Flow Corporation

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1416
Scientific abstract: Regional anesthesia

Percutaneous Freezing of Sensory Nerves Prior to Total Knee Arthroplasty

Vinod Dasa, Gabriel Lensing, Miles Parsons, Justin Harris, Julia Volaufova, Ryan Bliss
LSUHSC School of Medicine

Introduction

Total knee arthroplasty (TKA) is a common procedure resulting in significant postoperative pain. A nerve block via percutaneous cryoneurolysis targeting the infrapatellar branch of the saphenous nerve and anterior femoral cutaneous nerve prior to surgery could relieve postoperative knee pain by temporarily blocking sensory nerve conduction [1]. This has many implications, one being reduced pain. Decreasing pain could lead to the use of less narcotic pain medications and fewer adverse effects. Adverse effects to potentially be avoided include nausea, emesis, ileus, and dependence [2]. Another conceivable result of percutaneous cryoneurolysis is a shortened length of stay in the hospital, lowering not only nosocomial infections [3,4] but cost as well. Using focused cold therapy, cryoneurolysis, to perform this nerve block is not as well documented as the use of chemical/pharmacologic nerve blocks. Cryoneurolysis of peripheral sensory nerves has been shown to be efficacious in attenuating pain symptoms in patients with clinical conditions including trigeminal neuralgia, neuroma, and post-thoracotomy pain [5,6-10], with pain relief ranging from a couple of months to a few years [8,11]. The focus of this study is to assess the clinical implications of percutaneous cryoneurolysis prior to TKA and its effect on the post-operative outcomes of patients.

Materials and methods (NA for case report)

IRB approval was obtained for a retrospective chart review of 100 patients who underwent TKA was conducted to assess the value of adding perioperative cryoneurolysis to a multimodal pain management program. The treatment group consisted of the first 50 patients consecutively treated after the practice introduced perioperative (5 days prior to surgery) cryoneurolysis as part of its standard pain management protocol. The control group consisted of the 50 patients treated before cryoneurolysis was introduced. Outcome measures included hospital length of stay (LOS), postoperative opioid requirements to 12 weeks, and patient-reported outcomes (KOOs, WOMAC, Promis-29, SF-12, Oxford) of pain and function.

Results/Case report

A significantly lower proportion of patients in the treatment group had a LOS ≥2 days compared with the control group (6% vs. 67%, $p<0.0001$, Figure 1) and required 45% less opioid medication during the first 12 weeks after surgery (Figure 2). The treatment group reported a statistically significant reduction in symptoms at the 6- and 12-week follow-up compared with the control group. The treatment group also showed within-group significant reductions in pain intensity and pain interference at 2- and 6-week follow-up, respectively. In comparison, the control group reported no significant changes in the respective postoperative outcomes.

Discussion

The use of traditional nerve blocks has been proven effective in reducing postoperative pain and producing better long-term knee scores [1]. To our knowledge, this is the first study to investigate the clinical utility of cryoneurolysis administered prior to TKA in addition to a standard multimodal pain management regimen. Adding cryoneurolysis to a multimodal perioperative pain management protocol in patients undergoing TKA may help decrease hospital LOS, reduce postoperative opioid requirements, and improve knee symptoms and pain. Promising results from this preliminary retrospective review warrant further, adequately powered prospective randomized studies to validate the findings of this preliminary report.

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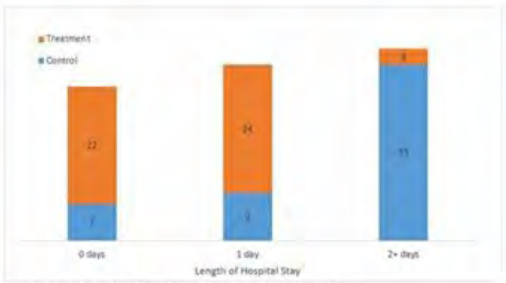

Figure 1: Length of hospital stay in treatment and control group.

New Section 1 Page 1

Length of hospital stay in treatment and control groups

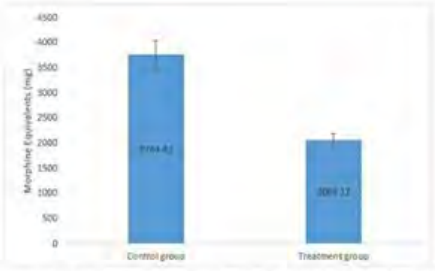

Figure 2: Average morphine equivalent intake up to 12 weeks post-operatively in the control and treatment group. Error bars represent 95% CI.

New Section 1 Page 1

Average morphine equivalent intake up to 12 weeks post-operatively in the control and treatment group.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
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Abstract: 1417
Medically Challenging Cases (report of up to 4 cases)

Bilateral TAP catheters facilitates wean from mechanical ventilation after 34 intensive care days.

Brian Butala, Rafik Tadros, Joeseph Schoenfeldt
Allegheny Health Network

Introduction

Transversus abdominis plane (TAP) blocks have been useful in managing postoperative pain since the 1990's[i],[ii],[iii]. Little has been reported about the utility and efficacy of the TAP block in the critically ill, mechanically ventilated patient. We report a case of bilateral TAP catheters with bupivicane infusion for facilitation of weaning from mechanical ventilation.

Results/Case report

A 58 year-old white male with history of COPD, asthma 30 pack-year tobacco abuse, obstructive sleep apnea, obesity (BMI 35.7), atrial fibrillation, HTN and Chron's disease who initially presented to the emergency department with complaints of nausea, vomiting and abdominal pain. CT scan on showed an incarcerated ventral hernia and the patient was taken emergently to the operating room for exploratory laparotomy. The patient remained intubated at the end of the case due to peak airway pressures >60 cmH^2O and copious secretions. Over the course of 30 days, the patient continued to have high peak airway pressures, agitation associated with supraventricular tachyarrythias requiring propofol and fentanyl infusions for sedation and required two additional small bowel resections for obstruction.

Consultation to the acute pain service was called on hospital day 30 after his third abdominal procedure. At this time, the patient was hemodynamically stable requiring mechanical ventilation via tracheostomy with peak airway pressures in the 50's. Chest x-ray showed bilateral lower lobe atelectasis. The patient's abdomen was still open with a wound vacuum dressing. The patient remained on fentanyl and propofol infusions for sedation

Under ultrasound guidance, bilateral TAP catheters were placed. 0.125% bupivicane at 10 ml/hr was infused bilaterally. 10 ml of 0.25% ropivicane were bolused bilaterally every 12 hours. On catheter day 1, the patient was weaned from sedation and was able to maintain adequate oxygenation on CPAP. On catheter day 2 the patient was weaned to trach mask oxygen. The catheters were removed on catheter day 6 after being bloused and the patient was transferred to a general medical floor.

Discussion

TAP blocks have been shown to provide excellent analgesia compared to conventional therapy in the perioperative period. However, we describe its use as an adjunct for weaning from mechanical ventilation in a patient with an open abdomen. Conventional continuous IV sedation in the mechanically ventilated patient has been shown to increase length of mechanical ventilation[iv]. TAP blocks may provide adequate pain control, reduce splinting and improve respiratory function in mechanically ventilated patients. Prospective studies are necessary for any definitive conclusion.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1418
Scientific abstract: Regional anesthesia

Safety and Efficacy of Subgluteal Sciatic Intraneural Injection for Lower Limb Amputation in Patients with Type 2 Diabetes

Yu Ma, Wen Ni, Lulong Bo, Xiaoming Deng
Changhai Hospital, Second Military Medical University

Introduction

To investigate the safety and efficacy of sciatic intraneural injection for lower limb amputation in patients with type 2 diabetes.

Materials and methods (NA for case report)

A prospective study of anesthetic techniques and management of 36 adult patients for lower limb diabetic gangrene who were admitted for emergence amputation. The choice of anesthesia for all patients was peripheral nerve block (0.375% ropivacaine) by ultrasound guidance for their poor general condition, such as inflammation fever, hyperglycemia, atrial fibrillation, and hypertension, et al. All patients accepted femoral nerve block (15 ml), lateral cutaneous nerve block (5 ml), and obturator nerves block (10 ml for anterior and posterior ramus). Sciatic nerve block was injected at subgluteal level and patients were divided into two groups (Group P and Group I). For patients in Group P, the tip of needle was near the sciatic epineurium and 20 ml local anesthetic was injected surround the sciatic nerve (Fig 1). For patients in Group I, the needle tip pierces sciatic nerve directly and a pop could be felt. 10 ml local anesthetic was injected into sciatic nerve and the ultrasound image of sciatic nerve inflated during injection (Fig 2). Time to complete sensory block and anesthesia effect during operation, and postoperative residual sensory block time were recorded. All patients were examined for any nerve complications at a follow-up 6 months after the procedures.

Results/Case report

All patients accepted anesthesia and amputation surgery safely. All blocks were guided by ultrasound and performed by skilled anesthesiologists. No patients complained paresthesia and injection pain during injection. The onset time of sciatic nerve block in Group I was shorter than that in Group P (17±3 min *vs.* 29±6 min, $P<0.01$). During operation, 11 patients in Group P felt endurable pain in the sciatic nerve distribution area and 1% lidocaine infiltration was able to inhibit the pain. None patients in Group I felt pain during operation. The analgesic time (residual sensory block) in Group I was longer than that in Group P (from beginning of block, 15±3h *vs.* 11±3h, $P<0.05$). No nerve complications and phantom limb pain were found in alive patients of both groups (2 died in Group P and 1 died in Group I at a follow-up 6 months).

Discussion

Our study showed that for lower limb amputation in patients with type 2 diabetes, careful intraneural injection is safe and can quick onset for complete sciatic nerve block.

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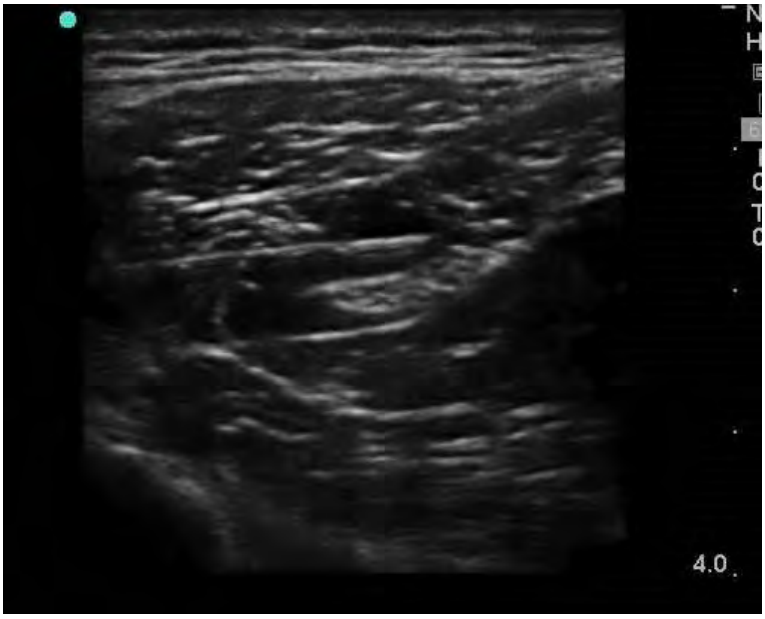

Fig. 1 For patients in Group P, the tip of needle was near the sciatic epineurium and 20ml local anesthetic was injected surround the sciatic nerve.

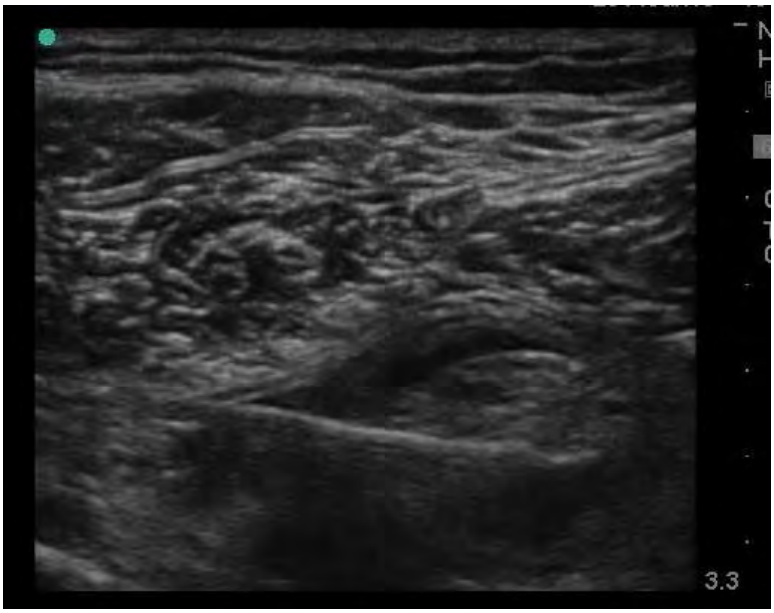

Fig. 2 For patients in Group I, the needle tip pierces sciatic nerve and a pop could be felt.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
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Abstract: 1421
Scientific abstract: Regional anesthesia

The Benefit of Continuous Peripheral Nerve Blockade (CPNB) in a Patient with Neural Sheath Fibromas.

John-Paul J. Pozek, Jillian Dashiell
Thomas Jefferson University Hospital

Introduction

Neurofibromatosis type 1 is a rare neurogenetic disease. This report describes the use of an adductor canal peripheral nerve block (PNB) and sciatic continuous PNB (CPNB) in a patient with Neurofibromatosis type 1(NF-1).

Results/Case report

The patient was a 62 year old male with NF-1, hypertension, atrial fibrillation and a right ankle fracture for tibiotalar calcaneal fusion. Cutaneous neurofibromas covered most of his body. After discussion with orthopedic surgery, the anesthetic plan was formulated to be general anesthesia. Postoperative analgesia was to be achieved by an adductor canal PNB and a sciatic CPNB.

The right saphenous nerve in the adductor canal was visualized by ultrasonography and 10 mL of 0.5% ropivacaine was injected with adequate perineural spread. Ultrasound identification of the tibial nerve was difficult as the structures believed to be nerve tissue in the patient were filled with hypoechoic densities (Figure 1). These structures were non-compressible and had no Doppler flow. With negative aspiration, 30 mL of 0.5% ropivacaine was injected with adequate local anesthetic spread and a 20g multi-orifice catheter was threaded.

General anesthesia was induced with propofol and fentanyl, with sevoflurane used as maintenance. No additional opioids were given and the procedure proceeded uneventfully. In the PACU, the patient reported 0/10 pain and 0/5 motor function along the sciatic distribution. A 0.2% ropivacaine infusion was started through the sciatic CPNB. Eight hours after the CPNB was placed, the patient complained of pain along the sciatic distribution which subsided with a 10mL bolus of 0.5% ropivacaine. Correct position of the catheter was confirmed with ultrasound.

A similar episode occurred 14 hours after CPNB placement, which was treated by a bolus of 0.5% ropivacaine and increasing the infusion rate. Boluses of 0.5% ropivacaine were required at 21 and 29 hours after CPNB placement, each providing relief.

Discussion

Current literature is scarce concerning the efficacy and safety of PNB in patients with NF-1.[1] Case reports involving the use of single injection nerve blocks have demonstrated adequate responses.[2,3] Ultrasound-guided regional anesthesia has been successful in neurofibromatosis in areas of normal neural tissue as well as in nerve tissue containing hypoechoic structures, which are believed to be a peripheral nerve sheath neurofibromas.[4,5,6,7] However, these neurofibromas may alter nerve conduction, spread of local anesthetic, and duration of blockade.[4] An extensive PubMed search has shown no literature on CPNB in patients with NF-1.

In this case report the patient had relief from the single injection but had resistance to continuous infusion. This appears to support the argument that nerve sheath neurofibromas can alter the spread and duration of local anesthetics. In this population, perhaps CPNB should be placed to administer intermittent boluses of more concentrated local anesthetics rather than a continuous infusion of a more dilute local anesthetic. Further research with CPNB will be necessary in this population in order to improve perioperative care.

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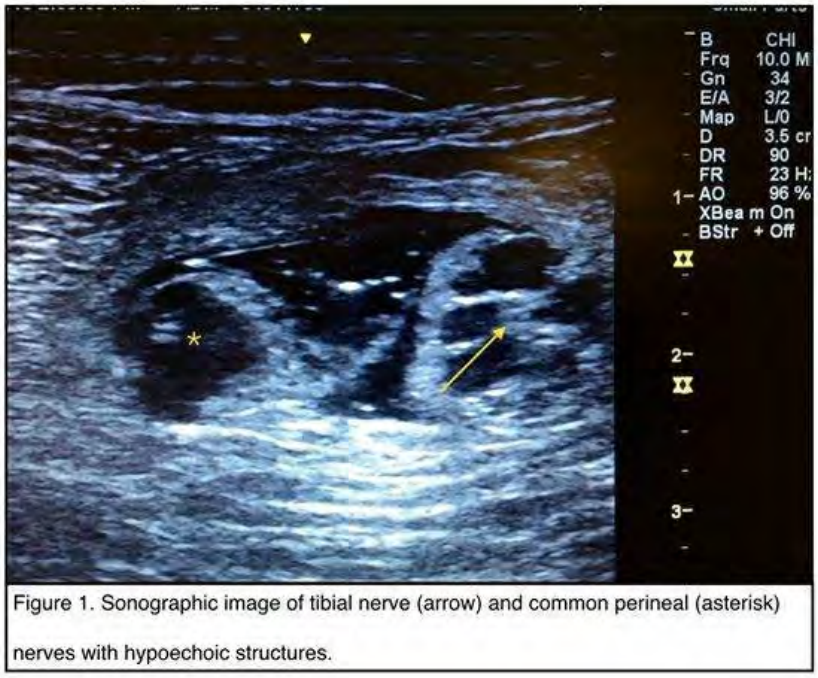

Figure 1. Sonographic image of tibial nerve (arrow) and common perineal (asterisk) nerves with hypoechoic structures.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
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Abstract: 1422
Scientific abstract: Regional anesthesia

Single Injection vs. Continuous Lumbar Plexus Block for Anterior Approach Total Hip Arthroplasty

Meghana Yajnik, Jean-Louis Horn
Stanford University

Introduction

Recently at our institution we have transitioned from placing lumbar plexus catheters to administering lumbar plexus single injection regional blocks for all patients having total hip arthroplasty via an anterior approach to avoid prolonged quadriceps weakness. We investigated whether this change in practice has resulted in a significant difference in post-operative pain and recovery.

Materials and methods (NA for case report)

This project was approved by our institutional IRB. We compared the most recent 20 patients who had pre-operative lumbar plexus catheters placed to 20 patients who had lumbar plexus single injection blocks. All patients then underwent general anesthesia and total hip arthroplasty via an anterior approach by the same surgeon. The primary end point was total narcotic use. Secondary end points included pain score, time to first physical therapy, and time to discharge.

Results/Case report

The total narcotic use (in morphine IV equivalents) from the time of surgery through post-operative day 1 (POD1) was similar between both groups (38.8 for the catheter group vs. 23.0 for the single injection group, $p = 0.95$). Time to first physical therapy was slightly less for the single injection group, although not statistically significant (0.85 days for the catheter group vs. 0.70 days for the single injection group). Time to discharge was similar between groups (2.45 days for the catheter group vs. 2.55 days for the single injection group, $p = 0.85$). Post-operative day 1 pain scores on a 1-10 Likert scale were less for the catheter group although not statistically significant (1.9 vs. 3.8, $p = 0.99$).

Discussion

Our data suggests that there is no significant difference between a continuous lumbar plexus block and a single injection block for total hip arthroplasty via an anterior approach in regards to post-op narcotic use and pain scores. Interestingly continuous nerve block did not delay rehab or discharge. Single injection lumbar plexus blocks may increase efficiency in the pre-operative area for regional anesthesia providers. Continuous nerve block and single injection lumbar plexus block are both reasonable options with similar post-op pain scores, narcotic usage and time to physical rehab for total hip arthroplasty via an anterior approach.

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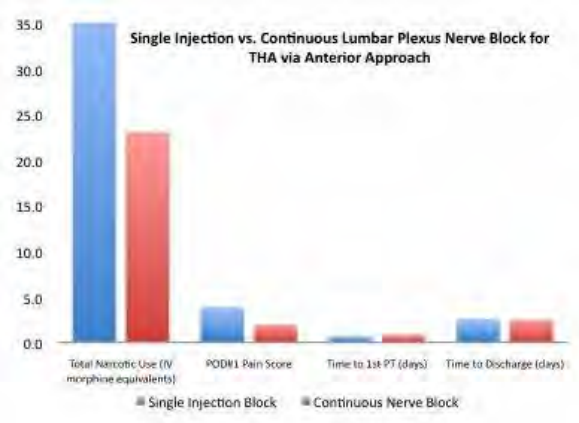

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1423
Scientific abstract: Chronic pain

Development of Chronic Pain and Disability after Multiple Rib Fractures

Arsh Chopra, Brian Hertzberg, Mena Abdelmalak, Aldis Siltumens, Kristin Berger, Khaled Iskandarani, Vernon Chinchilli, Sanjib Adhikary, Julia Caldwell
Penn State College of Medicine

Introduction

Rib fractures are present in 10-20% of all trauma patients.[1] The number of rib fractures have been correlated with both increased pain and pulmonary morbidity.[2,3] The incidence of chronic pain in these patients may be attributed to the difficulty in managing the acute pain effectively.[4] Our study examines risk factors which may make patients more susceptible to the development of persistent rib fracture pain and long-term disability.

Materials and methods (NA for case report)

This study was approved by the IRB/Human Subjects Committee of the Penn State College of Medicine. Retrospectively, patient demographics, medical histories, laboratory data, and pain management and treatment details were recorded for 916 patients of all ages with ≥2 rib fractures admitted to Hershey Medical Center between January 1, 2010 and December 31, 2012. The 282 patients admitted during the 2012 calendar year were telephoned to assess long-term complications and clinical status using the EQ-5D-3L Quality of Life questionnaire (EQ-5D™). 62 patients completed the questionnaire. The collected data were analyzed using descriptive statistics, bivariate, and multivariable analyses.

Results/Case report

- 66% of patients in our study were male and 34% female. 5.6% belonged to an ethnic minority. Mean age was 56.4 years (SD 20.6).
- 32% of patients contacted reported chronic pain associated with their rib fractures. 3% continued to require analgesic medications for pain control, and 85.7% of patients requiring long-term analgesia relied on opioid medications.
- Pneumothorax was a common complication (26.3%) and was associated with higher number of fractures (OR =1.20, CI 1.12, 1.28) and age < 60 years (OR = 1.71, CI 1.26, 2.32).
- Pneumonia occurred relatively infrequently (2.6%), but was associated with a higher number of fractures (OR= 1.21, CI = 1.08, 1.36).
- 100% of patients who developed chronic pain after rib fracture initially received opioid pain medications. 32.9% received patient-controlled analgesia.
- Higher pain score on presentation was associated with developing chronic pain (OR =1.35, CI= 1.11, 1.63).
- Average pain score was 8.0+/-2.2 in patients who developed chronic pain vs 6.3+/-2.6 in patients who did not.
- Higher pain scores from rib fractures were positively associated with female gender (p=0.001), non-Caucasian status (p=0.05), and age < 60 years (p<0.0001), and negatively associated with presence of other fractures (p=0.03).
- A greater number of rib fractures was not associated with developing chronic pain (OR =1.09, CI= 0.96, 1.23).

Discussion

Our study identified multiple risk factors for chronic pain in patients with rib fractures. Interestingly, a higher number of rib fractures was not a risk factor. The high incidence of chronic pain in these patients reflects a need to shift the care of these patients. Limited use of acute pain management interventions yielded insufficient data to assess efficacy in reducing the incidence of chronic pain. In conjunction with Patient Protection and Affordable Care Act influences towards cost-effective care, a study implementing efforts to manage acute rib fracture pain and thus prevent chronic pain and disability is warranted.

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Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
Regeneron Pharmaceuticals - Stock ownership

Amgen - Stock ownership

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1424
Scientific abstract: Acute pain

Multimodal Analgesia is not Associated with Decrease in Persistent Chronic Pain after Total Knee Arthroplasty.

Nabil Elkassabany, Ignacio Badiola, Brandon Kase, Jiabin Liu, Michael Ashburn, Charles Nelson
University of Pennsylvania

Introduction

Persistent post-surgical pain (PPSP) has been described as a silent epidemic with significant economic and social implications (1). The goal of Total Knee Arthroplasty (TKA) is to improve physical function and quality of life by alleviating the pain of degenerative joint disease (2). PPSP after TKA undermines the effectiveness of this treatment goal. Therefore, identifying effective interventions that reduces the incidence of PPSP is essential for improving long-term outcomes after surgery (3). Over the last several years, multimodal analgesia protocols resulted in better acute postoperative control after surgery across multiple specialties. However, it is not entirely clear whether implementation of such protocols results in lower incidence of chronic pain after TKA.

Materials and methods (NA for case report)

The IRB at the university of Pennsylvania (Philadelphia, PA, USA) has approved the study. Beginning in January 2012, a multimodal perioperative pain protocol (MP3) was instituted at Penn Presbyterian Medical Center (PPMC) for patients undergoing TKA. The protocol consists of acetaminophen, celecoxib, , gabapentin, NMDA receptor antagonism, local infiltration, and systemic opioids.

We compared the incidence of PPSP in patients undergoing TKA prior to MP3 implementation (Group 1- June 2010 to Dec 2011) with patients undergoing TKA after MP3 (Group 2-Jan 2012 to Dec 2013). PPSP was defined as pain lasted at least 6 months after TKA. The Brief Pain Inventory (BPI), Western Ontario Macmaster university index (WOMAC), and the short form McGill questionnaire were administered to assess PPSP. We collected the following variables: age, sex, race, BMI, psychiatric diagnoses, chronic pain syndromes, opioid prescription before surgery, complications following surgery, type of anesthesia, use of regional anesthesia, occupation status, marital status, history of prior or contralateral TKA. A multivariable logistic regression model was used to compare the incidence between both groups and to identify risk factors for PPSP.

Results/Case report

PPSP developed in 187/534 (35.0%) of patients before the MP3 protocol vs. 158/458 (34.6%) after the adoption of MP3 protocol (OR 0.98, 95% CI 0.75-1.27, p=0.88). Adjusting for other PPSP risk factors provided a similar estimate (OR 1.05, 95% CI 0.79-1.40, p=0.72). Independent risk factors for PPSP included: history of smoking prior to surgery, history of chronic pain syndromes before surgery, revision surgery, and younger age at the time of surgery.

Discussion

Implementation of the MP3 was not associated with decrease in the incidence of chronic pain after TKA. Although the MP3 protocol is based on the notion of multimodal analgesia with attempts to block multiple acute/postoperative pain pathways, the length of time that the regimen is implemented may not be long enough to make an impact on the transition from acute to chronic pain.

Other modifiable factors associated with its development should be explored and corrected. Further prospective studies to assess the efficacy of different interventions are warranted.

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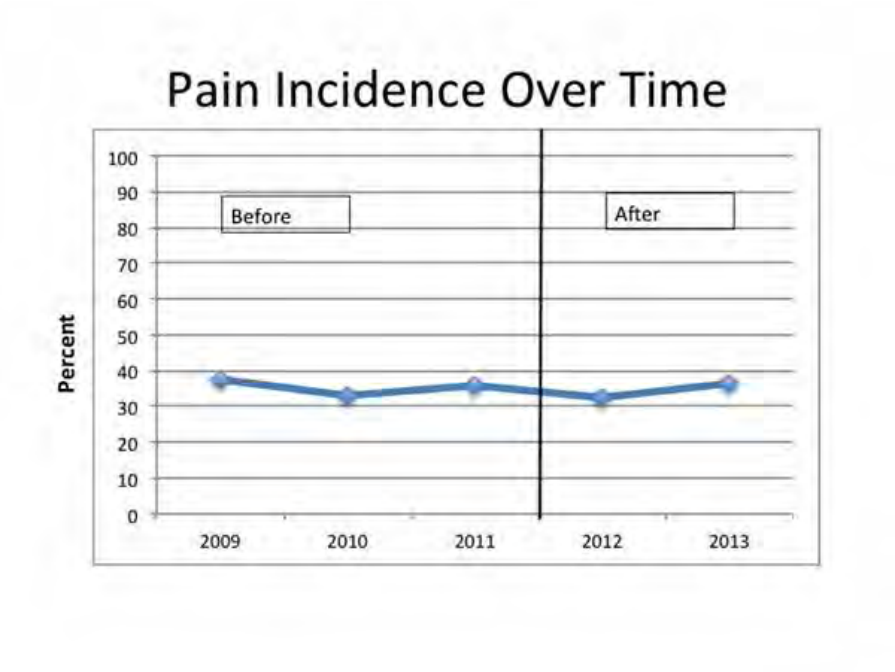
Tables/images



Incidence of chronic persistent pain after TKA over time before and after the MP3

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1426
Medically Challenging Cases (report of up to 4 cases)

Parsonage-Turner syndrome after total shoulder arthroplasty: presentation and management

Shara Cohn, Bryant Tran, Ryan Derby
Stanford University School of Medicine

Introduction

Parsonage-Turner syndrome (PTS), also known as neuralgic amyotrophy or brachial neuritis, is an uncommon condition characterized by acute onset of pain in the brachial plexus distribution followed by motor deficits that persist for weeks to months. Its pathophysiology is not well understood, but orthopedic surgery has been implicated as a possible trigger. We report a case of suspected PTS after total shoulder arthroplasty and interscalene brachial plexus blockade.

Results/Case report

A 70-year-old 64 kg, 178cm female presented to our facility for right shoulder total arthroplasty. Her medical history was remarkable for paroxysmal atrial fibrillation and degenerative joint disease. A continuous interscalene nerve catheter was placed pre-operatively without incident. Prior to operating room transfer, the patient appropriately reported numbness and altered proprioception of her right arm and hand. The surgical procedure was completed without issue.

On post-operative day 1, the patient was noted to have complete motor block and, following discontinuation of the local anesthetic infusion, significant motor and sensory deficits in the surgical extremity were revealed, including absent deep tendon reflexes and some areas of patchy hyperalgesia in all dermatomes of the right upper extremity. The patient had complete motor deficit in the right upper extremity and continued diminished, though slightly improved sensation in all dermatomes of the right upper extremity at the time of hospital discharge on post-operative day 4. At seven weeks post-operatively, the patient reported a new burning-sensation on the palmar surface of her hand and had continued biceps and triceps paralysis as well as radial and ulnar distribution paralysis. EMG performed was consistent with severe right brachial panplexopathy affecting the upper, motor, and lower trunks with ongoing motor denervation without signs of reinnervation. The patient began to show significant improvement six months post-operatively, demonstrating 4+/5 strength in her deltoid, biceps, and triceps. Sensation was intact in all distributions of her right upper extremity.

Discussion

The patient's acute and profound motor weakness, combined with panplexopathy on EMG, suggests that the patient had a pathophysiologic predisposition to nerve injury, which led to an inflammatory response and subsequent nerve injury during the perioperative period. Although the patient did not report any of these occurrences in the pre-operative period, PTS has been reported after bacterial or viral infection, immunizations, strenuous exercise, and psychological stress. Mechanical stretch injury and intraneural injection of local anesthetic were unlikely to be the direct causes of the patient's symptoms due to unremarkable events during the perioperative period.

We present this medically challenging case as a rare presentation for a seemingly routine orthopedic procedure. Current literature suggests that the incidence of PTS may be higher than previously thought. Follow-up and reassurance becomes essential for anesthesiologists in these cases, as neuropathy can significantly decrease quality of life.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1428
Scientific abstract: Case series (5 or more patients)

Medication Spread after Pediatric Bilateral Single Injection Ultrasound Guided Rectus Sheath Blocks

Ali Hassanpour, John Hauber, Lendi Joy, Stefan Scholz, Mihaela Visoiu
Children's Hospital of Pittsburgh of UPMC

Introduction

Bilateral single injection rectus sheath blocks are used for postoperative analgesia after midline abdominal incisions from the xyphoid superiorly, to the symphysis pubis inferiorly. There is clinical interest regarding the spread of the local anesthetic in the posterior rectus sheath plane to determine the need for multiple cephalocaudal injections. We hypothesized that the posterior rectus sheath limits the local anesthetic spread after ultrasound guided rectus sheath blocks, and that the expected spread does not extend from the xyphoid to the pubic symphysis.

Materials and methods (NA for case report)

Institutional Review Board (IRB) approval was obtained. We enrolled pediatric patients having abdominal surgery with ultrasound guided rectus sheath blocks in a case series study. Patient demographics collected were: age, sex, weight, height, body mass index (BMI), the distance from umbilicus to subcostal margin (cm), the volume of medication injected on each side (saline and ropivacaine, mL). Then a post-block ultrasound measurement was performed to measure local anesthetic spread along the posterior recuts muscle plane. The distance from umbilicus to subcostal margin (cm) used to correlate the spread of medication (cm) with the patient size. Statistical analysis of data was performed using mean (SD) or median (interquartile range), and Spearman’s correlation coefficient.

Results/Case report

A total of 68 patients were enrolled in this study. The patient’s demographics are presented in table 1. Total volume of injected medications and their spread above and below the umbilicus are presented in table 2. In our patient population, the incidence of total spread reaching the level of the subcostal margin was 85.3% on the right side and 92.6% on the left side. The incidence of no medication spread below the umbilicus on the right is 32.4% (n=22) and on the left is 23.5% (n=16). The correlation between total volume injected and the spread of mediation above and bellow the umbilicus is presented in table 3.

Discussion

Based on our findings, we show an incomplete cephalocaudal spread of injectate within the posterior rectus sheath plane to xyphoid superiorly and symphysis pubis inferiorly. If rectus sheath blocks are desired, multiple injections should be performed instead, preferentially at the same level and just lateral to the incisions.

Tables/images

Table 1 Descriptive Statistics for the Study Cohort

	N	Mean ± Standard Deviation
Age (yrs)	68	10.7 ± 4.3
Weight (kg)	68	41.7 ± 17.9
Height (cm)	63	140.0 ± 24.6
BMI (kg/m^2)	63	19.8 ± 5.1
Males	34	-
Females	34	-
Umbilicus Length	68	1.5 ± 0.3
Distance from Umbilicus to Subcostal Region (cm)	68	4.5 ± 1.4

Table 2 Descriptive Statistics for Medication Injection and Spread

	N	Right Rectus Sheath	Left Rectus Sheath
Saline Injected (mL)	68	2.3 ± 2.4	2.2 ± 2.2
Ropivacaine Injected (mL)	68	8.3 ± 2.8	8.3 ± 2.8
Total Volume Injected (mL)	68	10.6 ± 4.1	10.5 ± 3.7
Spread Above Umbilicus (cm)	68	3.9 ± 1.4	3.4 ± 1.3
Spread Below Umbilicus (cm)	68	1.4 ± 1.6	1.4 ± 1.4
Total Spread (cm)	68	6.7 ± 2.1	6.3 ± 2.0
Incidence of No Spread Below Umbilicus (%)*	68	32.4	23.5
Incidence of Spread Reaching the Subcostal Region (%)*	68	85.3	92.6

Data reported as a mean ± standard deviation, unless denoted with *

Table 3 Pearson's Correlation Coefficients between Medication Spread and Volume Injected

	Volume of Saline Injected	Volume of Ropivacaine Injected	Total Volume Injected
Right Rectus Sheath			
Spread Above Umbilicus	0.003	0.570**	0.388*
Spread Below Umbilicus	0.032	0.300*	0.222
Total Spread	0.037	0.677**	0.481**
Left Rectus Sheath			
Spread Above Umbilicus	0.065	0.552**	0.461**
Spread Below Umbilicus	0.108	0.341*	0.325*
Total Spread	0.132	0.685**	0.603**

* Significant to $p < 0.05$ level
** Significant to $p < 0.001$ level

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1429
Scientific abstract: Acute pain

Impact of Thoracic Paravertebral Continuous Catheters and Epidurals on Surgical and Anesthetic Outcomes for Patients Undergoing Liver Resections

Jennifer Mallek, Chris Giordano, Patrick Tighe, Ivan Zendejas, Terrie Vasilopoulos
University of Florida, Shands Hospital

Introduction

Prior studies on patients undergoing liver surgery suggest lower pain intensity ratings and lower opioid consumption associated with neuraxial analgesic regimens. However anticipation of postoperative coagulopathy following extensive hepatic resection limits the number of patients who would otherwise benefit from epidural catheters[1,2]

Thoracic paravertebral catheters (PVC) and intrathecal morphine (ITM) represent two alternative analgesic interventions for extensive hepatic resections.[3] The decision on whether a patient would best benefit from a preoperative epidural, bilateral thoracic PVCs with single shot ITM, or no regional technique at all follows a discussion between the acute pain service and surgeon on the day prior to surgery, and is based upon a combination of patient and procedural factors

Because of the perception and concern that PVCs may offer inadequate somatic and visceral coverage in comparison to epidural catheters, our institution adopted a composite approach for hepatic resections, administering a single injection of 200µg ITM following PVC placement.[4,5] The goals of this study are to analyze the appropriateness and effect of regional interventions on surgical outcomes: hospital and ICU length of stay (LOS), days until Foley catheter is successfully removed, days to advance and tolerate a clear liquid diet (CLD) and pain scores.

Materials and methods (NA for case report)

Following approval by the University of Florida Institutional Review Board we conducted a retrospective study of 300 adult patients undergoing liver resection surgery. The main factor considered was the assigned analgesic regimen (regional vs. non-regional). Covariates of interest included sociodemographic features, presurgical clinical factors, and severity of resection. Severity of the hepatic resection was categorized into one of three classes: Class 1 procedures were simple laparoscopic procedures, Class 3 large and involved open procedures, Class 2 an intermediate group. Measured outcomes included pain intensity ratings, time to resumption of (CLD), duration of urinary catheterization (days until Foley removal), hospital LOS, and ICU LOS (coded as patients with > 1 day in ICU). Multivariable linear and logistic regression models were conducted with JMP 12.0 (SAS Institute, Cary, NC).

Results/Case report

The number of patients with epidurals was small and therefore combined with the PVC group into a composite regional group (n=179). Results demonstrated lower pain scores following surgery in the regional compared with the non-regional assignment (mean difference: -1.5, 95% CI: -2.0 to -1.0, p=0.006), with no main effects of regional assignment on hospital LOS. Interestingly, there was a significant interaction between regional assignment and procedure class for both days to CLD (p=0.001) and hospital LOS (p=0.002). Class 3 procedures had shorter hospital LOS and time to CLD for the composite regional group, whereas Class 1 procedures had longer hospital LOS and days to CLD (Figure 1). These interactions did not reach statistical significance (p>0.05) for days to Foley removal and ICU LOS.

Discussion

Our results suggest regional analgesic interventions were associated with improved surgical outcomes in more complex hepatic resections, and highlight the importance of both patient and procedural stratification in optimizing analgesic strategies for surgical services.

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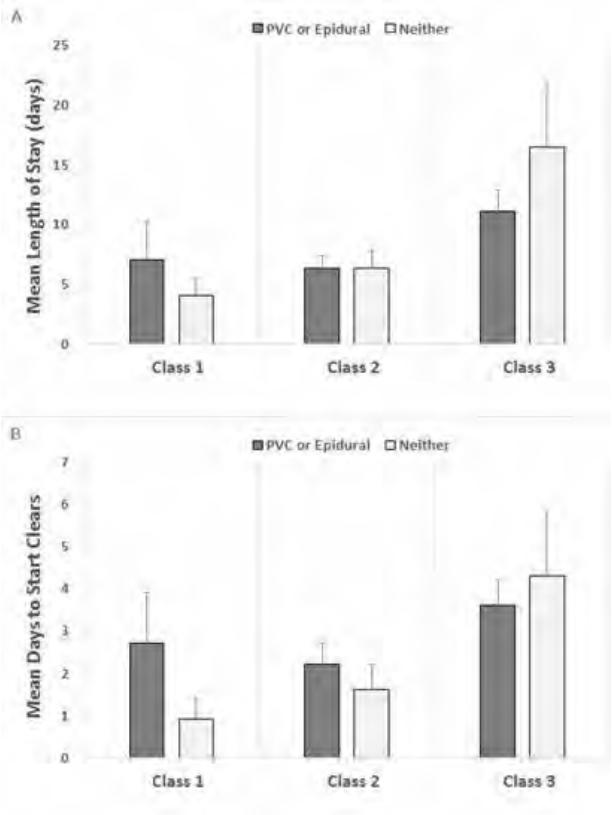

Association between PVC/Epidural use & clinical outcomes across Class. Panel A. Length of stay (p = 0.003); Panel C. Days to start CLD (p=0.012). There was a significant interaction between Class and use of PVC/Epidural. Error bars represent 95% CI

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1430
Medically Challenging Cases (report of up to 4 cases)

Successful treatment of persistent post-dural puncture headache from implantation of spinal cord stimulator using epidural fibrin glue patch after continued failure of epidural blood patches

Kevin Wong, Brian Monroe
Geisinger Medical Center

Introduction

Post-dural puncture headache (PDPH) is a well-recognized, iatrogenic complication associated with interventional neuraxial procedures.[1] It is postulated to be caused by caudal displacement of pain-sensitive intracranial structures secondary to cerebrospinal fluid (CSF) leakage through dural defects.[1] The incidence of accidental dural puncture varies from 0.4% to 6% with 60% rate of PDPH.[2] Risk factors include large-bore cutting needle, young female, multiple needle punctures, previous history of PDPH, and low body mass index.[3] Conservative management includes rest, hydration, caffeine, and analgesics.[1,3] Epidural blood patch (EBP) is the gold-standard for PDPH treatment with a success rate of 77% to 96%.[4] When EBP is contraindicated or has persistently failed, alternative therapies like epidural fibrin glue patch should be sought.

Results/Case report

A 58-year-old female was referred for evaluation of PDPH. She had a history of lumbar fusion for spondylolisthesis in 2005 and implantation of intrathecal hydromorphone pump for failed back surgery syndrome (FBSS) in 2008. Recently, she underwent a trial of spinal cord stimulator (SCS) that resulted in dural puncture. Since then, she developed severe positional headache radiating to bilateral frontal and occipital regions. She described the pain as constant, throbbing, cramping, and stabbing. The headache was associated with hearing loss and spells of confusion. It was worsened by sitting and standing, and relieved by lying flat. Despite several trials of EBP at an outside hospital, her headache failed to resolve. The patient had a known history of difficult venous access and her last EBP required central venous access. Physical examination revealed a well-developed woman with several well-healed scars on her back. Magnetic resonance imaging of her thoracolumbar spine demonstrated postoperative changes from previous lumbar fusion and superimposed degenerative changes of the lumbar spine (Fig. 1). The patient agreed to proceed with epidural fibrin glue patch.

The patient was positioned in prone position. An 18-gauge Tuohy needle was introduced into the epidural space at the L1-2 level using loss of resistance technique. Contrast dye was injected to confirm proper placement using epidurography (Fig. 2). A total of 5 ml fibrin glue was injected followed by 1 ml of normal saline and 5 ml of thrombin into the epidural space. The needle was removed and patient was discharged home in stable condition. A one-week follow-up phone call was made and she reported complete resolution of her PDPH.

Discussion

This case illustrates that epidural fibrin glue patch is a therapeutic option. Our patient suffered from PDPH after inadvertent dural puncture during implantation of SCS. The EBP only provided temporary relief and her quality of life was adversely affected. We decided to perform the epidural fibrin glue patch based on two reasons. Firstly, treatment failure after multiple EBP reflected continuous transdural leak. Secondly, the patient was known to have difficult venous access. Repeating EBP implied the need for central venous access. Epidural fibrin glue patch demonstrated promising outcomes for both immediate and long-term resolution of PDPH in our patient. Further studies are needed to investigate the safety and efficacy of fibrin glue for PDPH treatment.

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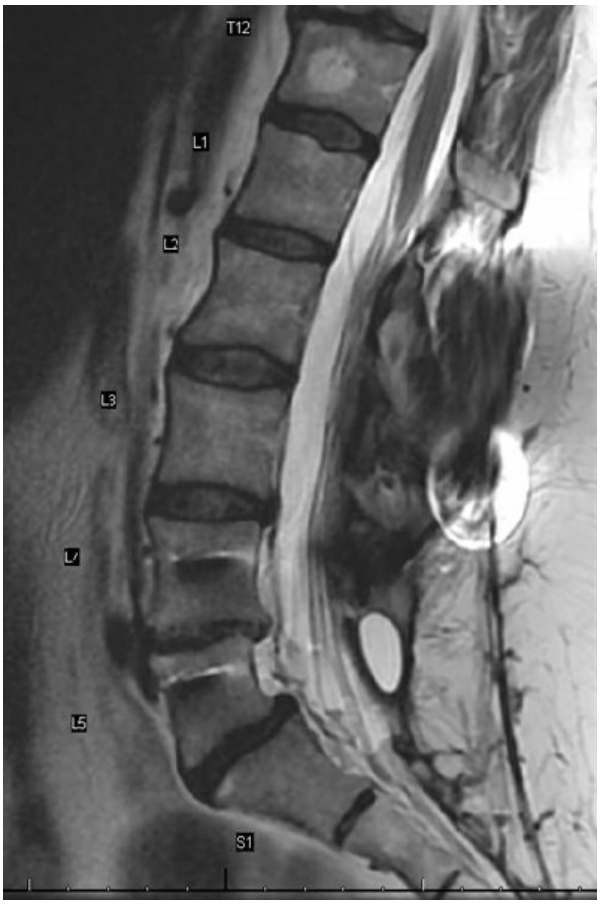

Figure 1. Magnetic resonance imaging of her thoracolumbar spine demonstrated postoperative changes from her remote history of L4-5 and L5-S1 fusion and superimposed degenerative changes with mild bilateral foraminal stenosis from L3 to S1.

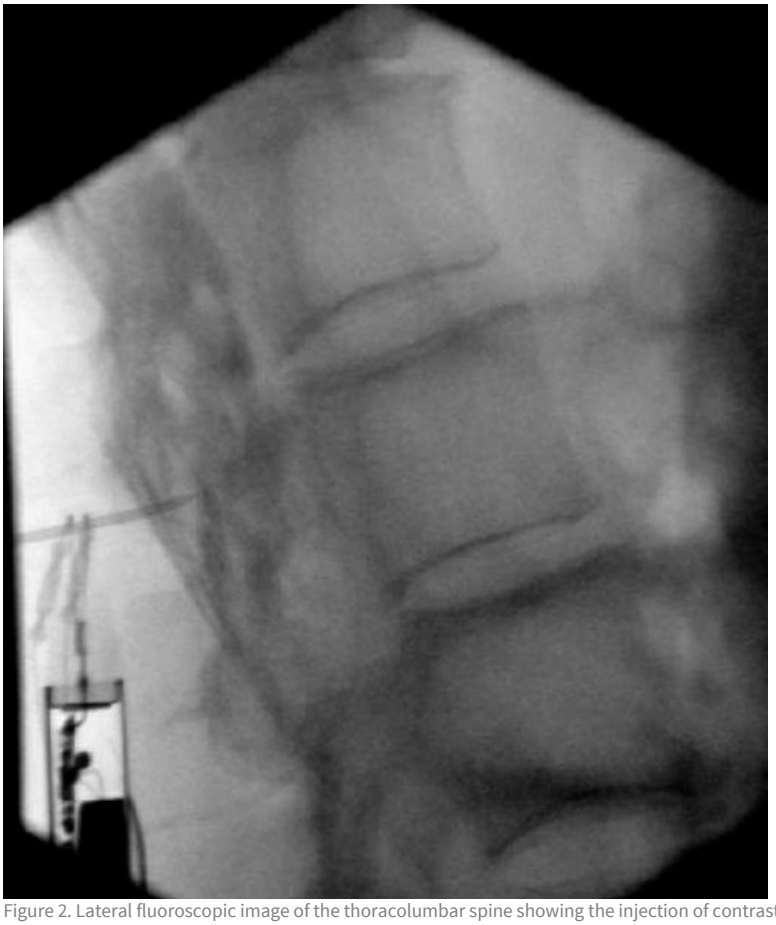

Figure 2. Lateral fluoroscopic image of the thoracolumbar spine showing the injection of contrast medium at the spinal level of L1-2 using loss of resistance technique.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1431
Scientific abstract: Case series (5 or more patients)

Severe neurologic symptoms following continuous popliteal-sciatic nerve block and foot and ankle surgery: 8 patient case series

Gunjan Kumar, Austin J Schwab, Vanila Singh, Jean Louis Horn
Stanford University Medical Center

Introduction

Sciatic nerve blocks at the popliteal fossa are common for foot and ankle procedures that are expected to cause severe pain[1]. The use of ultrasound guided continuous popliteal-sciatic nerve block (UGCPSNB) does not come without risk. Neuropathic complications range from 0-41%, with Gartke et al. arguing that mild and moderate symptoms are likely underreported[2-5]. Some patients present with severe neurologic symptoms. We present an eight-patient case series with severe neurologic symptoms after UGCPSNB.

Materials and methods (NA for case report)

IRB approval was obtained. UGCPSNB was placed in the supine position with the calf elevated on a firm pillow using sterile technique. The sciatic nerve was identified proximal to its division into the tibial and common peroneal nerves in short axis and the procedure was performed using in-plane, lateral to medial technique. A 17g tuohy needle is introduced through the skin and advanced into the paraneural sheath. Once adequate spread is achieved with normal saline, a peripheral nerve catheter is threaded 3-5cm beyond the tip of the needle. The catheter is secured with clear dressing and an anchoring device. Patients were referred from their surgeon to the chronic pain clinic or identified on postoperative followup by the regional anesthesia team between August 2012 and February 2015. Data were extracted from the electronic medical record.

Results/Case report

Table 1 outlines the analysis of the neuropathy.

Discussion

Because neuropathic complications from peripheral nerve catheters are rare, determining risk factors and prevention strategies is difficult. A limitation to previously published reviews is the technique for catheter placement was nerve stimulation. Ultrasound-guided catheter placement is now routine practice, however its use has not been shown to decrease the incidence of peripheral nerve injury[6]. Patients included in this series had surgery from 8/2012 to 2/2015. During this period, a total of 1615 UGCPSNB were performed at our institution. The incidence of nerve injury following foot and ankle surgery during the timeframe of this case series is 0.495%, compared to the overall perioperative nerve injury incidence of 0.03%[7]. Patients in our case series suffered both sensory (numbness, neuropathic pain) and/or motor (weakness) deficits and the tibial nerve was involved in 75% of cases. Only 1/8 patients has complete resolution of their symptoms.

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Tables/images

	Age	Sex	Preexisting Neuropathy	BMI	Chronic Pain	Onset	Distribution	Resolution	Course
PT 1	48	F	No	34	No	Several days postop	CP	Mild Improvement	Daily 4/10 pain
PT 2	52	M	Yes	27	Yes	Noted at 10 week follow up appointment	T/CP	Mild Improvement	Unable to walk on toes, 5/10 pain
PT 3	32	F	No	24	Yes	Hours after surgery	T/SP	Mild Improvement	Continued impaired dorsi/plantar flexion. Daily 3/10 pain
PT 4	56	F	No	30	Yes	8 weeks postop	CP	Yes	Improved after peroneal N release.
PT 5	60	F	No	19	Yes	2-3 weeks postop	T/CP	Moderate improvement	continued mild weakness, improving paresthesias
PT 6	43	M	No	39	No	After surgery, had 2-3 weeks of numbness, then increased hypersensitivity	T/CP	Mild improvement	hypersensitivity, neuropathic pain
PT 7	52	F	Yes	23	Yes	2 weeks postop	T	Moderate improvement	Improved, persistent pain
PT 8	55	F	Yes	34	Yes	4-5/10 pain immediately postop. 1 week later, shooting pain, and color changes	T	No improvement	Underwent left tibial/peroneal N release, tarsal tunnel release, daily severe pain and decrease in function

Table: Results

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1432
Medically Challenging Cases (report of up to 4 cases)

Regional and General Anesthesia Considerations in Patients with Osteogenesis Imperfecta

Bradley Lee, Monica Harbell
University of California, San Francisco

Introduction

Osteogenesis imperfecta (OI) is an inherited condition of abnormal collagen formation that predisposes patients to fractures and presents unique challenges to anesthetic management. We present two patients with OI who presented for fracture repairs and review key concepts, including the role of regional techniques, related to their management. Consent was obtained from patients to present details of the case.

Results/Case report

Patient #1 was a 63-year-old female with OI type I who suffered a left elbow fracture requiring open fixation. She was diagnosed with mild OI in her 50's after sustaining bilateral ankle fractures. For the procedure, a supraclavicular nerve block was placed followed by an uncomplicated general anesthetic using laryngeal mask airway. Arterial catheter was used to avoid repetitive compression with the blood pressure cuff, and intraoperative course was complicated by fracture propagation during fixation.

Patient #2 was a 35-year-old female with severe OI type III with short stature and severe kyphoscoliosis who was wheelchair-bound from previous femur fractures. She fell and suffered a right distal humerus fracture necessitating open fixation. Given the severity of her condition, IV was placed without a tourniquet, arterial line was used for blood pressure monitoring, and no extremity tourniquet was used during the surgery. Her anatomy in the infraclavicular region was challenging given her body habitus; therefore, supraclavicular nerve catheter was placed for postoperative pain control (Figure 1). She was transferred to the operating table using inflatable air mattress and positioned and padded carefully. General anesthesia was induced with propofol, fentanyl, and rocuronium, and she was intubated using video laryngoscope while keeping her neck in neutral position. Intraoperatively, fracture above the fixation was noted during splint application however was not amenable to repair. Post-operatively, the patient had new median neuropathy in the operative arm and leg pain prompting work-up with radiographs that were negative for fractures.

Discussion

As these cases demonstrate, OI raises important concerns in anesthetic management. Because of bone fragility, clinicians should focus carefully on padding, avoiding overextension, and cautious use of tourniquets and blood pressure cuffs[1,2]. The lack of a surgical tourniquet can increase intraoperative bleeding, and new fractures can occur during fixation. There should be a low index of suspicion and prompt evaluation for fractures from positioning or otherwise. Use of regional anesthesia is safe and effective, though nerve blocks can mask injuries and should therefore be discussed with the surgeon.

Difficult airway should be anticipated given that patients can have short necks, fragile teeth, and risk of cervical fracture[3] (Figure 2). Use of laryngeal mask airway, fiberoptic intubation, or video laryngoscope may circumvent these obstacles. Patients with severe kyphoscoliosis can develop restrictive pulmonary disease and are prone to hypoxemia and elevated airway pressures.[2] With the use of regional anesthesia, certain patients may be able to avoid general anesthesia altogether[4,5] and minimize these risks. Platelet count should be confirmed, in particular with regional techniques, due to possibility of abnormal platelet function[1,2]. In addition, OI patients have increased incidence of (nonmalignant) hyperthermia and close temperature monitoring is crucial.

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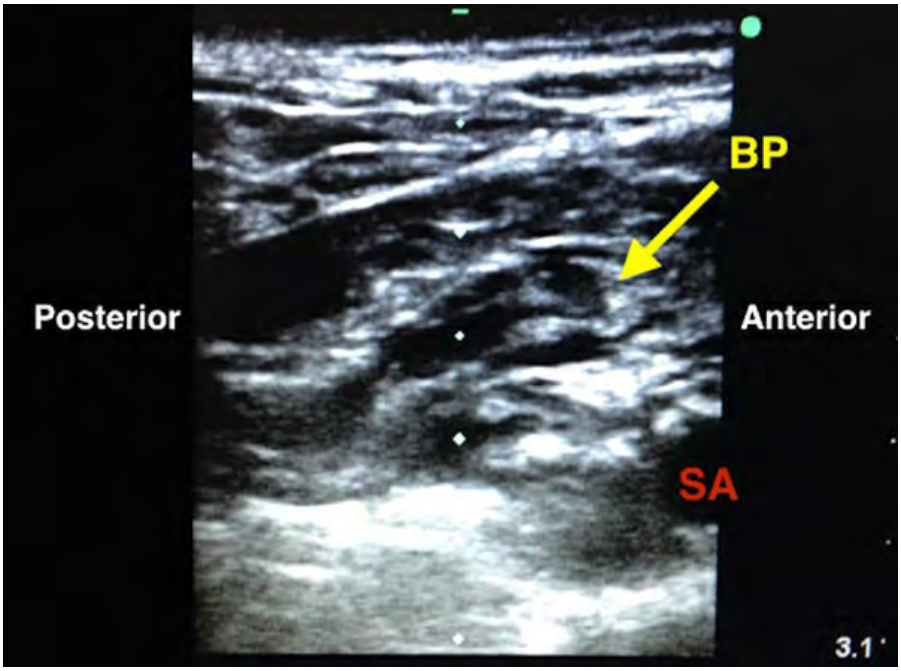

Figure 1. Ultrasound image during supraclavicular nerve catheter placement. (BP = brachial plexus, SA = subclavian artery).

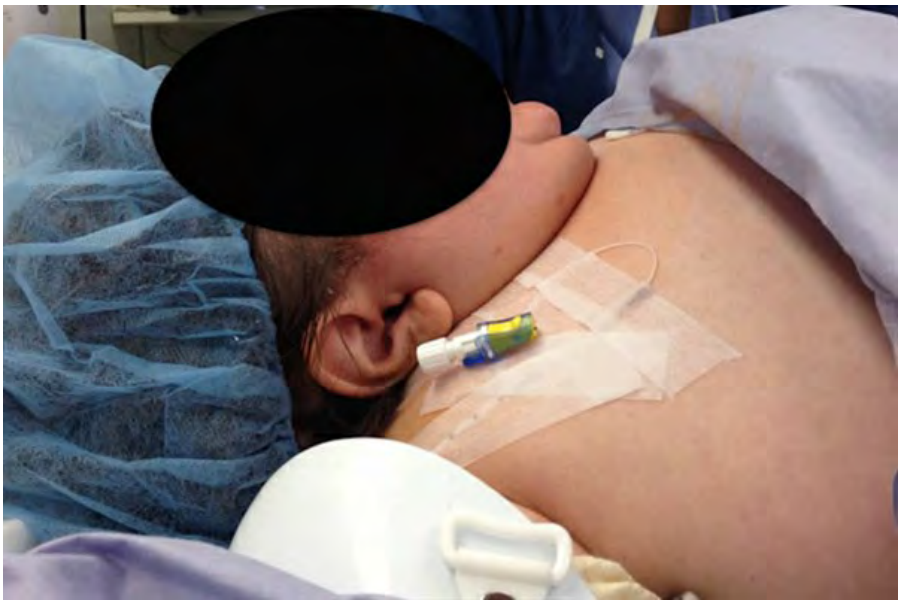
Figure 2. Osteogenesis Imperfecta patients often have difficult airways with short necks and cervical spine instability.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1433
Scientific abstract: Regional anesthesia

Pectoral I and II nerve blocks: a novel anesthetic technique for multiple breast catheter placement in a radiation oncology suite.

Patrick Wolfgang, Praveen Prasanna, Douglas Arthur, Bryant Tran
Virginia Commonwealth University Medical Center

Introduction

Pectoral I and II nerve blocks are new regional techniques that have been utilized to provide post-operative analgesia after breast surgery. To date, these blocks have not been used to provide surgical anesthesia for any procedure. We present a case report in which pectoral nerve blocks were utilized as a primary anesthetic for a radiation oncology procedure.

Results/Case report

The patient has given permission to present this case report.

A 60 year old woman with breast cancer status post mastectomy presented to the radiation oncology procedural suite for placement of multiple breast catheters. The patient elected to proceed with regional anesthesia and sedation.

Pectoral I and II nerve blocks were performed in the procedural suite after standard ASA monitors were placed. Ultrasound guidance was used to identify appropriate landmarks (Figure 1). After local skin infiltration was applied, a 21 gauge, 100mm insulated blunt needle was inserted into the appropriate targets under continuous ultrasound guidance. At the level of the 3rd and 4th rib, 12 cc 0.5% ropivacaine was injected in the plane between the serratus anterior and the pectoralis minor. An additional 8 cc 0.5% ropivacaine was injected in the plane between the pectoralis major and the pectoralis minor (Figure 2).

A low-dose propofol infusion was initiated for patient comfort and sedation. Nasal cannula oxygen was administered, and the patient was able to maintain spontaneous ventilation with no airway instrumentation. The proceduralist proceeded successfully with catheter placement; no local skin infiltration or additional pain medications were necessary during the intraoperative period.

After the procedure, the patient quickly emerged from sedation, appeared comfortable, and reported 2/10 pain. She met criteria for discharge within one hour. The patient reported by telephone follow-up that she started to feel mild discomfort approximately 10 hours after the procedure but did not take any pain medication after discharge.

Discussion

Pectoral nerve blocks have been proven to reduce pain scores and morphine consumption after radical mastectomy(1). One previous study has demonstrated superior analgesia with pecs blocks when compared with paravertebral blocks for breast surgery (2). Technical aspects, such as needle approach and location of local anesthetic placement, are still under debate (3,4). Pectoral nerve blocks are theoretically safer and easier to perform than paravertebral blocks, which can place the patient at risk for pneumothorax or inadvertent neuraxial injection. Safe execution of

regional nerve blocks is especially important in a “outside of operating room” setting such as a radiation oncology suite.

Multiple breast catheter placement for radiation therapy is a painful procedure and is associated with patient discomfort in the post-operative period. General anesthesia with generous local skin infiltration is often necessary to complete the procedure safely. By establishing surgical anesthesia for this patient, we were able to avoid airway instrumentation and inhalational agents, which greatly reduced the risk for dental damage, delayed emergence, and post-operative nausea and vomiting.

In conclusion, this case report confirms the feasibility of using pectoral nerve blocks to safely provide surgical anesthesia in a remote procedural setting.

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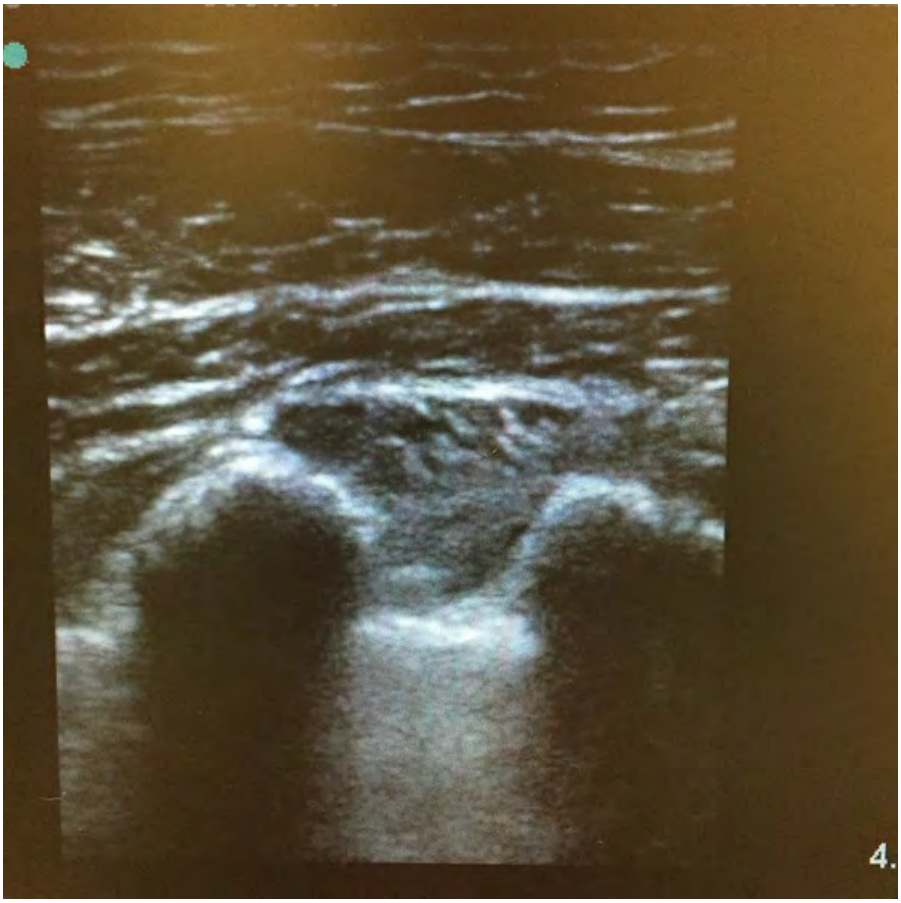

Figure 1. Ultrasound visualization for pectoral nerve block.

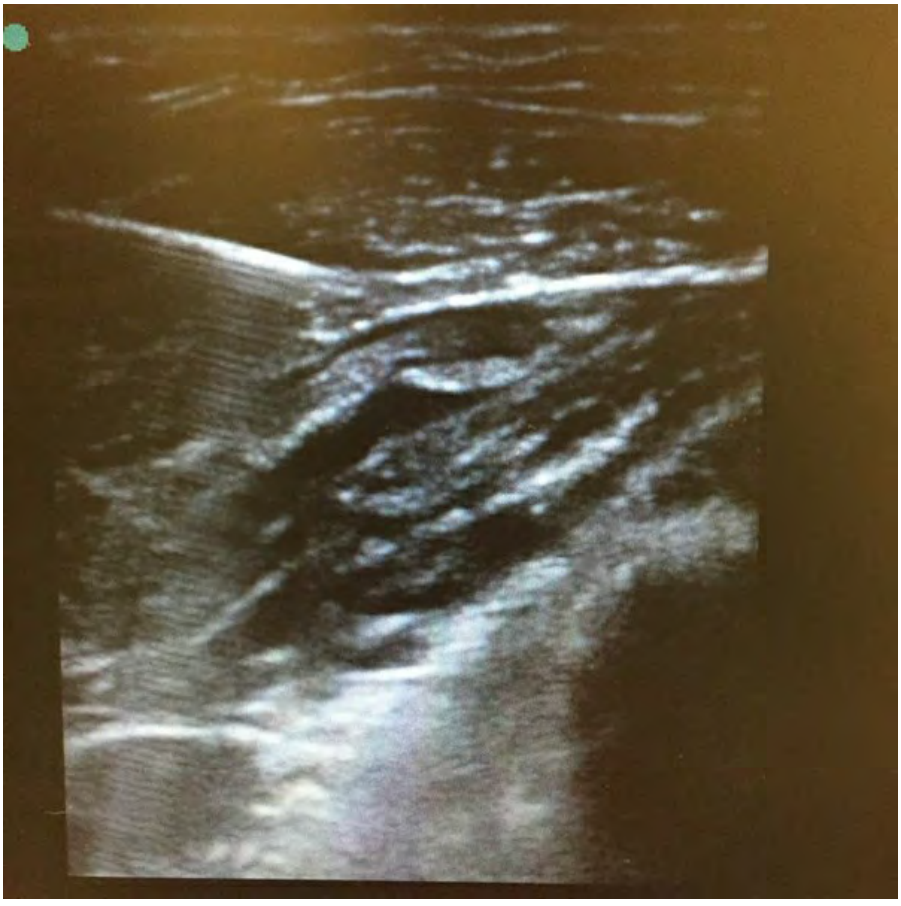

Figure 2. Ultrasound visualization of local anesthetic injection between the intermuscular planes of the pectoralis major, pectoralis minor, and serratus anterior.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1434
Medically Challenging Cases (report of up to 4 cases)

NEURAXIAL ANESTHETIC MANAGEMENT IN A PREGNANT PATIENT WITH REPAIRED TETHERED CORD SYNDROME

Kathryn Price, Thomas Vernon, Pavel Shapiro, Tracey Vogel
Department of Anesthesiology

Introduction

Tethered cord syndrome[TCS] is a rare disorder caused by anatomic restriction of the normal mobility of the spinal cord. Early surgical intervention is associated with improved outcomes. Tethering can recur and close follow-up is necessary. Neuraxial procedures for anesthetic management in patients with repaired TCS present multiple challenges. Inadvertent dural puncture is more common given post-surgical changes affecting technique while a low-lying conus medullaris increases risk of neurologic damage. This case offers insight into the medical decision-making necessary to create an appropriate anesthetic plan for pregnant patients with repaired TCS undergoing neuraxial management for labor analgesia.

Results/Case report

A 28-year-old primigravida at 36’5 weeks gestation with childhood history of repaired TCS presented for consultation regarding anesthetic options for delivery. She was previously diagnosed with TCS when sacral dimpling was observed on examination. Further imaging confirmed TCS without concurrent neurologic deficiencies and surgical correction was performed at age two. She remained asymptomatic with normal development and was released from specialty follow-up care at age twelve. During prenatal evaluation, her obstetrician recommended consultation to assess her risk of epidural placement for delivery. Physical exam revealed extensive scarring from L2–L5 without neurologic deficits. Given limited access to childhood records, timing since last imaging and potential for underlying pathology, a lumbar MRI was ordered for further assessment. Results demonstrated a low-lying conus medullaris at L3 without evidence of cord retethering. Significant post-surgical changes from L2-S1 and L5-disc bulging were also noted. Utilizing ultrasound, surgical changes were most minimal at L4-5 and L3-4. After discussing these findings and various options, the anesthetic plan entailed having a senior anesthesia team member cautiously attempt epidural placement[ideally at L4-5] for labor analgesia.

At 38’1 weeks gestation, patient was admitted for ruptured membranes. Labor was augmented with misoprostol and oxytocin. Epidural placement was requested at 5cm cervical dilation. The epidural space was easily accessed at L4-5 and later L3-4 with failure to thread the catheter at both locations. A second provider attempted needle advancement at L3-4 resulting in dural puncture, abandonment of the procedure and an adjusted plan for serial spinal injections as needed. Approximately one hour later, cesarean-section was performed for failure to progress. A single-shot spinal consisting of 12mg 0.75% bupivacaine, 10mcg fentanyl, and 0.2mg morphine was smoothly performed at L3-4.

Hospital course was complicated by a post-dural puncture headache which initially responded to conservative management, but ultimately required blood patch placement on postoperative day three. She was successfully discharged without further symptoms.

Discussion

Compared to intravenous medication, neuraxial anesthesia is preferred in laboring patients to limit maternal and fetal risk. Procedural complications and failure rates are elevated in patients with repaired TCS. Preoperative management with MRI imaging allows for identification of the optimal interspace for epidural or spinal placement. For patients with significant post-surgical changes, consider epidural placement outside the affected region or serial spinal injections throughout active labor to minimize complications. This case demonstrates how advanced planning, clinical judgement of anatomical barriers and careful technique are essential to successful management of patients with lumbosacral anomalies.

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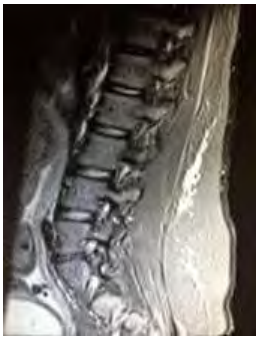

Lumbar MRI of patient with repaired tethered cord syndrome

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1436
Scientific abstract: Acute pain

Safety and Efficacy of Intrathecal Morphine in the Post-operative Period Following Lower Extremity Arthroplasty

Laura Lahaye, Gregory Golladay, William Jiranek, Shane Hess, Andrew Waligora, Kirbie Broughton, Brian Cocchioloa, Andrew Chapman
Virginia Commonwealth University Health System

Introduction

Intrathecal morphine can be useful for post-operative analgesia following lower extremity joint arthroplasty, but concerns exist regarding potential dose-related side effects (1). In this study, we examined the efficacy and safety of intrathecal morphine in patients undergoing lower extremity joint arthroplasty. We hypothesized that there would be a) an inverse relationship between intrathecal morphine dosing and 24-hour post-operative opioid requirement, and b) a direct relationship between dosing and side effects.

Materials and methods (NA for case report)

We retrospectively reviewed the charts of 1028 consecutive lower extremity joint replacement patients who had received intrathecal morphine. Intrathecal morphine dose, cumulative 24-hr morphine equivalent rescue medication administration, and side effects including included nausea/vomiting, pruritis and respiratory depression were recorded. The intrathecal morphine dose was trichotomized to <0.3, 0.3, and > 0.3 mg. Comparisons of side effects and post-operative 24-hour opioid requirements were performed using Pearson's chi-square test. Logistic regression was used to isolate significant variables related to side effects.

Results/Case report

There were 54% females with an average age of 61.9 years. Respiratory depression, defined as the need for opioid reversal, any recorded SpO2 <90% or respiratory rate <10, was seen in 3.3%, pruritis in 45% and nausea and/or vomiting in 53%. There was no significant difference in 24-hour rescue opioid requirement when comparing the three doses. There was a statistically significant dose-related difference in pruritis with doses of > 0.3 mg versus doses < 0.3 mg (OR 1.81 (1.05-1.17, P<0.001)) but no significant differences in respiratory depression or nausea/vomiting. Females were more likely than males to have nausea/vomiting (OR 1.37, CI 1.06-1.78, (P 0.017)) and pruritis (OR 1.66, CI 1.27-2.16, (p < 0.001)).

Discussion

Intrathecal morphine doses >0.3 mg do not significantly alter rescue medication requirements in patients undergoing lower extremity arthroplasty, but nausea/vomiting and pruritis increase at higher doses and are more prevalent in females. Respiratory depression, the major safety concern, does not appear to have a dose response.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1437
Scientific abstract: Emerging technology

DOES ULTRASOUND IMPROVE THE SUCCESS RATE AND DECREASE COMPLICATIONS IN LOWER THORACIC AND LUMBAR EPIDURAL BLOCKS BY NOVICES?

Dr. Pooja Baliga, Dr. Vijaya Patil
Tata Memorial Hospital

Introduction

Ultrasound (US) technology is rapidly gaining popularity amongst anesthesiologists. The central neuraxis however poses a unique challenge. In 2008, NICE recommendations[1] stated the use of US to be safe for epidural blocks . A number of studies[2-5] and recent meta- analysis[6,7] support the thinking that US is indeed a useful adjuct in neuraxial blocks. While most of these studies were conducted in experts, one study found pre-procedure US to decrease failed epidural rates in trainees[8,9]. We decided to conduct this study in newly registered anesthesia residents hypothesizing that a pre-procedure US information is likely to increase success and decrease complications in naïve trainees**.**

Materials and methods (NA for case report)

IRB approval was obtained prior to commencement of the study and patients informed consent taken before case allotment.This was a single site randomized non-blinded study conducted with 10 naïve trainees, 5 each in the study and control groups. Each trainee was randomly alloted 10 patients scheduled for surgeries needing epidural blocks with midline approach below T-11. The trainees were given information about the epidural anatomy and videos of neuraxial techniques. Trainees in the study group were assisted with the help of pre-procedure US performed by author/co author by marking the point of needle insertion and disclosing information about the epidural space depth. Trainees in the control group followed the landmark technique of epidural insertion. Two attempts were allowed to each trainee and loss of resistance (LOR) was advised in study group as additional safeguard. The success in 1st/2nd attempt, complications i.e dural tap, blood aspiration, paraesthesias, bone contacts and the difference in the sonographically determined depth and that found on actual LOR were recorded. The patients were later categorized into normal BMI (<25) and overweight (BMI>25).

Results/Case report

Trainees in study group succeeded in 54% of cases in correctly localising the epidural space while trainees in control group succeeded in 64% of cases. The difference in the success rate in the two groups was not statistically significant even between the two attempts. However the correlation between the sonographically determined depth and the actual LOR depth in the study group with successful attempts was significant ($p<0.01$)with a Pearson correlation coefficient of 0.813. The difference between sonographical depth and LOR ranged from 0 to +0.9cm with mean being +0.37cm. There was no statistically significant difference in the outcome in the two groups in the overweight patient category.

Discussion

A similar study was conducted recently in Toronto with second year residents and fellows who were trained systematically to perform pre-procedure US scans on obstetric patients[10]. They did not find pre-procedure US to make much difference in the outcome. In our study too, we found pre-procedure US to have no definite advantage over the landmark technique of epidural insertion in novices. Although the correlation between the sonographically determined depth with LOR depth in successful blocks was highly significant, this did not help in improving the overall outcome in the hands of novices and it probably needs more experience and practice in utilising the information yielded by a pre-procedure ultrasound.

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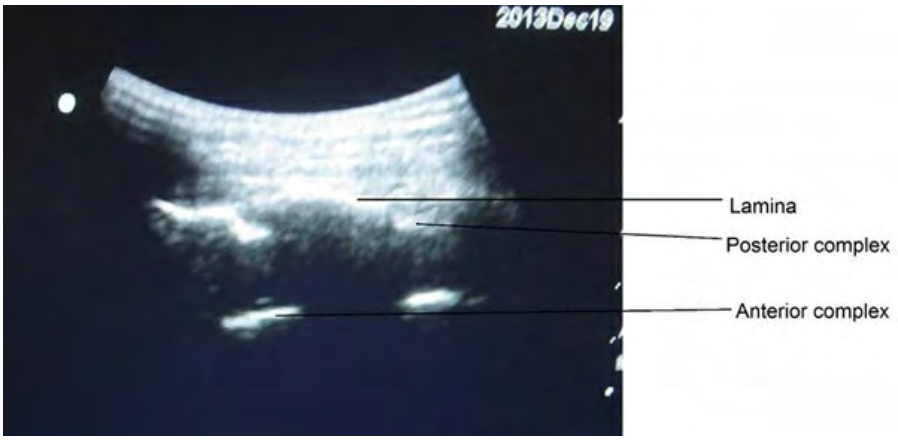
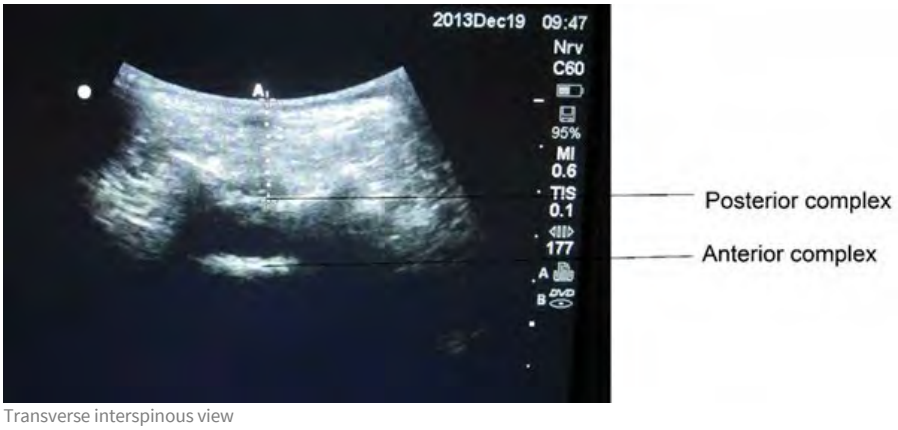
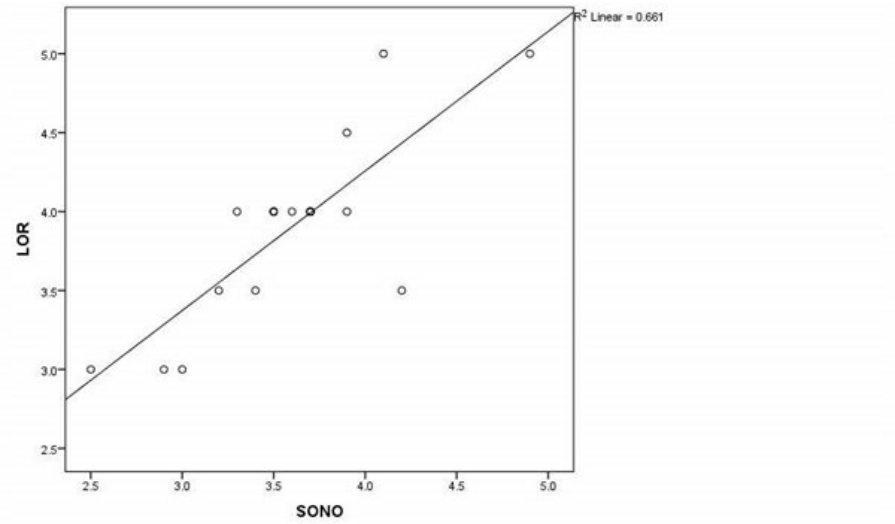


Paramedian longitudinal view



Transverse interspinous view



Correlation between sonographically determined depth of epidural space and that obtained by actual LOR in successful attempts in study group. Pearson coefficient =0.813; p= <0.01

Bar graph: Study and Control group comparison in overweight patients (BMI>25); p = 1.0

Statistics

Difference

N	Valid	19
	Missing	81
Mean		.3789
Median		.3000
Mode		.30
Minimum		.00
Maximum		.90

Table: Mean, Median, Mode of difference between sonographically determined depth and LOR

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1441
Medically Challenging Cases (report of up to 4 cases)

MANAGEMENT OF A YOUNG FEMALE WITH MYASTHENIA GRAVIS AND BRONCHOSPASMS UNDERGOING FIBULAR NECK FRACTURE REPAIR, AND COMMON PERONEAL NERVE ENTRAPMENT REQUIRING INTRAOPERATIVE NERVE MONITORING

Yan Cui, Stephanie Cheng
New York Presbyterian-Weill Cornell/Hospital for Special Surgery

Introduction

Myasthenia gravis (MG) is a disease of the neuromuscular junction caused by antibody blockade of postsynaptic acetylcholine receptors resulting in muscle weakness. High-dose steroids are a mainstay treatment and can produce remission in 1/3 of patients and improvement in 50% (1). However, long-term use can lead to debilitating side effects including osteoporosis. Increased bone resorption and decreased bone formation occurs most rapidly within the first few months (2, 3).

Patients with MG present specific anesthetic challenges. NMBAs should be avoided whenever possible as patients exhibit resistance to depolarizing agents and heightened sensitivity to nondepolarizing agents. Anticholinesterases for treatment also add to the unpredictable response. Additionally, sedatives and inhalation agents may cause prolonged intubation and recovery time in patients with respiratory muscle weakness. Regional anesthesia, therefore, offers a great alternative.

Materials and methods (NA for case report)

N/A

Results/Case report

The patient is a 38 year old female who was diagnosed with MG in 2010. She underwent a thymectomy, complicated by severe, prolonged autoimmune bronchospasms. She was treated with high dose prednisone, in addition to pyridostigmine and plasmapheresis. She developed multiple orthopedic injuries secondary to steroid dependence, including bilateral shoulder dislocations and labral tears, cervical facet arthropathy, and bilateral rib fractures. She recently experienced sudden leg pain and was diagnosed with a spontaneous fibular neck fracture, with entrapment of the common peroneal nerve requiring surgical intervention. There was concern for intraoperative iatrogenic nerve damage due to the proximity of the nerve, and the decision was made to use intraoperative nerve monitoring. After complete preoperative assessment, the patient underwent fracture repair and neurolysis under spinal anesthesia.

Discussion

The main consideration in this case was whether general anesthesia, neuraxial anesthesia, or peripheral nerve block (PNBs) was the optimal choice. Intraoperative nerve monitoring is often used in orthopedic procedures when a peripheral nerve is involved in the area surrounding the joint or fracture being repaired. Evoked potentials, most commonly SSEPs, are often used intraoperatively, and can monitor for dysfunction at any level along the neural pathway, including the peripheral nerve, the nerve root, the spinal cord, the brainstem, or the cortex (4). This is usually done under general anesthesia, with scalp or cord electrodes, but ineffective in patients under PNBs or neuraxial anesthesia, as the neural pathways are abolished (5). The use of SSEPs would thus require airway instrumentation, and probable paralysis in this patient with MG and severe bronchospasms. Direct nerve stimulation is an alternative, and involves the surgeon stimulating the nerve on the surgical field. It determines continuity around a particular area of concern at the level of the peripheral nerve (6), thus sparing this patient a general anesthetic. PNBs have the advantage of optimal postoperative pain control, unilateral blockade, and avoidance of urinary retention. However, local anesthetics, especially in large volumes such as those used in PNBs, in close proximity to the exposed nerve can interfere with monitoring. Given these considerations, the

most optimal anesthetic technique for this case was spinal anesthesia with direct local nerve monitoring, with which she received successful fibular repair and common peroneal nerve preservation.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1442
Scientific abstract: Regional anesthesia

Single shot T4 Level Paravertebral Block with liposomal bupivacaine in mastectomy with breast reconstruction

Yitzhak Belsh
Monmouth Medical Center

Introduction

Pain following mastectomy with breast reconstruction is often severe. Analgesia and some anesthesia can be provided with a thoracic paravertebral block (tPVB). This involves placing local anesthetic adjacent to the peripheral nerves that innervate the breast allowing for less opioids and other analgesics.

Liposomal bupivacaine uses depofoam technology to release bupivacaine over time. Depofoam is a multivesicular liposomal delivery technology that encapsulates drugs without altering their molecular structure and releases them over a desired period of time thus extending the effect of the local anesthetic up to 72-96hrs[3]. Its use in nerve blocks is an off label use.

Materials and methods (NA for case report)

After institutional review board approval, the records of five patients who received preoperative paravertebral blocks with liposomal bupivacaine for mastectomies with reconstruction were reviewed. Pain scores, opioid consumption, and adjuvant pain medication consumption were reviewed for the duration of the hospital stay. Follow up patient contact was also reviewed.

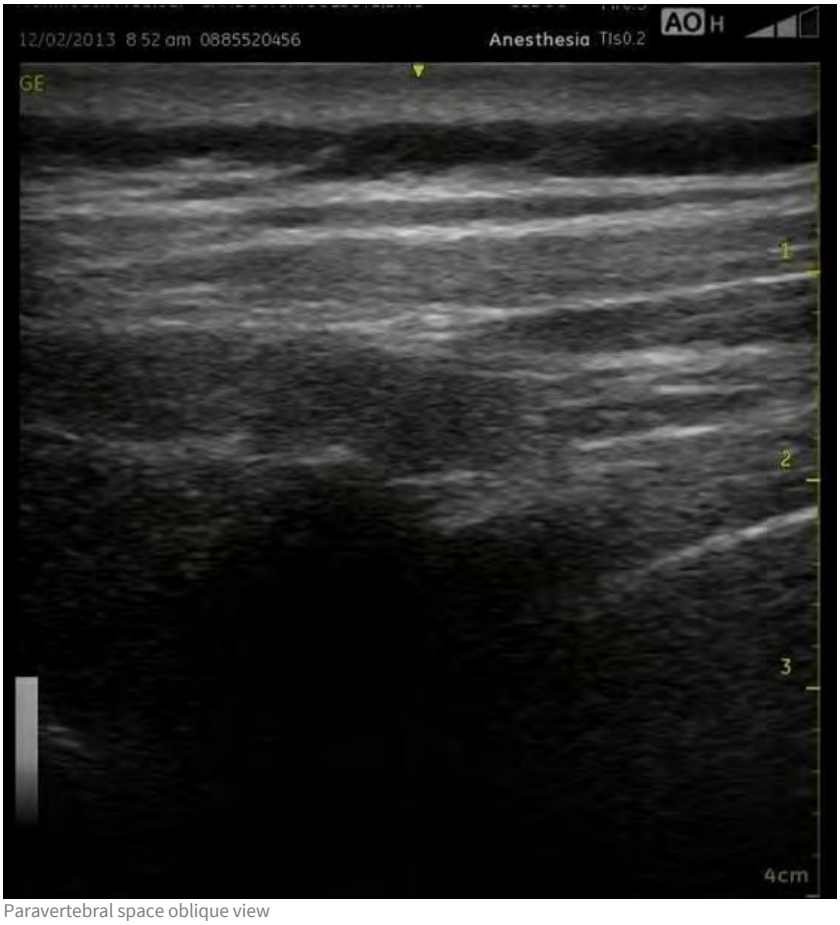
Results/Case report

Here we present 5 cases in a poster where we used liposmal bupivacaine, in an off-label single level (T4), single-injection tPVB. Cases were performed with ultrasound machine using an oblique approach to the paravertebral space. Liposomal bupivacaine provided prolongation of the initial peripheral nerve block beyond the usual 12-24hrs and lasted as long as 5 days.

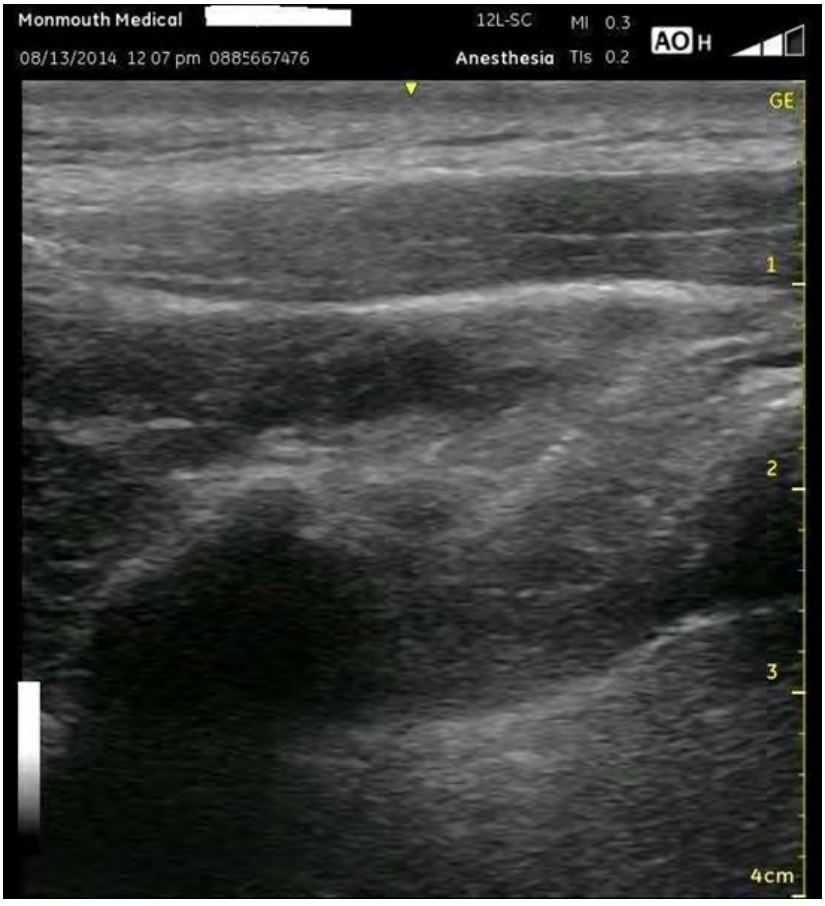
Discussion

The cases presented show a new approach to an old technique that can help breast cancer patients. We present 5 cases of women requiring bilateral mastectomy for breast cancer; all included immediate reconstruction involving bilateral tissue expander placement. Our course for postsurgical pain control included ultrasound guided single shot tPVBs performed at the T4 level using liposomal bupivacaine in an off label use. We found that this technique provided extended post-operative pain control, lowered narcotic use, improved pain scores and resulted in no incidence of postoperative nausea or vomiting. Additionally, two cases were able to be discharged home on POD 1.

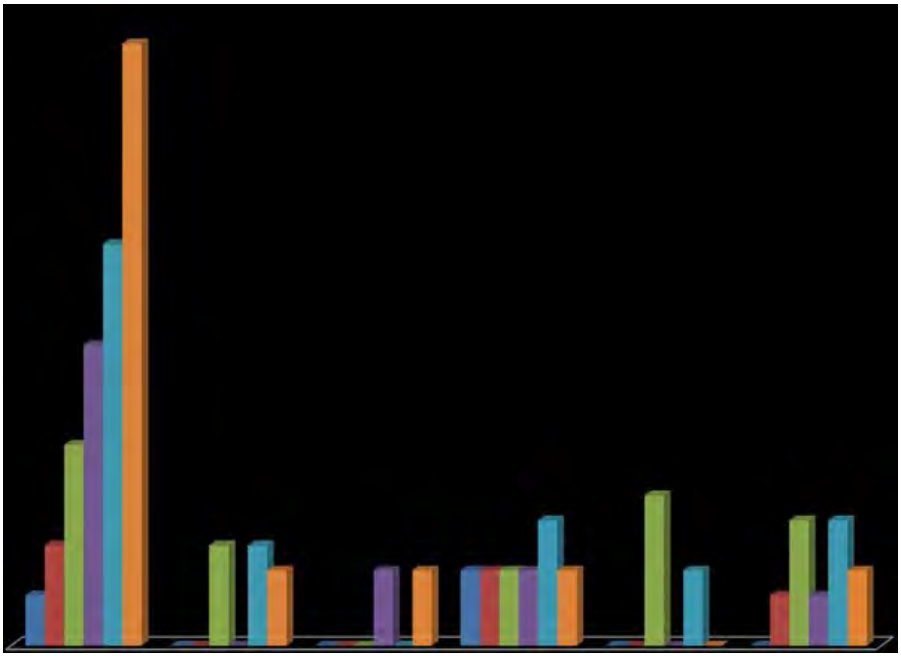
Tables/images



Paravertebral space oblique view



Paravertebral space parasagittal view



postop pain scores

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1443
Scientific abstract: Acute pain

CT Guided Epidural Blood Patch: A Case Report

Nicolas Maxymiv, Laura Lahaye
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Introduction

Dural punctures, whether from spinal anesthesia, myelograms, or inadvertent dural puncture, can cause gradual leakage of cerebrospinal fluid. This loss of fluid has been purported to cause dural stretch leading to pain. The headaches are classically positional in nature and are alleviated by lying flat. Conservative treatment includes IV fluid, caffeine, and NSAIDS. Epidural blood patch is the definitive treatment, and involves injection of blood into the epidural space in an effort to seal the dural defect.[1]

Results/Case report

We report the use of CT guidance for placement of an epidural blood patch in a 54 year old male who underwent a myelogram 1 week earlier. He subsequently developed a positional headache with mild photophobia. He failed conservative treatment including narcotics, IV fluids, and caffeine. His history also included a previous intrathecal catheter at L3-4 and multiple lumbar decompressive surgeries with retained hardware. Imaging revealed scarred dura throughout the lumbar spine. In conjunction with an interventional radiologist, the epidural space was accessed with CT guidance via oblique approach. A total volume of 3ml of blood was injected at which point he experienced substantial pressure. Over the following hour complete resolution of the pain was achieved.

Discussion

Traditional epidural blood patching is based on landmarks and palpation. A needle is advanced until a pressure change, or loss of resistance, is noted via syringe signaling entry into the epidural space. This technique is inherently difficult when performed blindly in patients with post-operative changes and hardware, arthritic deformities, scoliosis, obesity, or other pathologies. Patients with such conditions may be at a greater risk of failed blood patch or worse, creation of a second dural tear. CT guidance has the potential to aid in placement but does add the risk of radiation exposure. CT-guidance has been used in rare circumstances to aid blood patch placement for post-operative CSF leaks and for spontaneous intracranial hypotension.[2,3] Published cases typically report separate myelography to aid in the localization of an occult leak. Here we report successful blood patching using CT guidance without the aid of myelography for a post-dural puncture headache.

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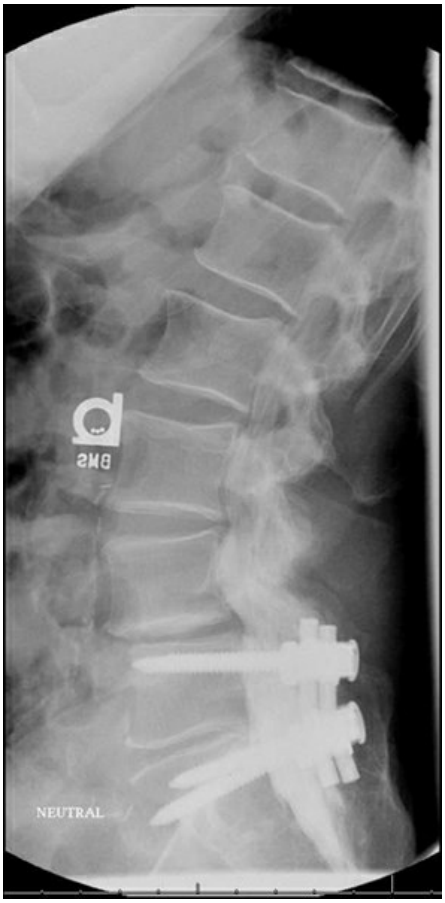
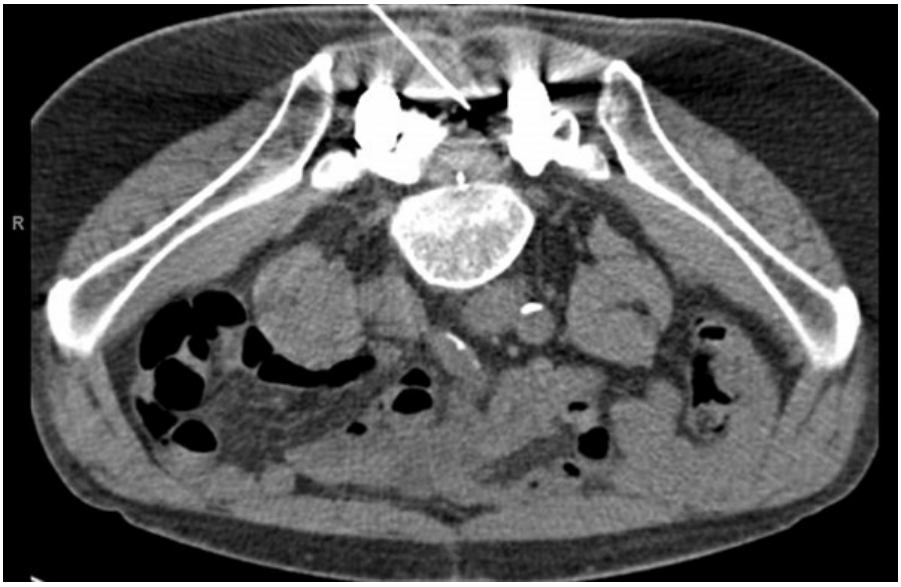
Mihlon F, Kranz PG, Gafton AR et al. Computed tomography-guided epidural patching of postoperative cerebrospinal fluid leaks. Journal of neurosurgery. Spine 2014; 21:805-10.

Tables/images



Lateral X-Ray of the patient's lumbar spine demonstrating both arthritic change and hardware.



CT scan demonstrating the oblique approach taken for the epidural blood patch.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1444
Medically Challenging Cases (report of up to 4 cases)

Peri-operative Analgesia With a Stellate Ganglion Block For Upper Extremity Surgery

Jeffrey Wu, Josh Elihu, David Cho
Harbor UCLA Medical Center

Introduction

The stellate ganglion nerve block is widely known for selectively blocking the sympathetic innervations of the upper limb, head and neck while preserving sensory and motor functions of the same neural distributions. Its successful use in treating many syndromes of chronic pain underlies the idea that the autonomic nervous system plays a significant role in the pain pathway. Recent studies suggest that the pathogenesis of acute pain also has an autonomic component via the acute inflammation pathway which sensitizes afferent nociceptive neurons. The stellate ganglion block therefore has potential use peri-operatively to reduce pain scores, opiate consumption and opiate side effects in patients undergoing upper extremity surgery, while also preserving sensory and motor function for perioperative neuromonitoring. We present a case in which the stellate ganglion block was performed successfully before the surgery to improve postoperative analgesia.

Materials and methods (NA for case report)

NA

Results/Case report

A 23 year old male with no significant past medical history except weekly marijuana use was scheduled for flexor tendon repair of his right hand. While gardening the day before his operation, he lacerated his third, fourth and fifth digits with a serrated knife. Surgeons also suspected possible ulnar digital nerve injury because of sensory and motor deficits in his fourth and fifth digits. Pre-operatively, he received stellate ganglion block with 20 milliliters of ropivacaine 0.5% that immediately reduced his pain level from 7 to 1, on a verbal numerical rating scale (VNRS) where 0 is no pain and 10 is most severe, with no reported side effects. The surgery was performed uneventfully under general anesthesia and the patient was discharged from the recovery room the same day with 0 pain on the VRNS.

Discussion

The stellate ganglion block has a variety of therapeutic uses that are not limited to treatment of chronic pain. Here, we report a case using the stellate ganglion block to treat acute, postoperative pain successfully without significantly affecting the sensory and motor nerves that were important for neuromonitoring by the surgeons. This block may have the added benefit of preventing and treating complex regional pain syndrome, as repeated stellate ganglion blocks have been shown to reduce complex regional pain syndrome symptoms. Although the role of the sympathetic nervous system in acute nociceptive pain has not been completely elucidated, this case report suggests that blocking it is effective in the reduction of pain and opiate consumption in the perioperative period. A more in depth study with a large sample size comparing stellate ganglion blocks to common brachial plexus blocks will demonstrate its potential use in treatment of acute postoperative pain.

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Disclosures

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Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1445
Medically Challenging Cases (report of up to 4 cases)

A simplified technique for sacral nerve radiofrequency ablation

Adam Romman, Tim Bednar, Ranganathan Govindaraj
UTMB

Introduction

Sacroiliac (SI) joint pain is a leading cause of chronic lower back pain occurring in about 10 to 25% of cases[1]. History and physical exam is supported by imaging and diagnostic SI joint blocks in evaluation of SI joint pain[2]. Multiple therapeutic techniques describing SI joint denervation after diagnostic block have been studied[3–5]. Radiofrequency thermocoagulation (RFTC) is an increasingly common modality used to ablate the often complex innervation of the SI joint[6–12]. We describe RFTC of the SI joint utilizing a radiopaque guide under fluoroscopy for more accurate targeting of the sacral nerve branches innervating the SI joint.

Results/Case report

A 76 year-old female with a history of osteoarthritis and total hip replacement presented with recurrent right SI joint pain noted by history, exam, and a positive diagnostic SI joint block. Conservative therapy failed and she had three previous RFTC procedures over the past three years with pain relief lasting 6-12 months. One year since her latest procedure, the patient returned with complaint of recurrent pain and repeat RFTC of the right SI joint was proposed.

In the prone position using fluoroscopic guidance, a radiopaque guide was placed along the lateral border of the S1-S3 dorsal foramina. After local anesthetic infiltration, a 22-gauge 10 cm SMK needle was advanced through the skin just medial to the right sacral crest and lateral to the sacral foramina passing beneath the radiopaque guide. After reproduction of pain with neurostimulation, 0.3 mL of 5% lidocaine was introduced followed by coagulation at 80°C for 80 seconds. Then, 1 mL of a solution containing 1 mL of triamcinolone (40mg/mL) and 9 mL of bupivacaine 0.5% was injected followed by normal saline flush. Multiple passes were made for each foramina in a cranial-caudal line just lateral to the right sacral foramina using the radiopaque guide. The line was continuous extending from just above the right S1 sacral foramen to below the level of the S3 sacral foramen. A total of twelves sites approximating four sites per sacral foramen were used. An additional lesion was made at the junction of the right sacral ala and sacral articulating process for the right L5 primary dorsal ramus.

At latest followup six months later, the patient continues to report significant pain relief allowing completion of her usual daily activities.

Discussion

Innervation of the SI joint is complex and variable. Cadaveric studies show 1-3 lateral branches exiting each posterior sacral foramina at S1-S3 along with occasional contributions from L5 and S4[11,12]. Due to the varying points of exit by the S1-S3 lateral branches, so called continuous ‘strip lesions’ have been proposed to ensure ablation of the branches[6–8]. Other methods include cooled radiofrequency to achieve larger tissue ablation and use of a multilesion probe[7,10]. We use a radiopaque guide under fluoroscopy to more easily attain a continuous ‘strip lesion’ in a simple stepwise pattern with 4 lesions per sacral level at S1-S3 and an additional lesion for the L5 primary dorsal ramus.

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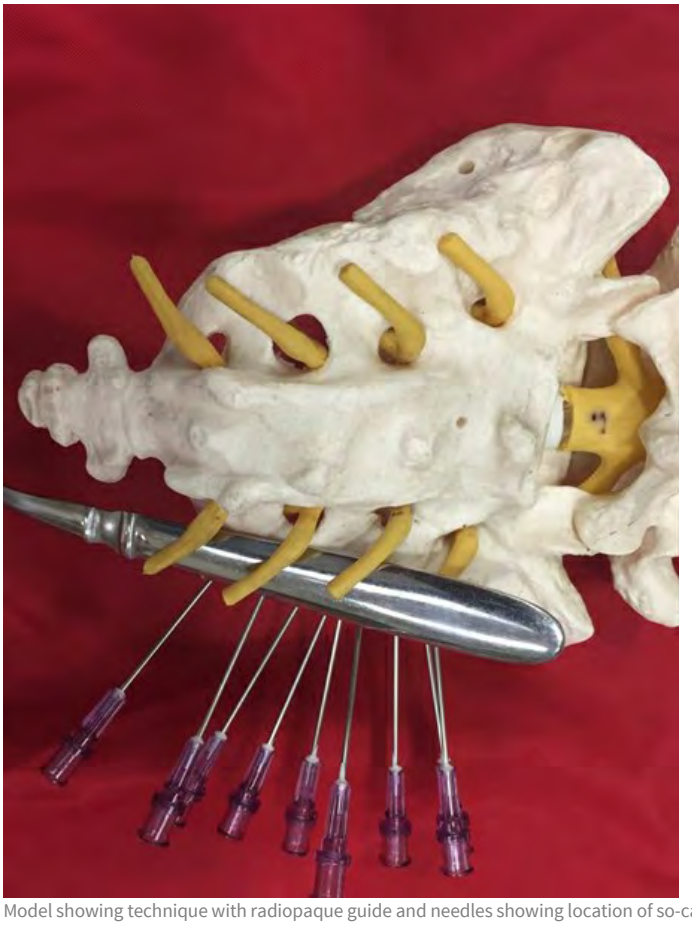

Model showing technique with radiopaque guide and needles showing location of so-called 'strip lesion'

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1446
Scientific abstract: Regional anesthesia

Total Spinal after Bolus through Infusing Epidural

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University Hospitals Case Medical Center

Introduction

Total spinal is a known consequence of epidurals and may appear after a bolus dose of local anesthestic. This is a unique case in which the speed in which a bolus was given through an epidural affected the clinical presentation.

Results/Case report

A 30 year old G7P2 patient with severe preeclampsia was admitted for labor. An epidural was placed at the L3/L4 level by an attending after one prior attempt by resident. The catheter was taped at 12cm at skin and 6cm in the space. An epidural infusion consisting of bupivicaine 0.044% fentanyl 1.25 mcg/ml and epinephrine 1:600,000 at a rate of 14 ml/hr with an option of a 10ml bolus every 15 minutes was initiated. The 10ml bolus was given in 1 minute by the pump. Patient was comfortable for 9 hours, then began to complain of perineal pressure. She had a left T10 level and no level on the right. Patient was given 10ml of Lidocaine 1% and 2ml of fentanyl 50mcg/ml which was given over roughly 10 seconds for a perineal dose. Immediately after the dose, she had hypotension which was successfully treated. 5 minutes post initial dose she starts complaining of nausea, then dyspnea. Nonrebreather mask was applied to patient. Patient was noted to have altered mental status and bilateral weakness in the arms. There was no evidence of CSF return from catheter. Patient was intubated then moved to the OR and attached to ventilator. After being on the ventilator for 15 minutes, patient started breathing spontaneously. Fetal heart rates were stable during the event and the patient had progressed with labor. Patient was extubated and returned to room. Epidural was restarted and titrated up. Patient had a cesarean section 8 hours later and during that time, only 3ml of lidocaine 2% with epinephrine and bicarbonate, which was hand bolused, was needed to achieve surgical analgesia.

Discussion

This case illustrates the potential for total spinal to occur in an infusion epidural after a bolus of medication. The patient was able to tolerate the epidural basal dosing and pump bolus dosing of the medication, but would develop a high level if patient was bolused through her catheter by hand, with higher entrance velocities. The patient was noted to be a difficult epidural with a previous attempt by a trainee, and it is possible that there may be a dura tear or meningeal hole. An unknown compromise in the dura or subarachnoid layer could have been drug movement through the layers, which could have resulted in total spinal analgesia. (1) This could be compounded by the presence of local anesthetic already in the subarachnoid fluid which may have diffused during the epidural infusion. (2) There is also possibility migration of the catheter, either to the subdural or intradural space, which could cause high spinal after a top off dose. (3) The high velocity may have facilitated fluids escaping to the subarachnoid layer.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1447
Scientific abstract: Regional anesthesia

ULTRASOUND-GUIDED NEEDLE VISUALIZATION USING ECHOGENIC NEEDLES AND BEAM-STEER TECHNOLOGY

Christopher Prabhakar, Rakesh Sondekoppam, Vishal Uppal
University of British Columbia

Introduction

Proper visualization of the needle is of paramount importance during ultrasound-guided procedures. As the angle of needle insertion in relation to the ultrasound probe increases the needle becomes more difficult to visualize. Echogenic needles use special coatings or reflectors to improve visualization[1]. As well, beam-steering technology allows the ultrasound beam to be angled to increase reflection of the needle at more acute angles[2]. Currently there is no appreciation for what is the best technology to use at moderate angles of insertion. We sought to compare the effects of medium and steep angle beam steering on visibility of echogenic and non-echogenic needle at 40, 50 and 60 degrees of angle insertion.

Materials and methods (NA for case report)

Ethics approval was waived for this non-clinical study. Non-echogenic and echogenic needles were individually inserted into uncooked pork loin under ultrasound guidance at 40°, 50°, and 60° with respect to the ultrasound probe by an experienced regional anesthesiologist. Ultrasound still images of the needle were obtained at each angle with or without the use of beam-steering (medium or steep setting). Participants were either consultant anesthesiologists with current clinical experience in regional anesthesia, or anesthesia residents who had completed a one month rotation in regional anesthesia. Participants were blinded to needle type or whether beam-steer was used to obtain each of the images and were asked to assess needle visualization of the still images on a 0-10 scale. Needle visualization score (0-10) were compared using a repeated-measures ANOVA. Tukey's test was used for pairwise comparison (not presented in abstract). Scores were defined as poor (0-3.3), intermediate (3.4-6.6), or good (6.7-10).

Results/Case report

Twenty participants completed the study. Mean scores (SD) and p-values by repeated measures ANOVA are found in Table 1:

	Non-echogenic needle score (SD)			Echogenic needle score (SD)			p-value
Angle	NBS	MBS	SBS	NBS	MBS	SBS	
40°	3.35 (1.63)	8.6 (1.31)	9.3 (0.86)	5.9 (1.65)	7.05 (1.4)	9.25 (1.02)	<0.001
50°	1.45 (0.83)	1.6 (0.88)	2.8 (0.95)	7.65 (1.18)	6.55 (1.54)	7.3 (1.34)	<0.001
60°	2.65 (1.53)	1.8 (1.28)	2.7 (1.49)	6.5 (1.57)	6.45 (1.23)	8.05 (1.5)	<0.001

NBS: No Beam-steering; MBS: medium beam-steering; SBS: steep beam-steering

At 40° non-echogenic needle scores improved from poor to good with both medium and steep beam-steering. For echogenic needles, the score improved from intermediate to good with steep beam-steering. At 50° and 60° non-echogenic needle scores were poor with or without beam-steering. Echogenic needles scores at 50° were good with or without beam-steering. At 60° echogenic needle scores were intermediate and improved to good with steep beam-steering.

Discussion

At 40 degree needle insertion, beam-steer offers benefit to both echogenic and non-echogenic needles. At 50 and 60 degrees, echogenic needles are superior in terms of visualization and beam-steering might have a limited role. These findings could guide improvement of ultrasound visualization at moderate to steep angles of needle insertion.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
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Abstract: 1450
Scientific abstract: Education

The development and application of risk stratification index system for outpatient shoulder arthroscopy patient management, a single academic center's experience.

Jing Zhao, Zhenggang Guo, Xiaowen Liu, Nabil Elkassabany, Jiabin Liu
Peking Union Medical College

Introduction

The general trend of our practice is to shift more surgical procedures into outpatient setting, while our patients' medical conditions are becoming more complicated. This paradox provides a great challenge for freestanding outpatient surgical centers, which lack inpatient service capacity in case of emergency or complications in addition to rigorous state regulation. The effectiveness of such freestanding outpatient practice relies on several aspects, including patient selection, surgeon skills, anesthesiologist, and etc. It is our aim to develop a Risk Stratification Index System that could guide our patient management strategy. We hypothesize that the risks of admission and complications are predictable based on patient factors.

Materials and methods (NA for case report)

The study was exempted by institutional review board. We first identified 124,807 subjects received outpatient shoulder arthroscopy procedure between 2008-2011 in HealthCare Cost and Utilization Project (HCUP) / New York State Ambulatory Surgery and Services Databases (SASD). There were 940 (0.75%) overstay admission (OS) or emergency department (ED) transfer respectively. We next conducted multivariable regression analysis to identify risk factors associated with unanticipated OS and/or ED. The significant risk factors include age > 80 y/o, congestive heart failure, arrhythmia, COPD, obesity, neurologic disease with function impairment, and general anesthesia. All factors were included in developing a risk stratification index (RSI) system, which was applied in our clinical practice for patient selection (Table 1).

Results/Case report

There were total of 583 outpatient shoulder arthroscopy procedures between August 2014 and June 2015 in our academic center (Penn Presbyterian Medical Center, Philadelphia, PA, USA). Among which 472 (81.0%) patients passed the RSI and were successfully managed in the outpatient surgical center uneventfully. There were 111 (19.0%) subjects with procedures performed in the main hospital instead either due to high RSI or surgeon's convenience. There were two unexpected admissions (1.8%), which both were at the main hospital location.

Discussion

We developed RSI tool with existing national database, and applied into our clinical practice. It is our conclusion that RSI is an effective tool to optimize our clinical practice with safety and efficiency. However, longer-term follow up might provide more convincing evidence over time.

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Tables/images

Table 1. Odds Ratios of Risk Factors of Overstay and/or AdmissionAfter Shoulder Arthroscopy Surgery

Risk Factors	Odds Ratio	95% CI		P value	Weight
Require General Anesthesia	4.07	3.46	4.79	<0.001	1
Age >80 y/o	1.35	1.06	1.71	0.015	1
Congestive heart failure	4.14	1.63	10.50	0.003	1
Arrhythmia	1.64	1.06	2.54	0.027	1
COPD	2.03	1.18	3.48	0.010	1
Obesity (BMI>35)	1.87	1.38	2.53	<0.001	1
Neurologic Disease with function impairment	2.82	1.64	4.85	<0.001	1

If Total Score <=2, rate of admission:	0.72	875/122180	Candidate for free standing ambulatory surgery
If Total Score >=3, rate of admission:	2.42	65/2683	Schedule for surgery at main hospital

Table 1. Odds Ratios of Risk Factors of Overstay and/or AdmissionAfter Shoulder Arthroscopy Surgery

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1451
Scientific abstract: Acute pain

The Effect of Preoperative Pregabalin on Postoperative Nausea and Vomiting: A Meta-Analysis

Mattthew Hulse, Chris Wu, Michael Grant
Vanderbilt University Medical Center

Introduction

Non-opioid adjuvant medications are increasingly included among perioperative Enhanced Recovery After Surgery (ERAS) protocols. Preoperative pregabalin has been shown to improve postoperative pain and limit reliance upon opioid analgesia. Our group investigated the ability of preoperative pregabalin to also prevent postoperative nausea and vomiting (PONV).

Materials and methods (NA for case report)

Our group performed a meta-analysis of randomized trials that report outcomes on the effect of preoperative pregabalin on PONV endpoints in patients undergoing general anesthesia. We calculate the pooled effects in trials involving preoperative pregabalin who report on nausea and vomiting side effects.

Results/Case report

Among all included trials, (24 trials; n=1739), preoperative pregabalin was associated with a significant reduction in PONV (risk ratio [RR]=0.51; 95% confidence interval [CI] 0.41-0.64; p<0.0001), nausea (RR=0.68; 95% CI 0.53-0.88; p=0.003) and vomiting (RR=0.64; 95% CI 0.50-0.82; p=0.0003) at 24 hours. Subgroup analysis of trials excluding repeat dosing, thiopental induction, nitrous oxide maintenance and including high-risk surgery result in similar PONV efficacy. Preoperative pregabalin is also associated with significantly increased rates of postoperative visual disturbance (RR=3.11; 95% CI 1.34-7.21; p=0.008) compared to control.

Discussion

Preoperative pregabalin is associated with significant reduction of PONV and should not only be considered as part of a multimodal approach to postoperative analgesia, but also for prevention of postoperative nausea and vomiting.

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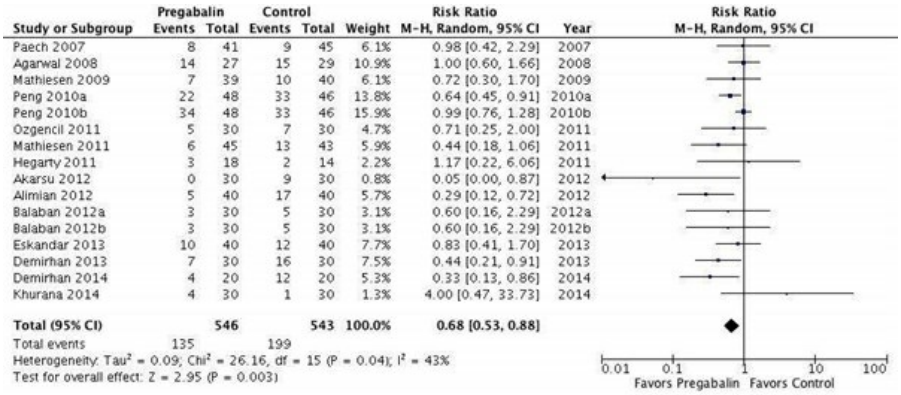
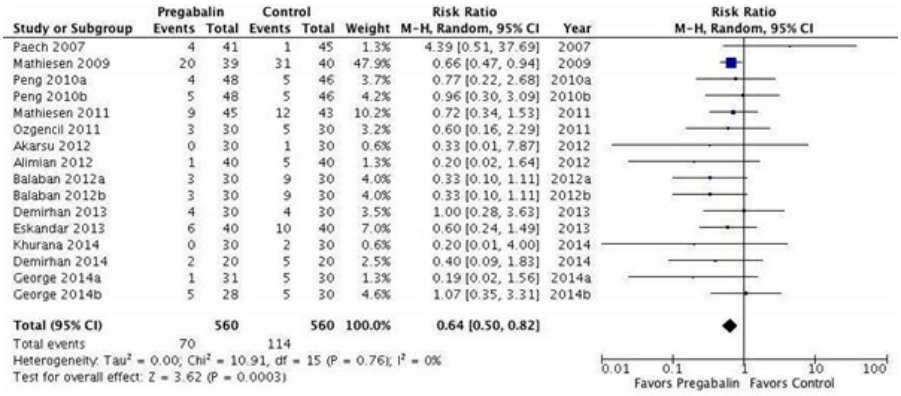
Tables/images



The weighted (pooled) estimate for the effect of preoperative pregabalin on nausea



The weighted (pooled) estimate for the effect of preoperative pregabalin on vomiting

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
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Abstract: 1453
Medically Challenging Cases (report of up to 4 cases)

Paraplegia associated with epidural hematoma from undiagnosed spinal metastasis in a patient receiving epidural analgesia

Steven Aho
Medical University of South Carolina

Introduction

Epidural hematoma is an extremely rare, but potentially devastating complication of epidural analgesia with a vastly variable incidence reported in the literature from 1:150,000 up to 1:3600 in certain patient populations [1-2]. Paraplegia after neuraxial intervention can develop rapidly and prompt diagnosis and treatment with surgical decompression are of the utmost importance. Certain risk factors for the development of epidural hematomas have been identified [1-3], however the recognition of other potential coexisting pathologies is important for identifying those at increased risk. This report describes a case of postoperative paraplegia caused by a hematoma developing from an undiagnosed spinal metastasis, and unrelated to epidural catheter placement.

Results/Case report

An 80 year-old Caucasian male with a diagnosis of pancreatic adenocarcinoma presented for a Whipple procedure. The patient had no known history of bleeding disorders or anticoagulation medications and had a normal neurologic history and exam. An epidural catheter was placed atraumatically at the T7-8 interspace pre-operatively. The surgical procedure was aborted intra-operatively due to the discovery of intra-abdominal metastasis with extensive portal vasculature involvement. His epidural catheter was maintained post-operatively at a rate of 4 cc/hour of 0.15% bupivacaine. Approximately 24 hours post-operatively, anesthesia staff was notified of profound bilateral lower extremity numbness and weakness. Neurologic exam at bedside showed complete motor block and loss of sensation in bilateral lower extremities. The patient had received 2 doses of heparin 5000 units subcutaneously at 8 hour intervals for venous thromboembolism prophylaxis. The epidural infusion was paused and emergent coagulation panel and MRI were obtained. After coagulation panel returned within normal limits, the epidural catheter was removed and the patient was sent for MRI. Imaging showed an epidural hematoma spanning from T5 to T8 with cord compression at the level of T5-6. Multiple metastases in both the lumbar and thoracic spine were seen with a T4 metastasis being the likely origination of the bleed, three levels above the epidural insertion site. The patient was taken emergently to the operating room for surgical decompression approximately 8 hours after onset of symptoms. He had full recovery of strength and sensation in his lower extremities and was ambulatory by post-operative day 2 after his decompression.

Discussion

This case is consistent with others in the literature describing postoperative paraplegia resulting from neuraxial intervention in the presence of undiagnosed spinal or vertebral tumors [3-6]. The presentation is unique in that the patient was asymptomatic from his extensive metastases pre-operatively and the hematoma seemingly developed unrelated to epidural catheter placement. More extensive imaging during surgical planning may be able to better identify this subgroup of patients and help prevent complications, however this is difficult to justify in a patient without back pain or other neurologic symptoms. Nevertheless, it emphasizes the need for vigilant post-operative monitoring and a high index of suspicion in this population, especially those on VTE prophylaxis, as swift intervention can avert poor outcomes.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1454
Medically Challenging Cases (report of up to 4 cases)

Neuraxial Labor Analgesia for a Ventilator-Dependent Parturient with ARDS

Shana Schwartz, Michael Isley, Sanjeev Dalela
Henry Ford Health System

Introduction

We present a case with a ventilator dependent parturient with ARDS presented in active labor.

Results/Case report

22-year-old female G2P0010 at 33 weeks 2 days presented to the hospital for acute dyspnea. Her husband had cold-like symptoms 3 days prior to when the patient started manifesting similar symptoms. Physical examination was significant for wheezing and coarse rhonchi. Chest X-ray showed signs of diffuse consolidation. As her condition deteriorated, she required intubation and ventilation for respiratory support, and diagnosis of ARDS was made. OB was consulted and found patient to be in active labor. Patient was given several doses of fentanyl for labor analgesia, which was helpful at first but became less so as labor progressed. Patient requested labor epidural.Due to advanced stage of labor, patient was offered combined spinal epidural for labor analgesia. The patient was placed in right lateral dependent position. Touhy needle placed at L3-4 and advanced, loss of resistance(LOR) achieved but no CSF returned when spinal needle was inserted. LOR was again confirmed needing slight advancement of epidural needle, received free flow blood leading to free flow CSF. Fentanyl and bupivacaine were administered intrathecally and intrathecal catheter placed, with boluses of bupivacaine given as needed.Patient blood pressure was elevated at start of procedure and decreased with intrathecal medication. Patient noted labor pain relief after intrathecal medication administration. The patient has a successful spontaneous vaginal delivery of a healthy infant.Patient was rapidly weaned from vent after delivery. She was able to be extubated two days after delivery, and was discharged from the floor on postpartum day six.

Discussion

ARDS during pregnancy is rare. The etiology in this case is presumed to be secondary to pneumonia. This process may have been made more fulminant in the patient compared to the husband due to the pregnancy itself. The rapid weaning of ventilator settings after delivery of the baby suggests the gravid state contributed to the respiratory compromise.The intrathecal catheter was able to provide significant labor pain relief. Analgesia without fetal respiratory compromise of high dose systemic opioids is a benefit of regional labor analgesia. Additionally, there is evidence that epidural analgesia decreases oxygen consumption during labor. Delivery of the fetus was effective in improving respiratory status.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1455
Medically Challenging Cases (report of up to 4 cases)

Pneumothorax post arthroscopic rotator cuff repair – A case report

Abhijit Biswas, Ki Jinn Chin, Ahtsham Niazi
Toronto Western Hospital

Introduction

Arthroscopic shoulder surgery is a commonly-performed procedure. Generally very safe, occasional complications like intra-articular bleeding, extravasation of fluid, infection and nerve palsy have been reported.[1,2] One other rare complication is pneumothorax. [2,3] In this report we describe a case of pneumothorax diagnosed following arthroscopic shoulder surgery and discuss the possible causes and role of point-of-care ultrasound(POCUS) in reaching a diagnosis.

Results/Case report

Written patient consent was obtained. A 50 year old healthy non-smoking male, with mild asthma , was admitted for arthroscopic rotator cuff repair.

Following informed discussion of the anesthetic plan, the patient received an ultrasound-guided in-plane interscalene nerve block, forty-five minutes prior to the surgery for post-operative analgesia. The block was performed by an anesthesia resident under supervision of an attending anesthesiologist. He subsequently received general anesthesia and was in sitting position for the surgery. The intraoperative period was uneventful with a total surgical time of 1.5 hours. The patient remained hemodynamically stable with peak airway pressures within 12-14 cm of water and oxygen saturations above 97% throughout surgery. Immediately after arriving in the post-operative care unit , the patient developed chest pain and dyspnea. His oxygen saturation was 93% despite receiving 10L/min of oxygen via facemask. Decreased chest excursion and reduced air entry was noted on the side of surgery. Chest X-ray confirmed the presence of a moderate apical pneumothorax. Ultrasound scan also documented absent pleural sliding and lung pulse at the effected side.

Based on the size of pneumothorax, stability of the patient, insertion of a chest drain was not deemed necessary. Repeat chest X-ray following morning revealed resolution of the pneumothorax, which corresponded with improvement in his symptoms. He was discharged home the same evening.

Discussion

Dyspnea following arthroscopic shoulder surgery could be due to several causes including phrenic nerve palsy (interscalene block) and perioperative pneumothorax. This pneumothorax can be spontaneous, or iatrogenic due to interscalene block or the surgical procedure.[2,4] Ultrasound guidance has significantly reduced the risk of pneumothorax after interscalene block. No cases were documented in a prospective study of 1169 patients undergoing ultrasound-guided supraclavicular and interscalene block [5] and only one case out of 521 in a similar prospective study with interscalene block.[6]

Pneumothorax and subcutaneous emphysema, though rare, is a recognized complication of arthroscopic shoulder surgery.[1,2,6] Rapid changes in fluid pressure in the subacromial space can result in air trapping and subsequent dispersion in subcutaneous tissue. Further dispersion, increase in intrapleural pressure and positive pressure ventilation may lead to rupture of parietal pleura and development of pneumothorax.[2,4] Trocar insertion may also cause pleural puncture

Lung ultrasound is easy, rapid and effective way of diagnosing pneumothorax, while waiting for a chest X-ray.[7-10] Absence of lung sliding, lung pulse and B lines are pathognomic of pneumothorax with a sensitivity of 81% and 100% specificity.[7,8,] As an anesthesiologist, it is pertinent that we develop this skills and routinely use ultrasound an accessory diagnostic tool specially following interscalene block to rule out pneumothorax and phrenic nerve palsy.

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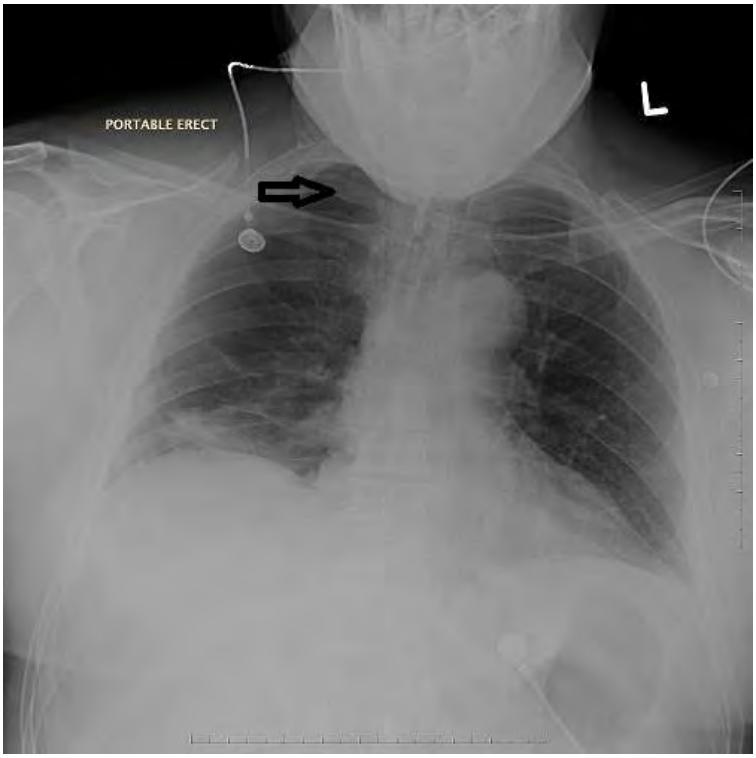
Tables/images



right apical pneumothorax

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1456
Scientific abstract: Regional anesthesia

The Effect of the Serratus Block on Analgesia after Breast Surgery - A Randomized controlled double-blinded study

Abhijit Biswas, Caveh Madjdpour, Faraj Abdallah, Stephanie Oldfield, Richard Brull
Toronto Western Hospital

Introduction

Inadequate pain control for breast surgery may lead to acute and chronic pain in postoperative period. This may render acute physiological and psychological responses that negatively affect patient outcome, poor quality of life and increase health care costs[1,2].

Regional anesthesia techniques are gaining importance in breast surgeries due to excellent analgesia, improved recovery profile and patient's satisfaction [3-6]. Paravertebral block is popular and provides excellent analgesia [10] for breast surgeries, but is difficult to perform; needs dexterity and also multiple levels of injection are required for adequate sensory block[7]. It can also be associated with serious complications like intrathecal and epidural spread of local anesthetic (1%) and pneumothorax (0.5%)[8]. Incidence of failed paravertebral block can occur in as high as 35%.

Serratus Block is a fascial plane block where local anesthetic is injected in between serratus anterior muscle and external intercostal muscle to block the cutaneous branches of the intercostal nerves. This block is easy to perform, involves a single injection technique, considered safer than paravertebral block and effective.

Materials and methods (NA for case report)

With Ethical approval, we are conducting a randomized controlled double blinded study comparing the addition of serratus block to a general anesthesia result in a better postoperative pain control in patients undergoing surgery for breast cancer. Secondary outcome measures are perioperative opioid consumption, incidence of side effects like nausea, vomiting and pruritis. We are also looking at looking at the quality of recovery among the groups.

ASA I – III, women aged 18-80 years, undergoing unilateral primary or secondary breast surgery for cancer(lumpectomies with sentinel node biopsy or partial mastectomies or simple mastectomies, with or without sentinel node biopsy) are included in the study. In order to demonstrate that the addition of a serratus block can reduce pain scores by 15 mm on the VAS, we calculated that 21 patients per group are required to detect a statistically significant difference between groups using a type I error estimate of 5% (alpha = 0.05) and 80% power (1-beta). Allowing for an approximate 15% incomplete follow up or patient drop out, we needed a total sample size of 50 patients for the two comparative groups. Primary outcome and other continuous data will be compared across groups using ANOVA. Ordinal data will be compared across groups using the Mann-Whitney U test and binary data will be compared by the use of Pearson's chi-squared test. Significance will be considered at $p<0.05$.

Study group patient received serratus block prior to GA for the surgery whereas the control group received a sham block and a GA.

Results/Case report

This study is in progress with fourteen patients enrolled so far. We should be able to produce an analysis by the end of March

Discussion

There is not enough evidence to prove serratus block to be easier, safer and effective block compared to paravertebral block. This is one of the first few randomized controlled blinded study comparing serratus block with GA for breast surgery. Results from this study will provide important

answers to several questions for this newly developed block

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1457
Scientific abstract: Regional anesthesia

Cost-effectiveness of outpatient vs inpatient care for complex hind foot and ankle surgery. A retrospective cohort study

Abhijit Biswas, Justin Oh, Rajiv Gandhi, Johnny Lau, Vincent Chan, Anahi Perlas
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Introduction

Complex hind foot and ankle surgery(fusion and complex ligament repair) is associated with moderate to severe post- operative pain, usually requiring inpatient admission for adequate analgesia. Continuous sciatic nerve block (CSNB) is an effective analgesia modality often used at the center of multimodal regimens to enhance quality of recovery[1,2]. We performed a pilot clinical study of 20 patients (from 1st January 2010 to 31st March 2014) to determine if outpatient management of this complex patient cohort including ambulatory CSNB is feasible and cost - effective.

Materials and methods (NA for case report)

Following approval by the local research ethics board , we retrospectively compared the postoperative functional outcome, assessed by lower extremity functional score(LEFS), and the total cost of care of this outpatient cohort (n=20) with a similar cohort of inpatients (n+20) matched by age, surgical type and baseline LEFS.

The primary outcome variable was Lower Extremity Functional Scale(LEFS) score at the time of discharge from the surgical program. Secondary outcome variables were quality of analgesia, rate of adverse events(surgical site infection,30-day readmission and revision surgery), and cost of perioperative care.

All patients received standard surgical, anesthetic and analgesic regimens as institutional practice. both inpatients and outpatients received a continuous perineural sciatic nerve infusion of local anesthetic for 48 hours as a key component of multimodal analgesia. Inpatients were followed daily while in hospital and outpatients were followed daily on the phone by the acute pain services for 2-3 days until catheter removal. Costs analyzed were total hospital costs for individual patients obtained from the department of finance after year - end closing.

continuous data were analyzed for normality using the Shapiro- Wilkinson test. The means of normally distributed variables were compared with Student's t test. The Wilcoxon Mann- Whitney test was usedfor the non-normally distributed continuous and ordinal variables.

Results/Case report

Functional outcome, as assessed by the LEFS score, was similar between groups on admission (23.4 ±10.5 and 24.7±16.0) and discharge from the surgical program (23.9 ±13.4 and 29.6 ±19.6) for outpatients and inpatients respectively. Analgesia was effective in both groups. No surgical (surgical site infections, re-admission within 30 days or revision surgeries) nor anesthetic complications (catheter dislodgement or premature removal, catheter site infections, medication errors) were reported. The total hospital cost of care was significantly lower (54%) in the outpatient vs. the inpatient cohort (CAD $ 3,507 ± 1,797 vs. CAD $ 7,573 ± 2,719 p<0.001).

LEFS score

		Outpatient Group(n= 20)	Inpatient Group(n=20)	P value
LEFS (mean ± SD)	**Admission**	**23.4 ± 10.5**	**24.7 ± 16.0**	**0.8885**
LEFS (mean ± SD)	**Discharge**	**23.9 ± 13.4**	**29.6 ± 19.6**	**0.4988**

Total Hospital Cost

	Outpatient Group (n= 19)	Inpatient Group (n=17)	P value
Total Hospital cost in Canadian Dollars	**3507 ± 1797**	**7573± 2719**	**<0.0001**

Discussion

This retrospective study suggests that outpatient care including an ambulatory perineural infusion of local anesthetic is feasible and may be a cost-effective alternative to inpatient care after complex hind foot and ankle surgery.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1459
Medically Challenging Cases (report of up to 4 cases)

Dilemmas in a Parturient with idiopathic thrombocytopenic purpura with low platelet count requesting an epidural for labor analgesia.

Sanjeev Dalela

Introduction

Idiopathic thrombocytopenic purpura (ITP), defined as isolated low platelet count with normal bone marrow and the absence of other causes of thrombocytopenia presents unique issues in managing delivery of the pregnant patient with ITP. In terms of maternal management, the primary consideration is achieving a platelet count sufficient to minimize maternal hemorrhage not only during vaginal delivery or cesarean section but also adequate hemostasis is required to minimize the risk of any resulting neurologic complications that might arise during central neuraxial techniques to provise analgesia and/or anesthesia during labor.

Results/Case report

A 30-year-old female with ITP requested labor analgesia with a manual platelet count of 72 K and smear showing giant platelets with granules, consistent with ITP. Hematologist recommended that there was no need for IVIG or steroid for treatment of ITP give current level of PLT, but to give a platelet apherisis pack, which should bring the platelet count above 100,000 and no need to recheck the count before placing epidural catheter. Plan was discussed with patient and her husband that while many studies have shown no adverse outcomes with epidural placements with low platelet counts , there still remains a risk of epidural hematoma. They were explained about other options such as IV medications
but they decided to have epidural. The first attempt at the epidural catheter placement yielded an inadvertant dural tap, and an intrathecal catheter was placed, which was initially used for labor analgesia & then later for cesarean section.

Discussion

The BCSH (British Committee for Standards in Haematology) guidelines recommend that a platelet count of 80,000/µl be attained for cesarean delivery as well as for epidural anesthesia, based on a retrospective review in which epidural anesthesia was successfully delivered with no neurologic complications in 30 thrombocytopenic women with platelet counts between 69,000-98,000/µl. Thus, though no prospective, randomized data is available to address this issue definitively, a platelet count in this range in a parturient with ITP may present certain challenges and additional therapy may be required in some pregnant patients as term approaches.Studies suggest that thrombocytopenia caused by increased destruction (e.g. ITP) is less likely to be associated with bleeding at a given platelet count than if it is a result of underproduction, as in marrow disorders. The rationale for this statement is that the platelets that circulate in destructive disorders are young and healthy whereas in disorders of inadequate production the circulating platelets are a mixture of young and old.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1460
Scientific abstract: Regional anesthesia

Complications after Continuous Posterior Lumbar Plexus Blockade for Total Hip Arthroplasty: A Retrospective Cohort Study

Catherine Njathi, Rebecca Johnson, Adam Jacob, Darrell Schroeder, Timothy Weister, Sandra Kopp
Mayo Clinic

Introduction

Regional anesthesia and analgesia has revolutionized perioperative care of surgical patients, especially when incorporated into multimodal analgesia pathways. Benefits of using continuous posterior lumbar plexus block within multimodal analgesia pathways for total hip arthroplasty (THA) have been well described. However, data describing the incidence of complications related specifically to the use of continuous posterior lumbar plexus block for THA remain limited. The primary aim of this study was to evaluate the incidence of infections, bleeding, and neurologic complications related to the use of continuous posterior lumbar plexus block in THA patients.

Materials and methods (NA for case report)

After obtaining Institutional Review Board approval, we reviewed the electronic medical records of all adult patients who underwent THA with continuous posterior lumbar plexus blockade between December 1, 2004 and April 30, 2015, using the Mayo Clinic Total Joint Registry and Advanced Cohort Explorer (ACE) software. All complications were then verified via manual chart review. Patient demographics, type of surgery (primary or revision THA), and complications were analyzed. Bleeding and infectious complications were included if present within 45 days postoperatively. Neurologic complications identified within 90 days postoperatively (based on Centers for Medicare and Medicaid (CMS) reporting criteria) were included.

Results/Case report

A total of 9,649 patients underwent THA with a continuous posterior lumbar plexus block during the study period. Of these, 4,985 (51.7%) were females and 4,664 (48.3%) were males. There were 7495 (77.7%) primary and 2154 (22.3%) revision THA, with the mean (SD) age being 63.9 (±14.1) years. There were no lumbar plexus catheter-related infections (0.00%; 95% C.I. 0.00-0.04%), while there was one catheter-related hematoma (0.01%; 95% C.I. 0.00-0.06%) in a patient following a traumatic placement. There were 50 (0.52%; 95% C.I. 0.38-0.68%) postoperative neuropathies, most of which were multifactorial post-surgical changes and/or pre-existing conditions.

Discussion

This is the largest single-center database study to report on complications related to the use of continuous posterior lumbar plexus block for THA. There were no catheter-related infections in our large sample, while the risks of catheter-related hemorrhagic and neurologic complications also appear rare.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1462
Medically Challenging Cases (report of up to 4 cases)

Use of fibrin glue in a pediatric patient for resolution of spontaneous intracranial hypotensive symptoms for chronic, recalcitrant spontaneous CSF leak.

Stacy De La Motte, Genevieve D'Souza, Elliot Krane
Stanford University

Introduction

Spontaneous intracranial hypotension (SIH) most commonly results from a spontaneous CSF leak. Intracranial hypotension, which is characterized by orthostatic headache, dizziness, tinnitus, and improvement of the symptoms in the supine position, is often encountered in patients with connective tissue disorders. The presence of a pre-existing defect in the dura is a potential cause of SIH. Certain connective tissue disorders are known to be associated with meningeal abnormalities that potentially may lead to dural defects. Meningeal diverticula are known to occur in Marfan's syndrome, Ehler's Danlos syndrome type 2, neurofibromatosis, autosomal dominant polycystic kidney disease, and familial osteosclerosis. Recently in our multidisciplinary pain clinic, we evaluated and treated a patient with an unspecified connective tissue disorder and chronic low pressure headache symptoms in whom initial treatment with an epidural blood patch failed to resolve his symptoms, but successful cessation was ultimately achieved by epidural patching with fibrin glue.

Results/Case report

We present the case of a 13-year-old Caucasian male with an unspecified connective tissue disorder with Marfanoid features, who met the diagnostic pattern of CSF hypotension with chronic headache and neck pain. Symptoms began in 2011, localized at the junction of the bottom of the skull and neck, in the midline and bilaterally. Intensity was described as 5/10, made worse with sitting up or standing, improved with lying down. The patient described episodes of pain as non-radiating, constant, non-pulsatile, starting in the morning with rising and lasting for 2 days. Conservative treatment consisting of hydration and caffeine provided only mild improvement.

The patient's MRI was suggestive of a CSF leak with flattening of the pons and accelerated CSF flow velocity in the cervicothoracic region, but was unable to identify the exact location of a dural tear. Therefore, he underwent empiric epidural blood patching at L3-L4 spinous interspace. The patient reported resolution of his low pressure headache symptoms after his initial intervention. Seven days following the initial epidural blood patch, the patient felt a "popping" sensation in his lower back while walking his dog and experienced a return of all symptoms including pain described as 5/10.

Discussion

Successful treatment of spontaneous intracranial hypotensive symptoms with fibrin glue injection has been reported in post-dural puncture headache in adults secondary to long-term intrathecal catheterization. Additionally, fibrin glue is widely used to achieve watertight dural closure in neurosurgical and orthopedic operations. After failing both conservative measures and epidural blood patch, a fibrin epidural patch was performed in the patient's lumbar spine at the L3-L4 interspace again. The patient's intracranial hypotensive symptoms resolved within the next 24 hours. At his follow-up appointment 1 month later, the patient reported continued resolution of his symptoms. This case is novel as it illustrates that epidural patching with fibrin glue may be a good alternative to autologous epidural blood patching, when epidural blood patching does not result in resolution of the symptoms in a pediatric patient in the setting of an underlying connective tissue disorder.

References

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1464
Scientific abstract: Regional anesthesia

Pectoralis and Serratus fascial plane blocks each similarly improve analgesic outcomes following breast tumor resection: A single-centre cohort study

Faraj Abdallah, David McLean, Caveh Madjdpour, Abhjit Biswa, Richard Brull
University of Toronto

Introduction

Pectoralis[1] and Serratus[2] fascial plane blocks have recently been described for use in breast surgery, however evidence supporting their analgesic benefits is limited.[3] This cohort study aims to evaluate the benefits of adding a Pectoralis or Serratus block to conventional analgesia in patients undergoing breast cancer surgery at Women's College Hospital in Toronto between July 2013 and July 2015. We tested the joint hypothesis that the addition of a Pectoralis or Serratus block i) reduced opioid consumption during post-anesthesia care unit (PACU) stay; and ii) decreased the incidence of postoperative nausea and vomiting (PONV). We also examined the Pectoralis and Serratus blocks for non-inferiority.

Materials and methods (NA for case report)

A total of 225 patients undergoing ambulatory breast tumor resection (Table 1) were propensity matched on 10 pre-identified potential confounding factors among three groups (75 per group): i) Pecs I block; ii) Pecs III block; and; 3) conventional opioid-based analgesia alone. Patients received a Pectoralis block, Serratus block, or none based on attending anesthesiologist practice and/or patient preference. Multivariable linear regressions within the propensity-matched cohorts were used to model the oral morphine equivalent consumption and the risk of PONV during PACU stay. We considered Pectoralis block non-inferior to Serratus block if it were non-inferior for both outcomes, with non-inferiority margins of 10 mg morphine and 10% difference in PONV. Other outcomes examined included intraoperative fentanyl consumption, PACU pain scores, time-to-first analgesic request, and PACU discharge time.

Results/Case report

Both Pectoralis and Serratus blocks reduced opioid consumption and decreased the incidence of PONV in PACU. (Table 2) The Pectoralis block was non-inferior but not superior to the Serratus block for these two primary outcomes. Both blocks each reduced intraoperative fentanyl consumption, prolonged time-to-first analgesic request, and expedited PACU discharge compared to the care standard; there was no between the Pectoralis and Serratus blocks for the remaining outcomes.

Discussion

Pectoralis and Serratus blocks are each similarly effective in reducing opioid consumption and decreasing the risk of PONV during PACU stay, compared to the conventional opioid-based analgesia alone. Both blocks seem to be beneficial analgesic adjuncts in patients undergoing breast tumor resection.

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Tables/images

Table 1: Patient characteristics

Parameter	*Pecs I* (N=53)	*Pecs III* (N=71)	*Control* (N=239)
Age (years)	56.0 +/- 12.4	56.0 +/- 11.8	51.1 +/- 15.2
BMI (kg m^{-2})	26.9 +/- 4.3	24.8 +/- 4.2	25.4 +/- 5.2
ASA status (I/II/)	19/34	16/55	101/138
Surgical side (L/R/B)	23/25/5	31/30/10	107/110/22
Duration of surgery (min)	94 +/- 9	87 +/- 8	84 +/- 10
Surgical procedure			
Partial mastectomy + sentinel lymph node biopsy	27	33	131
Mastectomy	4	7	19
Mastectomy + sentinel lymph node biopsy	18	17	47
Mastectomy + axillary dissection	3	12	35
Other	1	2	7

Values are expressed as the mean +/- standard deviation, or absolute numbers.

Abbreviations: ASA, American Society of Anesthesiologists; B, bilateral; cm, centimeter; kg, kilogram; L, left; min, minutes; Pecs, pectoral block; R, right;

Table 1

Table 2: Results

Outcome	*Pecs I* (N=75)	*Pecs III* (N=75)	*Control* (N=75)	*P* for overall group effect*	*P* for *Pecs I* vs. *Pecs III***
Intraoperative IV Fentanyl consumption (µg)	131.0 +/- 84.5	136.1 +/- 75.6	179.2 +/- 93.5	0.001	0.7
Time to PACU discharge (min)	81.0 +/- 10.3	81.6 +/- 11.6	99.4 +/- 19.1	<0.0001	0.74
Number of patients requiring analgesics in PACU	33 (44)	37 (49.3)	56 (74.5)	0.0002	0.51
Time to first analgesic request (min)	45.3 +/- 13.1	42.6 +/- 17.3	22 +/- 11.9	<0.0001	0.28
Rest pain severity VRS score *at PACU I admission (on)****	1.0 +/- 2.2	2.0 +/- 3.2	1.0 +/- 2.3	0.027	0.028
at PACU I discharge	2.1 +/- 1.9	2.0 +/- 1.8	2.0 +/- 1.9	0.9	0.74
highest during PACU I stay	3.1 +/- 2.5	3.3 +/- 2.7	4.0 +/- 2.5	0.08	0.64
Oral morphine equivalent consumption *in PACU* (mg) †	12.3 +/- 17.7	15.2 +/- 16.7	24.7 +/- 21.8	<0.0001	0.3
Postoperative incidence of PONV *in PACU* †	23 (30.3)	25 (33.3)	47 (88.7)	0.00006	0.73

(*) The P-value for the overall group effect is set at 0.05.

(**) The Bonferroni corrected P-value for the ***Pecs I* vs. *Pecs III*** comparison is set at 0.017.

(***) The Bonferroni corrected P-value for the repeated measurement of pain severity VRS scores is 0.017.

(†) Primary outcome

Values are expressed as the mean +/- standard deviation, or absolute numbers (percentage).

Abbreviations: µg, micrograms; min, minutes; mg, milligram; N/A, not applicable; n/N, percentage; *P*, P-value; PACU, post-anesthesia care unit; PONV, postoperative nausea and vomiting; VRS = verbal rating scale

Table 2

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1467
Scientific abstract: Regional anesthesia

Adductor canal block provides non-inferior analgesia and superior quadriceps strength compared to femoral nerve block in anterior cruciate ligament reconstruction

Faraj Abdallah, Vincent Chan, Richard Brull
St Michael's Hospital

Introduction

By targeting the distal branches of the femoral nerve in the mid-thigh, the adductor canal block (ACB) can preserve quadriceps muscle strength while providing analgesia similar to a conventional femoral nerve block (FNB) for inpatients undergoing major knee surgery. In this randomized, double-blind, non-inferiority trial, we hypothesized that ACB provides postoperative analgesia that is at least as good as FNB while preserving quadriceps strength following outpatient anterior cruciate ligament (ACL) reconstruction.

Materials and methods (NA for case report)

After ethics approval, 100 consented patients were randomized to receive ACB or FNB with 20 ml ropivacaine 0.5% (with epinephrine). We sequentially tested the joint-hypothesis that ACB is non-inferior to FNB for cumulative oral morphine equivalent consumption and area under the curve (AUC) for pain scores during the first 24-hours postoperatively, and also superior to FNB for post-block quadriceps maximal voluntary isometric contraction (MVIC).

Results/Case report

We analyzed 52 and 48 patients who received ACB and FNB, respectively. Compared to pre-set non-inferiority margins, the ACB-FNB difference [95% confidence interval] in morphine consumption and AUC for pain scores were -4.8 mg [-12.3, 2.7](P=0.03) and -71 mm hr [-148, 6](P<0.00001), respectively, indicating non-inferiority of ACB for both outcomes. (Figure 1) The MVIC for ACB and FNB at 45 minutes were 26.6 pound-force [24.7, 28.6] and 10.6 pound-force [8.3, 13.0](P<0.00001), respectively, indicating superiority of ACB. (Figure 2)

Discussion

Compared to FNB, our findings suggest that ACB preserves quadriceps strength and provides non-inferior postoperative analgesia for outpatients undergoing ACL reconstruction.

Tables/images

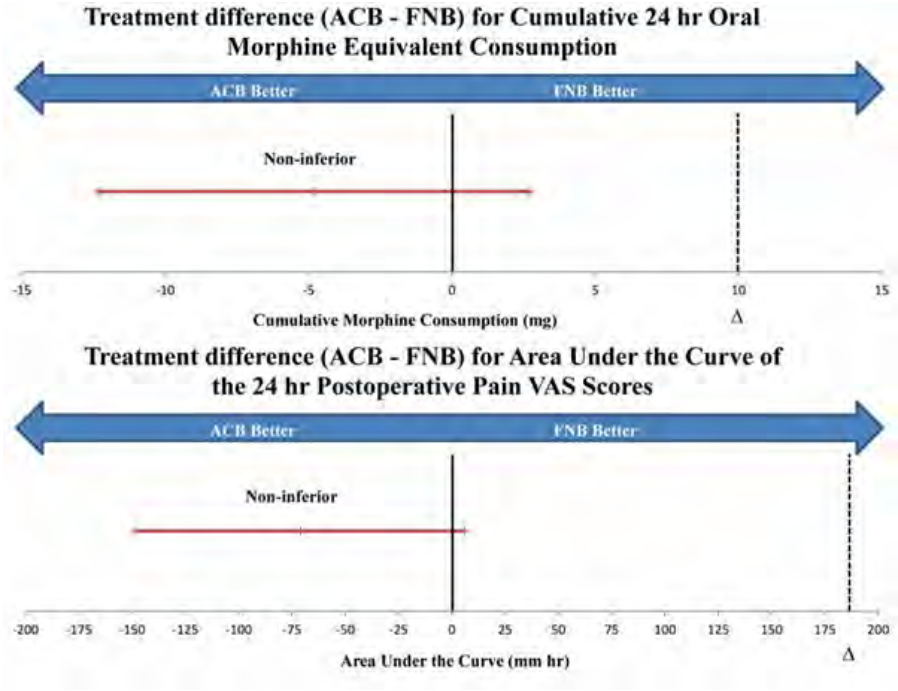

Figure 1

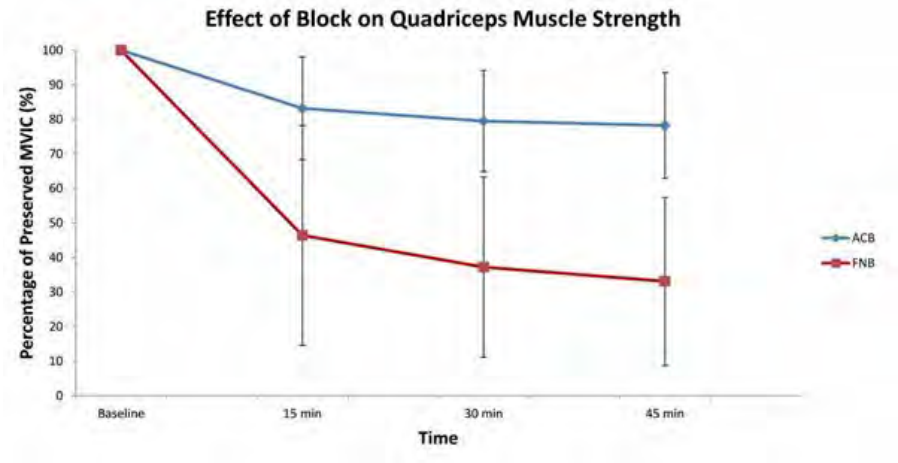

Figure 2

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1468
Scientific abstract: Regional anesthesia

Optimizing Pain and Rehabilitation after Knee Arthroplasty (OPRA): A Randomized Trial

Stephen Choi, Turlough O'Hare, James Paul, Colin JL McCartney
Sunnybrook Health Sciences Centre

Introduction

Total knee arthroplasty (TKA) is widely performed and improves quality of life when successful. Pain after TKA is severe without significant targeted interventions and is a major contributor to delayed rehabilitation with negative costs to both patient and society. Current postoperative management of pain after TKA varies widely between institutions with patients receiving IV opioids alone, continuous epidural, and fewer receiving cFNB or LIA. cFNB has not been compared to sFNB or LIA in a study of sufficient power using pain as the primary endpoint. This trial was designed to compare the effects of cFNB, sFNB, and LIA on acute postoperative analgesia, opioid consumption, and rehabilitation outcomes after TKA.

Materials and methods (NA for case report)

After obtaining IRB approval and regulatory approval (Health Canada) for off label use of subcutaneous ketorolac, adults (18 to 85), ASA I-III, scheduled for primary tri-compartmental total knee arthroplasty were approached for participation. Patients with allergies/intolerance/contraindications to study medications, inability to walk independently, ASA 4 or 5, BMI > 40, or chronic opioid use were excluded. Participants were randomized (1:1:1) to one of three groups.

cFNB: Placebo LIA (0.9% NS), cFNB bolus (ropivacaine 0.5% 20ml), cFNB infusion (ropivacaine 0.2% 5ml/h); *sFNB*: Placebo LIA (0.9% NS), cFNB bolus (ropivacaine 0.5% 20ml), cFNB infusion (0.9% NS 5ml/h); *LIA:* LIA (ropivacaine 0.2%, epinephrine 10 mcg/mL, 150 mL, ketorolac 30mg), fascia iliaca bolus(0.9% NS), facia iliaca infusion (0.9% NS 5ml/h). All study materials were packaged identically and infusions continues until POD 2 06h00. Peripheral nerve bock catheters were placed sterilely with US guidance by experienced anesthesiologists or supervised trainees in all participants. Investigators, research assistants, participants, outcome assessors, and data analysts were blinded. Participants received preoperative acetaminophen 1000mg, celecoxib 400mg, and gabapentin 300mg. Surgical anesthesia was achieved with intrathecal bupivacaine 0.5% (12.5 mg) and fentanyl (12.5µg). Intra-operative sedation was achieved with propofol 25-100µg kg^{-1} min^{-1} titrated to an RSS of 3 or 4.

Postoperative multimodal analgesia was standardized: IV-PCA hydromorphone (48h), acetaminophen 1000mg q6h (20 doses), celecoxib 200mg q12h (10 doses), sustained release hydromorphone 3mg q8h (12 doses), and gabapentin 200mg q8h (12 doses).

Outcomes included NRS for pain with movement at 09h00 on POD 2 (primary). Secondary outcomes included NRS for pain (POD 1, 6 weeks, and 4.5 months), cumulative 48h opioid consumption and common functional outcomes.

Results/Case report

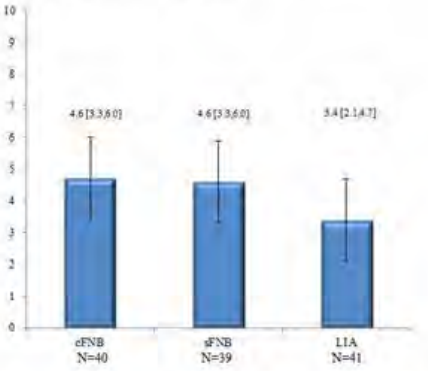
There were no statistically significant differences in pain during physiotherapy on POD 2 at 09h00. (Fig 1) Both cFNB and LIA were superior to sFNB for pain on post-operative day 1 at rest and with movement (ANOVA, p=0.00). (Table 2) There were no statistically significant differences in cumulative 48 hour opioid consumption or other secondary outcomes. (Fig 2, Tables 2 and 3) There were no adverse events reported in the three groups.

Discussion

cFNB and LIA are superior to sFNB for early analgesic outcomes (NRS on POD 1) after TKA. cFNB and LIA are both appropriate analgesic options, in non-chronic pain or opioid naïve patiemts, for TKA depending on the experience of practitioners

Tables/images

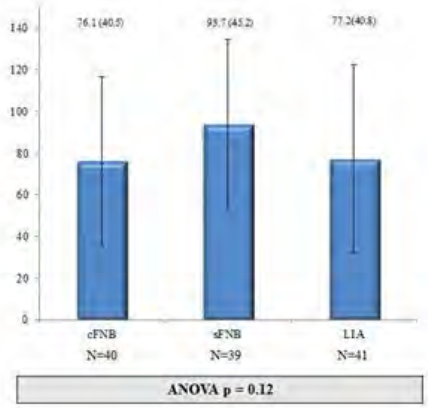
Fig 1 – NRS with movement, POD 2 09h00



ANOVA p = 0.05		
	Mean Difference NRS (95%CI)	**P-value (Tukey correction)**
cFNB – LIA	1.2 [-0.1,2.5]	0.07
sFNB – LIA	1.2 [-0.5,0.2]	0.10
cFNB – sFNB	0.0 [-1.3,1.4]	1.00

Figure 1 - NRS POD 2 09h00

Fig 2 – 48h parenteral morphine equivalent consumption (mg)



ANOVA p = 0.12

Figure 2 - 48h opioid consumption

Table 1: Demographic/pre-operative baseline data

	cFNB N=40	sFNB N=39	LIA N=41
Age (y)	64.0 (7.4)	65.2 (9.2)	65.9 (8.0)
Gender M:F	18 (44):23 (56)	20 (51): 19 (49)	20 (49): 21 (51)
BMI (kg m^{-2})	30.1 (3.5)	31.4 (4.7)	29.3 (4.8)
ASA I:II:III	4/19/18	3/21/17	1/18/20
Pre-operative NRS	6.0 (2.2)	5.9 (2.8)	6.0 (2.7)
Pre-operative 6-MWT (m)	385 (116)	365 (137)	372 (116)
Pre-operative TUG (s)	10.8 (3.1)	11.8 (3.9)	13.2 (6.0)
Pre-operative Knee Flexion (degrees)	115 (19)	110 (15)	112 (17)
Pre-operative WOMAC	41 (13.9)	43.0 (18.9)	46 (20.4)

ASA – American Society of Anesthesiologists' classification, BMI – Body mass index, NRS – Numeric Rating Scale for Pain, TUG – timed up and go, 6-MWT – six-minute walk test, WOMAC – Western Ontario and McMaster University Arthritis Index
Data presented as mean (SD), count (%)

Table 1 - Demographics

Table 2: Secondary pain outcomes

Immediate post-op	cFNB N=40	sFNB N=39	LIA N=41	P-value
NRS POD 1 (PT) 09h00	4.8 [3.9,5.6]	6.4 [5.6,7.3]	4.4 [3.6,5.2]	ANOVA: 0.00
Pairwise comparisons: mean difference NRS		cFNB – LIA: 0.35 [-1.0,1.7] cFNB – sFNB: -1.7 [-3.1,-0.3] LIA – sFNB: -2 [-3.4, -0.6]		Tukey: 0.82 Tukey: 0.01 Tukey: <0.01
NRS POD 1 (resting) 09h00	2.7 [2.0,3.4]	3.9 [3.2,4.6]	2.5 [1.8 ,3.2]	ANOVA: 0.01
Pairwise comparisons: mean difference NRS		cFNB – LIA: 0.3 [-1.0,1.4] cFNB – sFNB: -1.2 [-2.7, 0] LIA – sFNB: -2 [-2.6, -0.2]		Tukey: 0.86 Tukey: 0.06 Tukey: 0.02
Worst NRS POD 1	4.1 (2.8-5.4)	6.3 (5-7.5)	4.7 (3.7-5.9)	ANOVA: 0.00
Pairwise comparisons: mean difference NRS		cFNB – LIA: -0.6 [-1.8, 0.7] cFNB – sFNB: -2.7 [-3.5,-0.9] LIA – sFNB: -1.6 [-2.9,-0.3]		Tukey: 0.53 Tukey: 0.00 Tukey: 0.01
Bolus of catheter (n)	3 (8)	5 (13)	2 (5)	0.38
4.5 months	**cFNB N=37**	**sFNB N=33**	**LIA N=38**	**P-value**
NRS at 4.5 months	2.4 (2.5)	2.1(2)	1.9 (2.2)	ANOVA 0.65
S-LANSS 4.5 months	6.0 (6.63)	6.3 (7.1)	4.2 (5.9)	ANOVA 0.32

NRS – Numeric Rating Scale for Pain, PT – physiotherapy, S-LANSS – self reported Leeds Assessment of Neuropathic Symptoms and Signs pain scale
Data presented as mean (SD) or [95% CI], count (%)

Table 2 - Pain Outcomes

Table 3: Functional outcomes

Immediate postoperative	cFNB N=40	sFNB N=39	LIA N=41	P-value
POD 2 TUG (seconds)	76.6 (59.4)	61.1 (35.4)	73.7 (52.6)	ANOVA: 0.38
Late Outcomes	**cFNB N=37**	**sFNB N=33**	**LIA N=38**	**P-value**
Active ROM 4.5 months (degrees)	120 (13)	116 (12)	119 (9)	ANOVA: 0.48
6-MWT (metres)				
6 weeks	383 (93)	350 (110)	356 (99)	ANOVA: 0.58
4.5 months	451 (75)	406 (200)	397 (12)	ANOVA: 0.73
WOMAC				
6 weeks	24.1 (12.3)	25.9 (14.8)	30.0 (11.5)	ANOVA: 0.84
4.5 months	19.1 (17.3)	15 (14.7)	16.3 (16.6)	ANOVA: 0.53
LEFS				
6 weeks	43.0 (11.2)	45.4 (12.7)	42.2 (14.7)	ANOVA: 0.57
4.5 months	55.9 (14.6)	59.0 (15.7)	57.4 (16.3)	ANOVA: 0.71

Rom – Range of Motion, TUG – Timed up and go, 6-MWT – 6-minute walk test, WOMAC - Western Ontario and McMaster University Arthritis Index, LEFS – lower extremity functional scale
Data presented as mean (SD)

Table 3 - Functional Outcomes

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1469
Medically Challenging Cases (report of up to 4 cases)

Stellate Ganglion Blockade for Medically Refractory Electrical Storm in a Patient with Percutaneous Ventricular Assist Device

Edward Doherty, Andrea Tsai, E. Adriana Desillier
Tufts Medical Center

Introduction

Electrical storm (ES) is characterized by recurrent ventricular tachycardia (VT) or fibrillation resistant to standard antiarrhythmic medications, commonly requiring multiple electrical cardioversions. A growing body of literature supports the use of sympathetic blockade as a means of terminating ES [1]. We describe a case of stellate ganglion block (SGB) utilized to control ES in a patient with ES despite multiple antiarrhythmic medications and percutaneous left ventricular assist device (LVAD). To our knowledge this is the first report of SGB in a patient with an Impella LVAD, and we discuss considerations of SGB in this population

Results/Case report

A 42-year-old male was transferred in cardiogenic shock with multiple episodes of VT requiring electrical cardioversion. Three weeks prior, he had been fitted with an external defibrillator when evaluation for abdominal pain and dyspnea revealed an old anterior infarct on EKG and a completely occluded left anterior descending coronary artery on cardiac catheterization. Over the next 3 days, the patient continued to require multiple cardioversions for VT in spite of therapy with lidocaine and amiodarone. The patient underwent repeat catheterization where revascularization was unsuccessfully attempted and percutaneous LVAD was subsequently placed. After 6 days of intermittent VT, the decision was made to perform left SGB for sympathetic blockade. Systemic anticoagulation was managed per American Society of Regional Anesthesia and Pain Medicine (ASRA) guidelines and SGB was performed under ultrasound guidance with 5ml of 0.25% bupivacaine. No episode of VT recurrence was observed, LVAD support was weaned, and antiarrhythmic therapy was converted to oral medication. The patient received an implantable cardioverter defibrillator 7 days after LSGB and was discharged home the following day.

Discussion

Ventricular arrhythmias after myocardial infarction (MI) develop as a result of complex interactions between arrhythmogenic substrate, local metabolic and acid/base changes, and autonomic nervous system dysfunction [2]. Myocardial ischemia can cause neural transmission changes that enhance sympathetic activity in these patients with vulnerable myocardium, associated with QT interval prolongation and an increasing propensity for ventricular arrhythmias [3]. Post-MI patients with ES may benefit from sympathetic blockade compared to ACLS guided therapy [1]. SGB is an attractive choice for the treatment of ES in the critically ill population. SGB can be performed at bedside, is minimally invasive, and causes fewer hemodynamic effects compared to beta blockade or deep sedation. However, SGB in the critically ill may require additional considerations. These include periprocedural anticoagulation management as in our case, and little guidance is available. ASRA guidelines suggest to hold systemic heparin for 4 hours before and 2 hours after an intermediate risk procedure such as an SGB [4]. The Impella requires anticoagulation both systemically and in a purge solution for a goal PTT of 45-55. Considering the risks and benefits, we managed the systemic anticoagulation per ASRA guidelines, while the purge solution was continued and the device was monitored for signs of thrombus. No bleeding or clotting complications were observed.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1471
Scientific abstract: Regional anesthesia

Global Snapshot of Regional Anaesthesia Practice

Katherine Barron, Dr. Sanjiv Patel, Dr. Damon Kamming
University College London Hospital, NHS Foundation Trust

Introduction

A recent internal audit of Regional Anaesthesia (RA) practice in our UK hospital revealed a wide variation in preferences amongst experienced practitioners. We wanted to understand the current extent of variation in global regional anaesthesia practice as a first step to standardising our local regional anaesthesia practice.

Materials and methods (NA for case report)

An anonymous global survey of practice was ascertained using an online survey tool for two months. https://www.surveymonkey.com/r/RAsurveyUK

The 70-question survey inquired about the practice of: Interscalene, Supraclavicular, Infraclavicular, Axillary, Pectoralis, Paravertebral, Transversus Abdominis Plane (TAP), Fascia Illiaca, Adductor Canal, and Popliteal Sciatic nerve blocks.

Questions included: the frequency the practitioner performed the block, type and concentration of local anaesthetic (LA) used, volume infiltrated, mixing of short and long acting LA, and use of additives (Epinephrine and/or Dexamethasone). The survey was distributed using the authors email networks, relevant social media and membership networks of well-known RA groups.

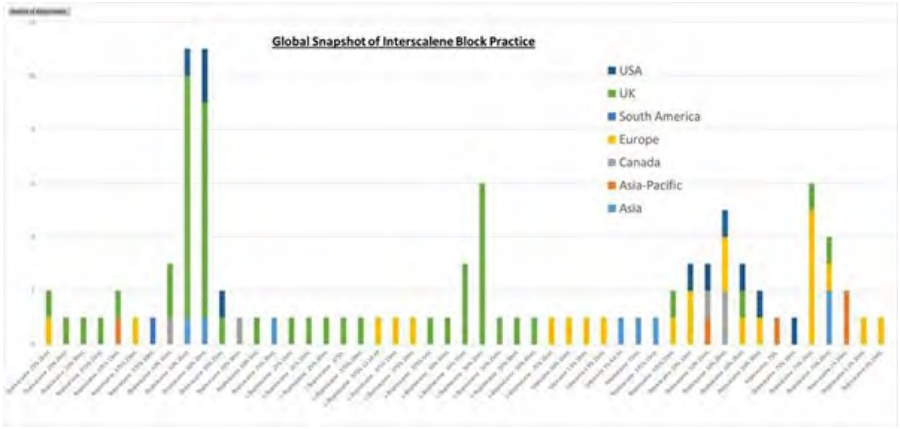
Results/Case report

The 70-question survey was answered by 172 respondents from 31 countries. The majority of responses were from the UK (35.5%), the USA (22.7%), and Europe (22.1%), with Asia (8.1%), Canada (7%), Asia-Pacific (3.5%), South America (0.6%), and Africa (0.6%) also represented. Figure 1.0 shows that for the Interscalene Block alone there were 49 different combinations of LA type, concentration and volume used (filtering for **no** use of additives or addition of Lidocaine with long acting LA). Throughout all 10 blocks examined, there was anywhere between 28-49 different combinations used.

Discussion

Our survey demonstrates a significant variation in global regional anaesthesia practice amongst experienced practitioners (as defined by those who performed each block monthly or more frequent). There is evidence of variation in local anaesthetic type, concentration, volume, mixing and the addition of additives for each specific block. This makes standardisation of local practice difficult and the comparison of outcomes globally challenging. The next and more arduous question might therefore be: What is the best global regional anaesthesia practice for each specific block?

Tables/images



Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1476
Medically Challenging Cases (report of up to 4 cases)

Left Ultrasound-Guided Stellate Ganglion Block for Treatment of Refractory Electrical Storm

Blaine Farmer, Boris Spektor
Emory University School of Medicine

Introduction

Electrical storm (ES) is a condition that results in multiple, recurrent ventricular dysrhythmias such as ventricular tachycardia (VT) or ventricular fibrillation (VF). It produces life-threatening hemodynamic instability often refractory to conventional drug therapy. The pathophysiology appears to involve the sympathetic nervous system. The stellate ganglion block (SGB) is typically used to relieve the pain of sympathetically-mediated conditions of the head, neck, and upper extremity. This case describes the use of SGB for the treatment of refractory ES.

Results/Case report

A 58 year old male with asthma presented after multiple witnessed syncopal events. Initial evaluation revealed recurrent polymorphic VT requiring defibrillation in addition to amiodarone, lidocaine, and phenylephrine infusions. Diagnostic testing including 12-lead electrocardiography (ECG), coronary angiography, and transthoracic echocardiography failed to explain the etiology. VT and VF recurred, approximately every 45 minutes despite uptitration of antiarrhythmic doses and addition of procainamide.

After 14 episodes of defibrillation, a left SGB was performed at the patient's bedside. In the supine position at the C6 level, a 22 gauge 80 mm echogenic needle was advanced under in-plane ultrasound guidance. The left internal jugular vein could not be displaced despite contralateral head rotation, and the needle was advanced through the compressed IJ just beyond the prevertebral fascia into the longus colli muscle. After negative aspiration, 8 mL of bupivacaine 0.25% with 8 mg of dexamethasone was incrementally injected. The needle was removed without complications, and pressure was held over the injection site for 5 min.

Following the SGB, no further episodes of ventricular dysrhythmia occurred. Antiarrhythmics were weaned and an implantable cardioverter defibrillator (ICD) was placed. Cardiac magnetic resonance imaging later showed a basilar focal scar of the myocardium consistent with cardiac sarcoidosis, and he was treated with methylprednisolone prior to his discharge from the hospital.

Discussion

The stellate ganglion, a relay station for sympathetic innervation to the heart, has been shown to play an important role in ventricular arrhythmogenesis in both animals and humans. This case provides confirmatory evidence that left-sided cardiac sympathetic denervation through ultrasound-guided SGB interrupts the otherwise fatal refractory electrical storm, permitting hemodynamic stabilization. Anticipating short-term benefit, dexamethasone was added to the bupivacaine to prolong neural blockade; this particular case was not amenable to an indwelling catheter given needle trajectory through the internal jugular vein with high risk for catheter-related hematoma. Fortunately this patient had durable relief from the SGB. For patients with refractory electrical storm, SGB presents a valuable tool for rapid and life-saving hemodynamic stabilization.

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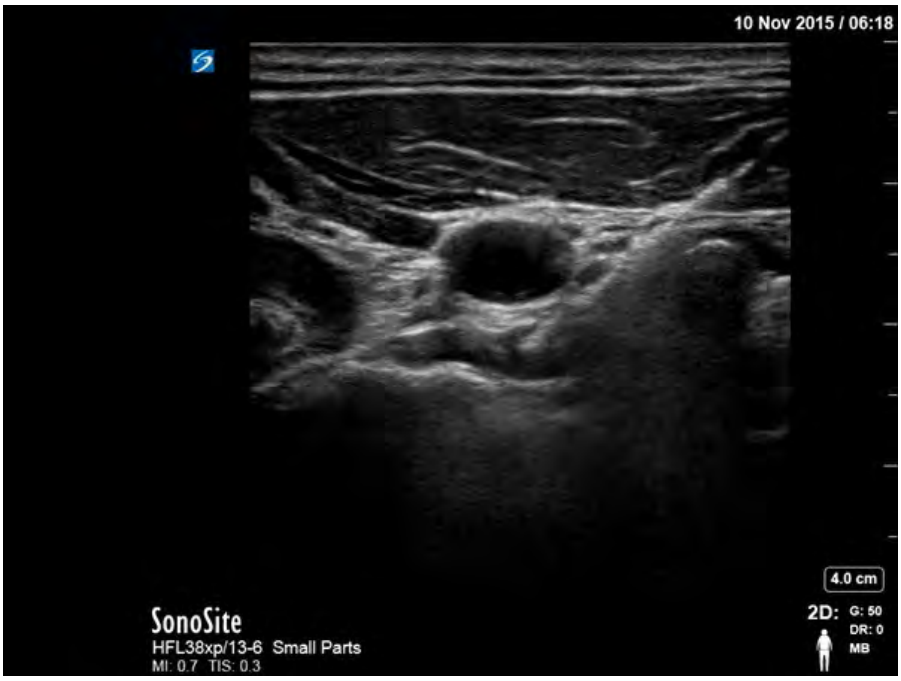
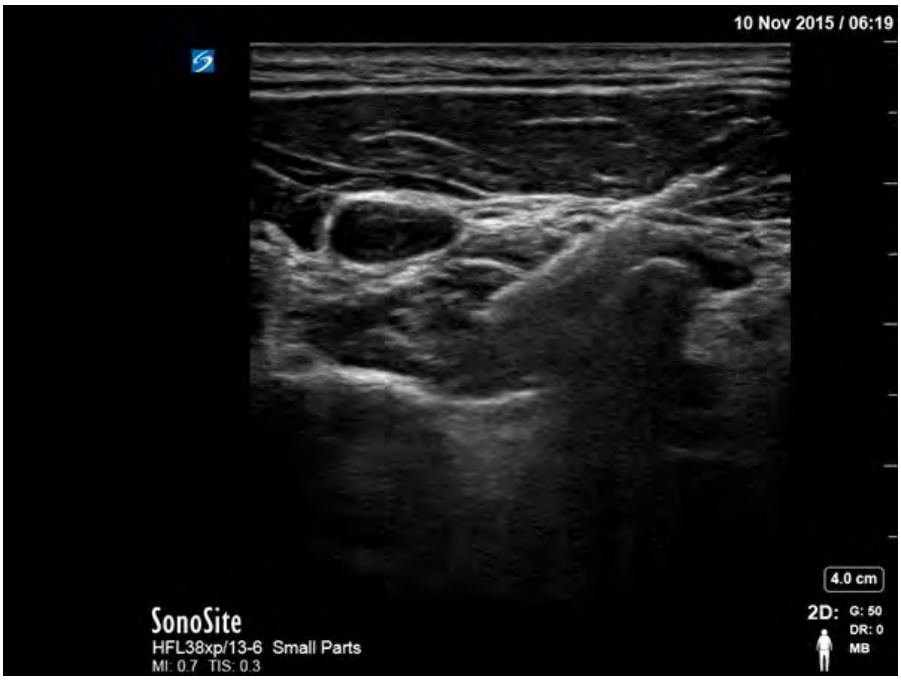
Tables/images



Pre-injection ultrasound image



Post-injection ultrasound image

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1477
Medically Challenging Cases (report of up to 4 cases)

Neuraxial analgesia in the laboring parturient with Arnold-Chiari Type I malformation – relief of pain in unchartered terrain?

Suneil Jolly, Ana Lobo
Yale School of Medicine

Introduction

Arnold-Chiari Type I malformation (ACM-I) is a congenital anomaly characterized by downward displacement of the cerebellar tonsils through the foramen magnum, which can lead to compression of cerebellar components, the lower brainstem, and the upper cervical spinal cord. In turn, a variety of neurological deficits and permanent nervous system damage may evolve. Asymptomatic tonsillar ectopia is an increasingly recognized phenomenon questioning the significance of such findings on imaging. Currently, no true guidelines exist on the safety and efficacy of performing neuraxial analgesia on patients with ACM-I. There are studies, however, that have shown neuraxial techniques can be performed safely in laboring patients with ACM-I (3-10). For our patient diagnosed with ACM-I during pregnancy, an epidural analgesic technique was used for labor pain.

Results/Case report

17 yo F, G1P0 @ 40w+2d diagnosed with ACM-I *during 2nd trimester*

PMH: headaches, occasional weakness in her hands (right>left) since 10

HPI: vision changes, increased frequency headaches during 2nd trimester, asymptomatic during 3rd trimester

Imaging: CT consistent with ACM-1; follow-up MRI ***after*** delivery with 7mm herniation

Procedure: -17 gauge Tuohy @L3-L4, sitting position -LOR @4.5cm, negative 3cc test dose w/lidocaine 1.5% + epi. Loading dose 0.25% bupivicaine injected slowly. -Constant infusion low dose hydromorphone/ bupivicaine

Pain score 9/10 to 1/10, uneventful delivery, asymptomatic @1w, 1m.

Discussion

Currently, no absolute contraindications to neuraxial analgesia exist in ACM-1

The possibility of increased ICP imparts significant risk during L&D leading to concern over use of neuraxial analgesia (9).

Accidental dural puncture could lead to tentorial herniation, brain shifts, and decreased perfusion pressure (4).

Studies from the 1960s confirmed the effects of labor on CSF that can ultimately lead to a harmful outcome (11-15).

The contractile force of uterus on CSF causes increase in ICP and unsuspected herniation (12-15), perhaps with increased intra-abdominal/intrathoracic pressures secondary to pain.

GA entails risks as well; increased ICP from intubation and drugs such as succinylcholine and ketamine.

A recent review of current literature identified 22 documented cases in which ACM-1 patients received neuraxial analgesia (4). 17/22 received an epidural, 11 with NSVD and 6 via C/S. Only 1 case produced maternal postpartum symptoms that included neck pain and spasms.

To our knowledge, this is the first documented case in which an epidural was performed successfully in a patient that was diagnosed with ACM-1 ***during*** pregnancy and not an established diagnosis with imaging prior to pregnancy

The decision to administer neuraxial analgesia was made based on the patient's lack of symptoms over a one month period

We advocate slow injection of the test dose along with any further loading dose to avoid rapid expansion of the epidural space; skill/experience can further prevent complications related to dural puncture

We believe neuraxial analgesia can actually benefit ACM-1 patients by avoiding the risks of general anesthesia and preventing ICP shifts induced by labor/pain

Further developments in neuraxial procedures , smaller epidural needles, and additional studies characterizing shifts in CSF with/without neuraxial analgesia may help alleviate the hesitation to proceed with these analgesic techniques

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1478
Scientific abstract: Chronic pain

RFA of Ilioinguinal Nerve Under Ultrasound Guidance

John Gardner
University of Cincinnati Medical Center

Introduction

Chronic pelvic pain can result from neuropathy of the ilioinguinal, the iliohypogastric, and/or the genitofemoral nerves. Ultrasound-guided interventional procedures have been described with success in the diagnosis and treatment of these syndromes. Our patient is a a 46 year-old woman with a history of regional sympathetic dystrophy confined to the right hip and thigh with ilioinguinal neuralgia who presented with chronic right hip pain. Her pain developed approximately 12 years ago when she had a total abdominal hysterectomy; afterwards she developed chronic pain in her right hip and thigh. She has been seen in our clinic for the past two years and during that time has failed conservative medication management as well as a spinal cord stimulator for her chronic pain. We performed a right ilioinguinal nerve block twice over the course of two months, after which she experienced 90%-100% pain relief for one day. She subsequently elected to have a radiofrequency ablation of the ilioinguinal nerve given these results. The right ilioinguinal nerve was located by placing the probe medial to the ASIS and scanning for the external oblique muscle, internal oblique muscle and the transverse abdominis muscle. The nerve was then identified above the level of the transverse abdominis muscle under direct ultrasound visualization and RFA was performed. No complications were noted during the procedure and the patient was scheduled for a follow-up visit.

Results/Case report

The patient reported a 50-60% relief of her pain for approximately 2 months after her procedure that is still ongoing at the time of this presentation. She rated her pain level as a 2/10 on VAS which was decreased from 5/10 on VAS during her previous evaluations.

Discussion

Based on the results of this procedure, RFA of the ilioinguinal nerve is a reasonable procedure to consider for patients with ilioinguinal neuralgia.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1479
Medically Challenging Cases (report of up to 4 cases)

Lower extremity myoclonus following thoracic epidural placement

David Tsiang, Natale Naim
UCLA David Geffen School of Medicine

Introduction

A patient developed lower extremity myoclonus following seemingly successful and uncomplicated placement of a thoracic epidural. We explore possible etiologies for the myoclonus in order to draw attention to this rare but potential complication of neuraxial anesthesia.

Results/Case report

A 64 year old female scheduled for hiatal hernia repair, Nissen fundoplication, and cholecystectomy underwent preoperative thoracic epidural placement for postoperative analgesia. Placement was challenging but otherwise atraumatic, aspiration was negative to blood and CSF, and no pain or paresthesias were reported during injection of Lidocaine with Epinephrine test dose. Following epidural placement, the patient demonstrated bilateral T4-T9 sensory block to cold.

30-45 minutes later, the patient complained of involuntary leg spasms, consisting of regular, rhythmic contractions of her bilateral feet and posterior thigh and calf muscles. The patient denied sensory or motor deficits, or bowel or bladder dysfunction. Blood pressure was within normal limits. The leg spasms were causing the patient severe discomfort, so the epidural catheter was removed. Within a few minutes the leg spasms were reportedly less intense.

After complete resolution of the leg spasms, thoracic epidural placement was repeated per patient request, which was smooth and uncomplicated. The leg spasms never returned and the patient never developed any other neurologic deficits by the time the epidural was removed two days later.

Discussion

Axial propriospinal myoclonus is a type of myoclonus consisting of axial jerks starting from a single spinal level that can spread both rostrally and caudally via propriospinal pathways to affect the musculature of a few spinal levels. This can be caused by trauma to the spinal cord or nerve roots. In this case it is possible that the Tuohy needle had inadvertently pierced the dura during the difficult epidural placement and either the needle or the catheter caused a focal irritation or lesion of the spinal cord, which then spread caudally to the lumbar and sacral levels, causing contractions of the feet and posterior thigh and calf muscles, though aspiration was negative to CSF.

Inadvertent subdural injection is a rare but known complication of epidural placement. A subdural communication with the cerebellum could explain how the patient developed myoclonus despite negative aspiration to CSF. Furthermore, if the needle and catheter were lodged between the epidural and subdural spaces then it could explain how the patient had an appropriate epidural sensory block to cold without the typical symptoms of subdural injection.

Spinal myoclonus secondary to neuraxial anesthesia has been limited to a few case reports. The common proposed mechanism seems to be loss of CNS inhibition within the spinal cord or irritation of the spinal cord or nerves roots by either local anesthetic, needles, or catheters. Treatments for spinal myoclonus have ranged from removal of the offending agent to benzodiazepines or anticonvulsants to further regional anesthesia.

In this case the myoclonus completely resolved with removal of the epidural catheter. This complication is rare, so it is important for anesthesiologists to be aware of the possibility so that it can be promptly recognized and treated to avoid causing permanent neurologic deficits.

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Consent
Informed consent was obtained from the patient for publication of this case report and is available upon request.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1481
Medically Challenging Cases (report of up to 4 cases)

Ultrasound-guided Rectus Sheath Block Below The Arcuate Line Is An Option For Cesarean Section: a case report

xulei Cui, Yuguang Huang
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Introduction

Rectus sheath block (RSB) is an old technique that gained new clinical interest with the advent of ultrasonography-guidance[1,2]. The aim of the technique is to deposit the local anesthetic (LA) in the virtual space between the posterior wall of the rectus abdominis muscle and its sheath to provide somatic analgesia for anterior abdominal midline incisions[1,3]. Rectus sheath block is more commonly performed at the umbilicus level and used for umbilical hernia repair in paediatric and adult patients[4,5]. Its use in abdominal gynaecological, urological surgeries or other small midline incisions has also been described[6-8]. Herein, for the first time according to our knowledge, we present a case of RSB performed below the arcuate line for C-section in a woman with HELLP syndrome and previous cesarean section ,where epidural and spinal anesthesia was contra-indicated.

Results/Case report

A pregnant woman (30-year of age; G3P2, 31+4-week gestation) presented with late decelerations of fetal heart rate . She had severe preeclampsia , HELLP syndrome and anemia(Table 1) during the pregnancy, and a low abdominal midline incisional scar from the previous C-section(Fig.1). Epidural and spinal anesthesia was contraindicated due to severe thrombocytopenia (39×109/L). The patient received emergency C-section. Ultrasound-guided bilateral rectus sheath block (RSB) with 0.5% ropivocaine 10ml per side was performed below the arcuate line (Fig.2) to provide anesthesia for low abdominal wall separation. The ultrasound image allowed identification of the rectus abdominis, the posterior sheath (the transversalis fascia) and the uterus wall (Fig. 2). General anesthesia preceded by a rapid-sequence induction with i.v.3ng/ml remifentanil in continuous target-controlled infusion, 1.5mg kg-1 propofol and 1.5mg kg-1 succinylcholine was used to provide visceral analgesia for hysterotomy and delivery. Perioperative hemodynamic was stable(Fig. 3). The delivery was eventless. The Apgar score of the newborn was 9-10.Consent was obtained from the patient prior to the reporting of this case.

Discussion

In the current case, the predicted induction-delivery time would be most likely beyond 15minutes due to the tissue adhesion caused by the previous cesarean section, which may have a negative effect on the newborn. [10,11]. As such, we chose to perform RSB first to provide anesthesia for the abdominal wall separation. The surgical incision was at the level of between T11 to L1. To achieve sufficient effect with minimal volume of local anesthetic, for the first time as we know, we chose to block at the middle level (about T12) of the incision, which is supposed be below the arcuate line. Where, the blending aponeurosis of the internal oblique and the transverses pass anterior to the rectus abdominis, and left the transversalis fascia immediately beneath the rectus abdominis.[12]The ultrasound image of the current case showed there was only one hyperechogenic line beneath the recuts abdominis, which believed to be the transversalis fascia(Fig. 2). In summary, this case suggests that ultrasound-guided RSB below the arcuate line is safe and reliable, and can provide effective somatic anaesthesia for lower midline abdominal incision.

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Tables/images

Table 1. Laboratory data at patient presentation and follow-up.*

	Presentation 3d Pre-op.	5hr Pre-op.	4hr Post-op.	1d Post-op.	2d Post-op.	4d Post-op.	9d Post-op.	25d Post-op.	Normal Range
Hemoglobin (g/dL)	8.5	8.6	8.9	8.8	8.2	8.0	9.8	101	11.0-15.0
White Cell Count (×10⁹/L)	6.73	3.91	9.65	11.26	10.34	4.58	4.77	4.24	3.50-9.50
Platelets (×10⁹/L)	56	39	96	71	65	56	57	109	100-350
INR	0.90	0.94	–	0.99	0.98	0.99	0.98	–	0.84-1.14
APTT(S)	21.3	25.1	–	26.9	28.6	26.2	22.0	–	22.7-31.8
PT(S)	10.1	10.5	–	11.1	11.0	11.0	11.0	–	10.4-12.6
Fbg(g/L)	3.18	4.03	–	5.50	5.95	5.26	3.66	–	1.80-3.50
D-Dimer	0.65	--	–	12.62	–	1.87	25.09	–	0-0.55
AST (U/L)	–	29	–	–	–	21	–	–	35-100
ALT (U/L)	10	11	15	19	–	31	–	–	7-40
LDH (U/L)	–	290	–	–	–	305	–	–	0-250
Alb(g/l)	26	26	26	25	–	29	–	–	35-52

*The normal ranges of the variables are based on the Chinese population. INR: international normalized ratio; APTT: activated partial thromboplastin time; ATIII: antithrombin III; FDP: fibrin degradation product; AST: aspartate aminotransferase; ALT: alanine aminotransferase; LDH: lactate dehydrogenase; Alb: albumin

Table 1

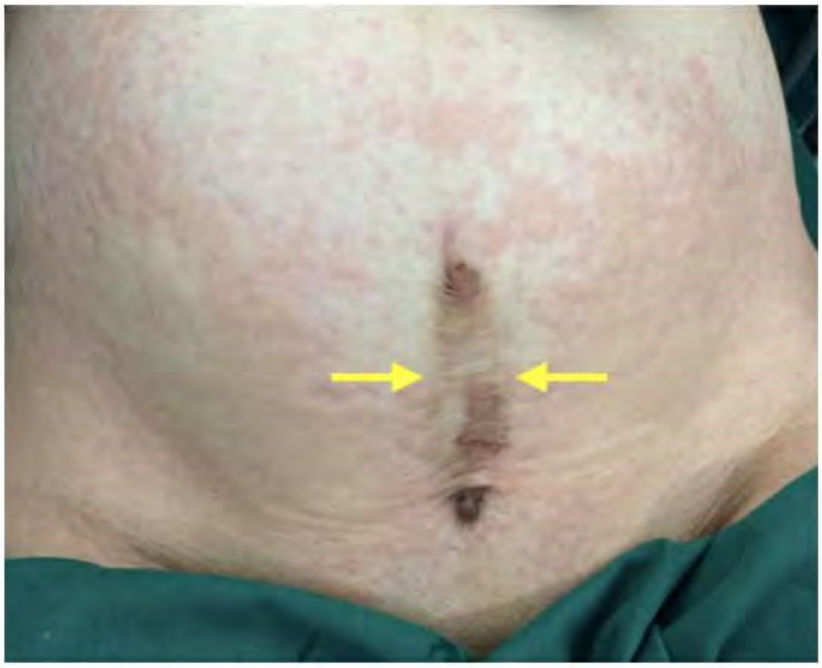

Fig. 1 The patient had undergone a cesarean section previously with midline abdominal incisional scar left. The yellow arrows point the actual block level.

Fig 1

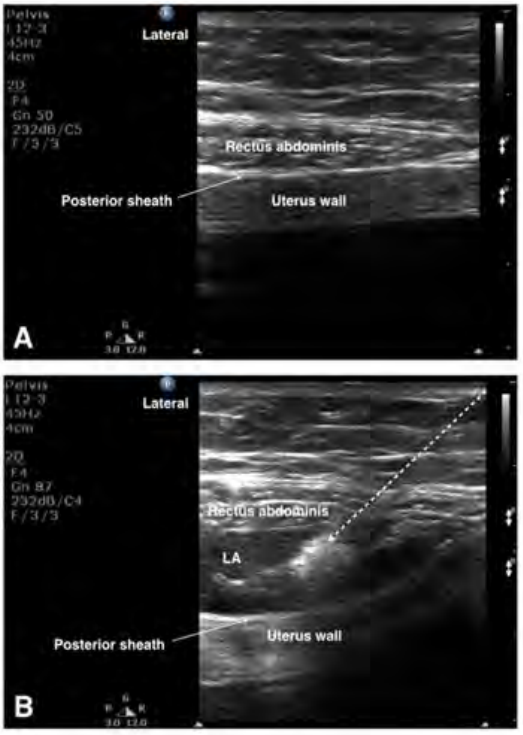

Fig.2 A. Ultrasound image shows the rectus abdominis muscle, the hyper-echogenic line beneath which is the posterior sheath. Inferior to the posterior sheath is the uterus wall. B. Ultrasound image shows the local anesthetic (LA) was injected in the space between rectus abdominis muscle and its posterior sheath. The dotted line represents the needle pathway.

Fig 2

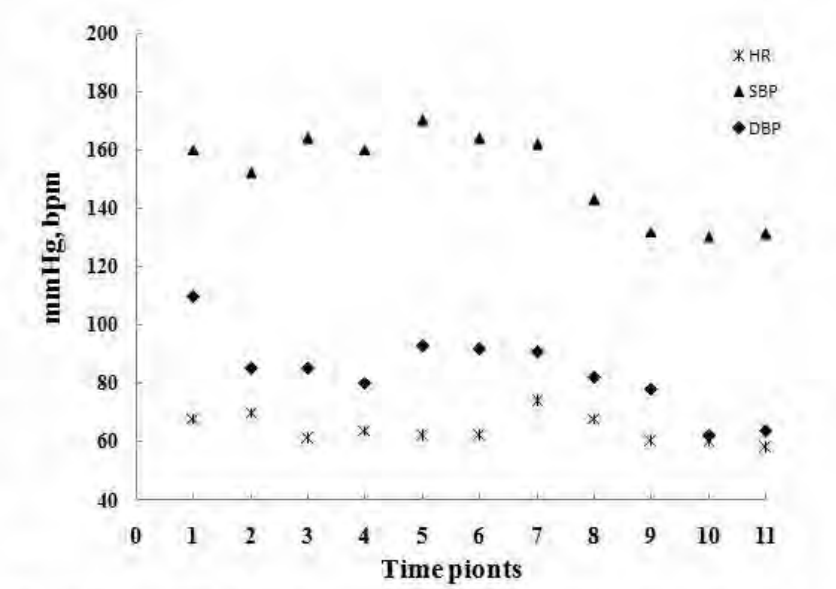

Fig. 3 Perioperative blood pressure and heart rate . Time pionts: 1= on admision, 2 = rectus sheath block, 3 = 5min before skin insicion, 4 = skin insicion, 5 = peritoneum insicion, 6 = induction, 7 = intubation, 8 = 2min post-intubation, 9 = baby delivery, 10 = 10min post-intubation, 11 = end of surgery.

Fig 3

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1482
Scientific abstract: Regional anesthesia

Continuous Paravertebral Nerve Blockade for Postoperative Analgesia after Pediatric Nuss Procedure, A CHP of UPMC Pain Management Protocol

Saifeldin Mahmoud, Tyson Smith, Yukli Elliott, Stefan Scholz, Barbara Gaines, Lendi Joy, Mihaela Visoiu
Children's Hospital of Pittsburgh of UPMC

Introduction

Postoperative pain after the Nuss procedure is severe, requiring a pain protocol that combines multimodal analgesia with a continuous regional technique [1,2]. Our goal is to implement an analgesic protocol that will minimize side effects from opioid consumption (respiratory depression, sedation, nausea, vomiting, constipation, and pruritis), adverse events (severe pain), and decrease length of hospital stay (goal is for discharge on postoperative day 4).

Materials and methods (NA for case report)

We performed a retrospective chart review and identified 30 pediatric patients who underwent the Nuss procedure and followed our protocol for pain control. Our Nuss Protocol includes bilateral continuous paravertebral catheters (PVBc) which are inserted before surgery, hydromorphone PCA with goal of transition to oxycodone on postop day 1, ketamine infusion, acetaminophen, gabapentin, cyclobenzaprine, and a nonsteroid anti-inflammatory agent. Postoperative numeric rating scale (NRS) pain scores and analgesic usage were collected. Total length of hospital stay and complications secondary to medications and regional technique were analyzed.

Results/Case report

Postoperative mean NRS pain scores are depicted in figure 1. Overall, the majority of patients had well-controlled pain with mean NRS scores ranging between 2.4 and 3.5. In figure 2, we divided our patient population into three groups representing mild, moderate, and severe pain.The intra-operative and daily morphine equivalent (ME) usage are depicted in figure 3. The hydromorphone PCA was discontinued on POD 1 in only 6 patients with the majority of patients (n=19) having their PCA stopped on POD 2. The PVBc were discontinued by POD 4 in all patients. Length of hospital stay ranged from 3.3 to 6.2 days (See Table 1). The overall goal for discharge was POD 4 which occurred in 19 patients (63%), with 5 patients (17%) being discharged early on POD 3. By POD 5, 25 patients (83%) were discharged home. The most common side effects were nausea (n=18) and pruritus (n=8). We did not encounter opioid-induced respiratory depression or any complications from our PVBc.

Table 1. Characteristics of participating patients in the CHP of UPMC Nuss Pain Management Protocol

		Patients (N= 30)
Age, years (SD)		14.7 (1.5)
BMI, (SD)		18.4 (1.9)
Sex, n (%)	**Female**	3 (10%)
	Male	27 (90%)
Surgical Time, min (SD)		87 (26)
Anesthesia Time, min (SD)		186 (34)
Length of Stay, days (SD)		4.6 (0.8)
Block Time, min (SD)		2 (7)
PACU Stay, min (SD)		131
Catheter duration, hours (SD)		78.8 (15)

Discussion

The children's hospital of UPMC Nuss protocol optimized the clinical management of pediatric patients undergoing thoracoscopic pectus excavatum repair. In a study done by Qi et al. [3], an ultrasound-guided PVB catheter for the Nuss procedure provided improved postoperative analgesia. In general, postoperative opioid use in the PACU was significantly decreased. For our patients, we advocate for a standardized multimodal approach which includes continuous bilateral PBVc with a combination of analgesics and adjunctive agents. Overall, the majority of patients have good pain control with no complications from regional anesthesia.

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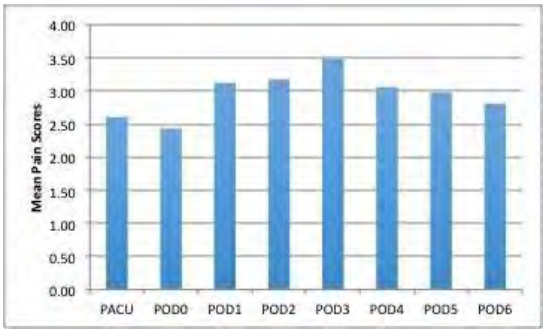
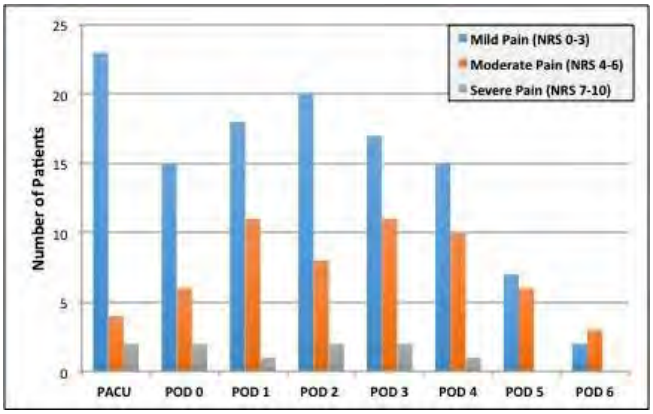
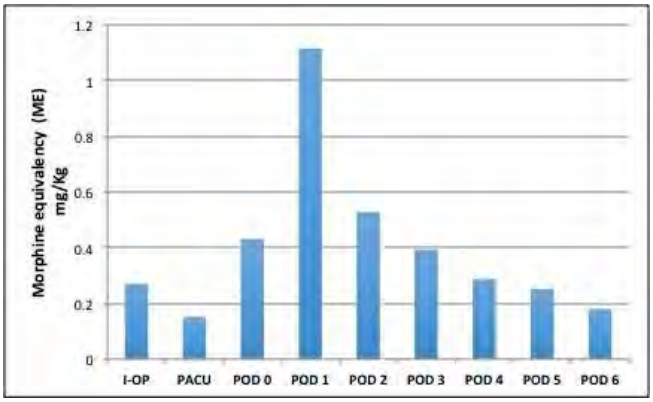
Tables/images



Postoperative Numeric Rating Scale (NRS) pain scores



Postoperative Numeric Rating Scale (NRS) pain scores categories



Daily Morphine Equivalence (ME) Usage mg/kg

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1483
Scientific abstract: Acute pain

Paravertebral Nerve Blocks for Adolescent Breast Surgery: A Children's Hospital of Pittsburgh of UPMC Clinical Pathway

Brent McNew, Lorelei Grunwaldt, Mihaela Visoiu
Children's Hospital of Pittsburgh

Introduction

Breast surgery is known to result in significant pain, as well as PONV in adults. Outcomes in adolescent breast surgery are likely similar to adults. By using a multimodal approach that includes paravertebral nerve blocks, we aim to reduce patients' pain to an acceptable level, decrease nausea/vomiting , facilitate earlier discharge, and improve patient/family/nurse satisfaction.

Materials and methods (NA for case report)

We performed a chart review of 48 pediatric patients who underwent 49 breast surgery procedures. Demographic data, paravertebral nerve block characteristics, intraoperative and postoperative analgesics consumption, and pain scores were examined. Complications, satisfaction with pain control, and discharge data were analyzed.

Results/Case report

17 (34.7%) males and 21 (42.9%) females underwent *bilateral mastectomy/breast reduction for bilateral gynecomastia/macromastia ,* respectively. 3 (6.1%) females underwent *bilateral surgery for breast deformity and symmastia.* 3 (6.1%) males and 5 (10.2%) females underwent *unilateral mastectomy for unilateral gynecomastia / breast deformity,* respectively.

Demographic Data

Age, years (Median, IQR)	16.2 (15.2 – 17.1)
Weight, Kg (Median, IQR)	70.7 (62.1 – 82.3)
Height , cm (Median, IQR)	164.59 (157.6 – 173.8)
Body Mass Index, kg/m^2 (Median, IQR)	26.7 (22.3 – 30.0)
Female, Number (%)	29 (59.2%)
Male, Number (%)	20 (40.8%)
American Society of Anesthesiology class, Number (%)	
I	26 (53.1%)
II	21 (42.9%)
III	2 (4.0%)

The blocks were performed under general anesthesia for 28 (57.1%) procedures and under sedation for 21 (42.1%) procedures. Ultrasound was used in 23 (46.9%) cases. The number of paravertebral levels performed (T3-T7) is presented in Table 2. The local anesthetic used was ropivicaine 0.5%; median (IQR) of 1.9 (1.7-2.2) mg/kg for bilateral blocks and a median (IQR) 1.8 (1.7-1.9) mg/kg for unilateral blocks. There were no major complications from paravertebral blocks.

Table 2

Paravertebral Levels Blocked			
Unilateral Surgical Procedures		*Bilateral Surgical Procedures*	
Number of Levels Blocked	*No. of Patients*	*Number of Levels Blocked*	*No. of Patients*
1	**3 (6.1%)**	*1*	**6 (12.2%)**

2	**5 (10.2%)**	*2*	**26 (53.1%)**
3	**0 (0%)**	*3*	**8 (16.3%)**
4	**0 (0%)**	*4*	**1 (2.0%)**

Perioperative Opioid Consumption

		No. (%)	Median mcg/kg	IQR mcg/kg
Intraoperative	*Fentanyl*	48 (98%)	1.9	1.4 – 2.5
	Morphine	17 (34.7%)	64.8	49.7 – 101.7
	Hydromorphone	4 (8.2%)	13.1	11.3 – 14.8
	Total oral morphine equivalents	48 (98%)	97	56.1 – 267.9
Recovery Unit	*Fentanyl*	25 (51.0%)	0.5	0.5 – 0.9
	Morphine	14 (28.6%)	49.0	37.2 – 50.0
	Hydromorphone	2 (4.1%)	5.7	*
	Oxycodone	1 (2.0%)	89.9	*
	Total oral morphine equivalents	32 (65.3%)	21.9	0.0 – 112.6

Intraoperatively, 10/49 (20.4%) received ketamine and 41/49 (83.7%) dexmedetomidine. 14/49 (28.6%) received ketorolac and 29/49 (59.2%) received intravenous acetaminophen either intraoperatively or in the recovery unit.

During the recovery room stay, median (IQR) NRS was 3.0 (0.3-5.0).

15/20 (75%) males were discharged from the recovery unit on the day of surgery with the remainder (25%) discharged on postoperative day 1. All female patients stayed overnight per surgical management protocol with 27/29 (93.1%) discharged on postoperative day 1.

22/49 (44.9%) of patients, their parents, and their recovery nurses had their satisfaction recorded. Median (IQR) patient, parent, and nurse satisfaction scores were 10.0 (9.3-10), 10.0 (10.0-10.0), and 10.0 (10.0-10.0) respectively.

Discussion

Thoracic paravertebral analgesia was effective for our patients and the patient, their families, and our recovery nurses were very satisfied with their pain control.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1485
Medically Challenging Cases (report of up to 4 cases)

Epidural Anesthesia for Laparoscopic Colorectal Surgery

Daniel Pak, Stephanie Cheng
Weill Cornell Medical College

Introduction

Laparoscopic surgeries are typically performed under general anesthesia with controlled ventilation. However, in patients who are at increased risk of morbidity with general anesthesia or postoperative pulmonary complications, such as those with preexisting respiratory disease, regional/neuraxial anesthesia may be used. We aim to provide an overview of the anesthetic considerations for utilizing epidural anesthesia during laparoscopic colorectal surgery in this case report, which has been very limited in the literature.

Results/Case report

An 89-year-old, 83 kg male with a large cecal adenoma was scheduled for a combined endoscopic and laparoscopic resection. Given the patient's chronic obstructive pulmonary disease, age, and strong preference for regional anesthesia, the decision was made to proceed using an epidural technique.

In the OR, standard ASA monitors were placed. The patient was placed in a sitting position, and a 17-gauge Hustead needle was introduced at the T9-T10 intervertebral space using the paramedian approach. The epidural space was identified using the "loss of resistance" to air method, and a 20-gauge epidural catheter was threaded 6cm cephalad from the needle tip. After securing the catheter, the patient was made to lie in the supine position. A 3cc test dose of 2% lidocaine with epinephrine (1:200,000) was given to exclude intravascular and intrathecal injection. An initial 8cc bolus of 2% lidocaine was then injected through the catheter and segmental sensory block (pinprick test) was confirmed ten minutes later from the L2-T4 dermatomes. Motor blockade was also confirmed. For sedation, dexmedetomidine was infused at 0.5 mcg/kg/hr for the duration of the case. Pneumoperitoneum with carbon dioxide was established at an intra-abdominal pressure of 7mm Hg at a flow of 2 L/min. The patient did not have any respiratory distress or acute episodes of hypotension. MAP's were maintained from 65-75mm Hg without vasopressor intervention. Intermittent 5cc boluses of 2% lidocaine were given for maintenance anesthesia. The patient did not complain of shoulder discomfort or nausea/vomiting. Total surgical time was 2 hours and 48 minutes.

The epidural catheter was removed immediately postoperatively, and the patient's recovery was uneventful with satisfactory pain control. He was discharged on postoperative day 1.

Discussion

Utilizing an epidural technique for laparoscopic surgery allows the patient to maintain his/her own airway and avoid the postoperative pulmonary complications associated with airway instrumentation and general anesthesia (i.e. atelectasis). It also facilitates early ambulation, less postoperative nausea, and better pain control.[1] This is particularly important when managing patients with pre-existing pulmonary issues, such as COPD.

The anesthetic goals for these cases include the following: achieving adequate sensory blockade, managing pneumoperitoneum and shoulder pain from diaphragmatic irritation, maintaining respiratory mechanics, and managing any potential hypotension from neuraxial blockade.[1,2]

Limitations of using an epidural anesthetic include block failure or intolerance to pneumoperitoneum requiring conversion to general anesthesia. Trendelenburg positioning, which increases intrathoracic pressure, may make the pneumoperitoneum particularly intolerable.[3] Aspiration is also a risk that must be considered in these patients.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1486
Scientific abstract: Regional anesthesia

Identification of the thoracic paravertebral space using predetermined depths based on bony anatomy

Rishi Agarwal, Barys Ihnatsenka, Linda Le-Wendling
University of Florida

Introduction

Thoracic paravertebral block (TPVB) is an advanced technical procedure due to its difficulty in achieving a consistent local anesthetic spread pattern, difficulty in recognizing correct target endpoint, and risk of pneumothorax **(1)**. We propose a technique to perform TPVB that takes advantage of the consistent relationship between the transverse process (TP), superior costotransverse ligament (SCTL), and thoracic paravertebral space (TPVS). Using measurements of multiple bony landmarks of the thoracic spine (taken from chest CT), we speculate that a predetermined advancement depth in combination with precise needle entry point and needle angulation is crucial in consistently guiding the needle safely into the TPVS.

Materials and methods (NA for case report)

After obtaining IRB approval, 50 adult chest CTs were used to obtain the following measurements **(Figure 1)**: anterior-posterior distance from skin to TP (skin-TP), skin to vertebral lamina (skin-VL), skin to pleura, lateral distance from spinous process (SP) to tip of TP (SP-TP), SP to edge of VL (SP-VL), TP to pleura, rib thickness, TP thickness, and anterior-posterior distance from TP to VL (TP-VL). Measurements were performed at 3 different thoracic levels: T2, T5-6, and T9-10. Patient height and weight were collected.

Results/Case report

Means were calculated for each of the measurements **(Table 1)**. Measurements of bony anatomy were consistent across different BMI ranges and at different thoracic levels, while measurements involving skin were variable.

Discussion

The thickness of the TP is on average 10mm, while depth of TP to pleura is on average 20mm. Therefore, if the proceduralist advances the needle by 10mm beyond the TP after making contact with and walking caudad to the TP, the TPVS should be reliably located without risk of pneumothorax. The SCTL runs obliquely from the inferior aspect of the TP above to the superior aspect of the rib below, making the AP dimension of the TPVS widest and the SCTL more superficially engaged when the needle enters caudad to the TP **(2)**. Walking cephalad once bony contact is made is not recommended since the rib tends to be cephalad to the corresponding TP, introducing unpredictability in depth of TPVS from bone.

However, this predetermined advancement depth of 10mm must be paired with thoughtful needle entry point placement and needle angulation. The optimal needle entry point on skin is slightly caudad to the inferior edge of the TP with angulation of about 15-30 degrees cephalad in order to allow the needle to touch the infero-lateral aspect of the TP. Once the needle makes contact with the TP, it is walked caudad to the TP, which would put the needle at an angle roughly perpendicular to the skin. Only then can the predetermined advancement depth of 10mm be reliable as an endpoint for TPVS localization independent of thoracic spine level or patient BMI.

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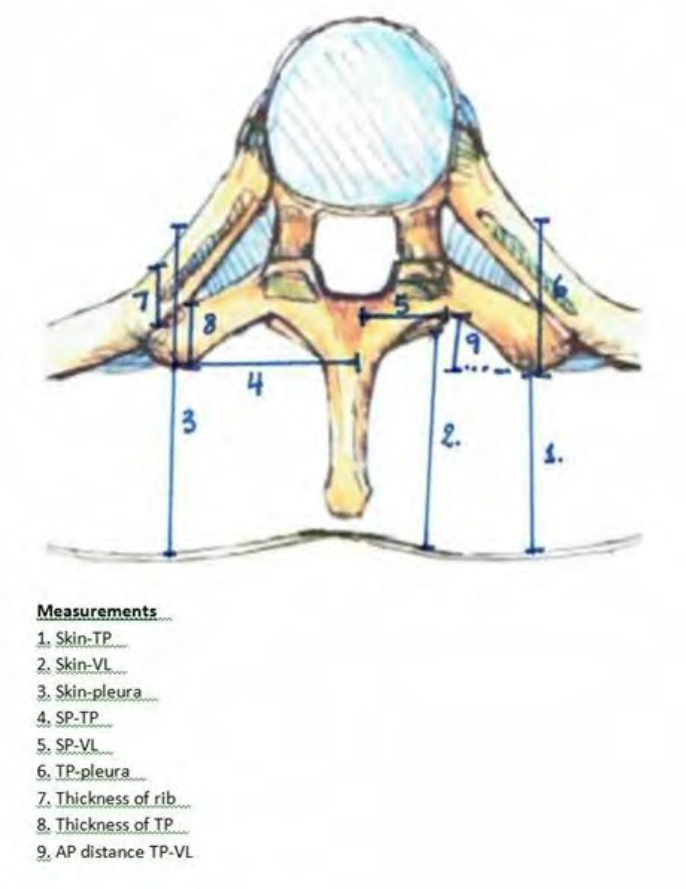

Figure 1. Anatomic landmarks measured at the thoracic spine.

	T2	T5-6	T9-10	T2	T5-6	T9-10	T2	T5-6	T9-10
Skin-TP	42	23	21	53	35	33	72	52	56
Skin-VL	47	33	30	58	43	42	76	61	66
Skin-pleura	68	43	43	74	54	57	94	72	81
SP-TP	30	28	24	31	28	25	30	27	25
SP-VL	20	17	18	21	17	19	20	17	18
TP-pleura	22	20	24	21	20	24	21	20	26
Rib thickness	10	16	17	9	16	17	10	15	16
TP thickness	11	8	11	11	8	11	12	9	12
TP-VL	10	11	10	9	9	10	10	9	10

Table 1. Mean distance (in millimeters) between anatomic landmarks of the thoracic spine in patients with BMI <20, 20-40, and >40.

LEGEND:
BMI <20
BMI 20-40
BMI >40
TP = transverse process, VL = vertebral lamina, SP = spinous process, AP = anterior-posterior

Table 1. Average distances between anatomic landmarks measured at T2, T5-6, and T9-10 in patients with BMI <20, 20-40, and >40.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1488
Scientific abstract: Regional anesthesia

Lumbar Plexus Catheter versus Fascia Iliaca Block in Total Hip Arthroplasty

Andrew Parsons, Kevin Winegar, Mike Kent
Walter Reed National Military Medical Center

Introduction

Lumbar Plexus catheters consistently show benefit in perioperative pain management following total hip arthroplasty (THA) [1-5]. However, insertion and maintenance of a lumbar plexus catheter is not without risk[6]. An alternative to alleviate postoperative pain following THA is the fascia iliaca block[7]. We sought to compare outcomes in patients undergoing THA treated with a fascia iliaca block single injection versus patients receiving a lumbar plexus catheter.

Materials and methods (NA for case report)

A retrospective chart review was performed of patients receiving either lumbar plexus catheters or a fascia iliaca nerve block prior to THA. All patients received a general anesthetic and were prescribed identical multimodal analgesic regimens postoperatively to include extended release oxycodone, acetaminophen, and celecoxib with as needed oxycodone and hydromorphone. Patients within the fascia iliaca group received 50-60cc of 0.375% ropivacaine under ultrasound guidance. Patients within the lumbar plexus catheter group received a preoperative catheter placement with 20-30 ml of 0.5% ropivacaine followed by a one day infusion of 0.2% ropivacaine. Outcomes measures included pain ratings within the PACU and the first two postoperative days (Numerical Rating Scale- NRS) and opioid usage.

Results/Case report

44 patients were reviewed with 24 patients receiving a fascia iliaca block and 20 patients receiving a lumbar plexus catheter. One-way ANOVA found a significant difference (p=0.026) on initial PACU pain scores between the lumbar plexus group (M = 1.0, SD = 1.94) and the fascia iliaca group (M = 2.88, SD = 3.08). Also, maximum PACU pain scores were significantly higher in the fascia iliaca group (M = 4.54, SD = 2.47) than the lumbar plexus group (M = 2.25, SD = 2.61) (p=0.005). The mean PACU opioid use (morphine equivalents) was significantly higher in the fascia iliaca group (M = 9.5, SD = 9.43) than in the lumbar plexus group (M = 3.58, SD = 7.73) (p=0.03). Mean pain scores were also compared on postoperative days (POD) 0, 1, and 2. Pain scores on POD 0 for the lumbar plexus group (M = 1.50, SD = 1.21) were significantly lower than pain scores for the fascia iliaca group (M = 2.45, SD = 1.59) (p=0.0). While pain scores during the first 24 hours were less in the lumbar plexus group, no significant differences were noted on day 1 or 2. Furthermore, no differences were found between the groups when comparing total opioid usage and length of hospital stay.

Discussion

Fascia iliaca blocks have been utilized for analgesia following THA, however efficacy has not been determined by randomized trials. The appeal of a single injection for post-operative analgesia prior to the procedure is alluring. Further, as an advanced regional technique that must be planned around anticoagulation, widespread use of lumbar plexus catheters may be limited and confers greater risk. However, in this chart review, lumbar plexus catheters had significantly better pain scores in the PACU and first 24 hours following surgery when compared to fascia iliaca blocks. Further study is needed to determine if the fascia iliaca block is an effective option for post-operative analgesia following THA.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1489
Scientific abstract: Regional anesthesia

Case Report: Selective Ultrasound-Guided Sensory Nerve Blocks For Total Knee Arthroplasty

John DaSilva, McRuiz Joseph Tyler, Strebel Joseph, Daniel Gianoli, Kevin Finkel
Integrated Anesthesia Associates

Introduction

Sensory nerve radiofrequency ablation (RFA) is a well documented therapy for chronic pain associated with both knee osteoarthritis and pain following total knee arthroplasty (TKA).[1,2] The reliable anatomic location of several articular sensory branches with respect to osseous anatomy allows diagnostic blocks to be performed using fluoroscopy prior to RFA.[3] As fluoroscopy is typically unavailable in the perioperative setting and is a source of ionizing radiation, we describe an alternative technique using an ultrasound-guided periosseous, subfascial technique as a way to provide motor sparing, sensory analgesia in the perioperative setting.

Materials and methods (NA for case report)

NA

Results/Case report

A fifty-eight year old man with an uncomplicated past medical history presents for a primary left TKA secondary to chronic, bilateral knee pain from advanced osteoarthritis. He had no previous lower extremity operations or significant injuries.

In addition to our usual adductor canal catheter and a posterior capsule infiltration technique targeting articular branches from the tibial nerve, [4] we performed periosseous infiltration at multiple sites targeting sensory articular branches of the anterior capsule.

A 15 mHZ linear array probe was used to identify the femur and tibia in a longitudinal orientation. The probe was centered at the metaphysis, which is the approximate location of the geniculate artery. An in-plane needling technique targeting the sensory articular branches associated with superior lateral (SL), superior medial (SM), and inferior medial (IM) genicular arteries was used. Using the genicular arteries as landmarks, we advanced our needle until contacting the periosteum of the femur or tibia.[5] A periarteriolar, periosseous infiltration was performed adjacent to the above mentioned arteries using 3-5 ml of 0.5% ropivacaine, creating a sub-fascial, periosteal spread at each injection site.

With the addition of these periosseous infiltration sites our patient had an immediate reduction in pain scores (5/10 to 0/10) without a motor block, and excellent postoperative pain control.

Discussion

This case illustrates that purely sensory articular nerve branches, typically blocked under fluoroscopy, can be blocked with ultrasound imaging using our above described technique. Furthermore, this technique may be a useful method for improving pain control in the perioperative setting that minimizes postoperative muscle weakness. Additional studies are needed to evaluate its efficacy and effectiveness on postoperative pain control in comparison to other perioperative pain control methods.

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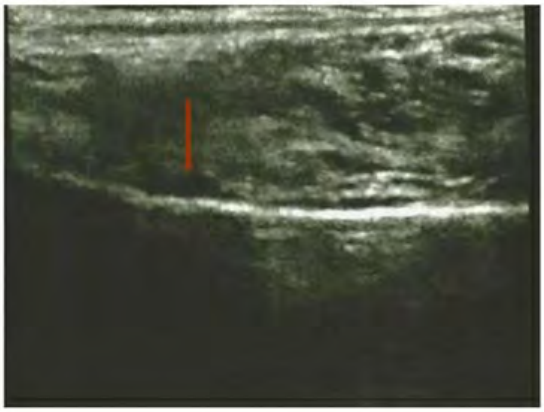
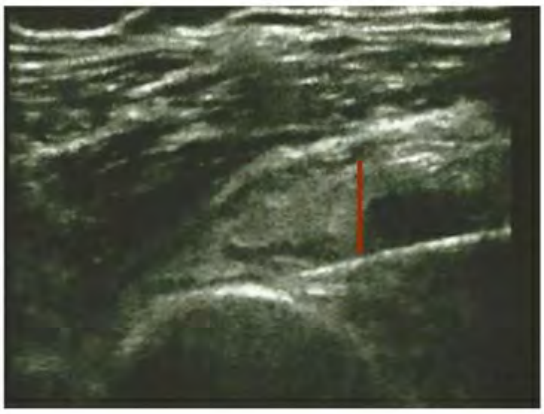
Tables/images



Ultrasound image of the femur in the longitudinal orientation. The arrow indicates the approximate location of the geniculate artery in the metaphysis.



An ultrasound image of an in-plane of the needle (arrow) contacting the femur.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1490
Scientific abstract: Regional anesthesia

Randomized comparison of popliteal-sciatic catheter tip migration in a cadaver model using over-the-needle versus through-the-needle catheter designs

Lauren Steffel, Steven K Howard, Lindsay Borg, Edward Mariano, Jody Leng, T. Edward Kim
Stanford University School of Medicine

Introduction

Effective analgesia with perineural catheters is dependent upon accurate tip placement near target nerve or plexus. Recently, over-the-needle (OTN) catheters have emerged, but the influence of this new catheter design on risk of catheter tip migration is not well known. We designed this study to test catheter tip migration between OTN and traditional through-the-needle (TTN) catheters for ultrasound-guided short-axis in-plane (SAX/IP) insertion.

Materials and methods (NA for case report)

With VA research committee approval and IRB exemption, we evaluated the migration of popliteal-sciatic catheters in a prone unembalmed male cadaver. Thirty catheter placement trials were divided randomly into two groups based on catheter type (Figure 1): OTN (On-Q Quikbloc, Halyard Health, Alpharetta, GA) or TTN (Arrow FlexTip Plus, Teleflex Medical, Research Triangle Park, NC) modified to enhance tip echogenicity as described previously. Catheters were placed SAX/IP by a single anesthesiology resident then examined by ultrasound before and after ipsilateral knee range of motion (ROM) exercises (0-130° flexion). Caliper measurements were performed by one blinded expert, with secondary confirmation by an additional blinded expert. The primary outcome was change in catheter tip to center of nerve distance (cm) from pre- to post-ROM. Non-normally distributed data were compared using the Mann-Whitney U test. Difference in proportion of catheters dislocated out of the nerve compartment was analyzed using Barnard's exact test. $P<0.05$ was statistically-significant.

Results/Case report

Change in tip-to-nerve distance [median (10th-90th percentiles)] was 0.06 (-0.16-0.23) cm for TTN versus 0.00 (-0.12-0.69) for OTN ($p=0.663$). However, there was a difference in proportion of popliteal-sciatic catheters dislocated out of the nerve compartment after ROM: 0/15 for TTN versus 4/15 for OTN ($p=0.043$).

Discussion

Although there was no effect on change in measured migration distance of popliteal-sciatic catheters using different catheter designs, 27% of OTN catheters were dislocated out of the nerve compartment. These results may influence choice of catheter equipment when using SAX/IP insertion techniques.

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Tables/images

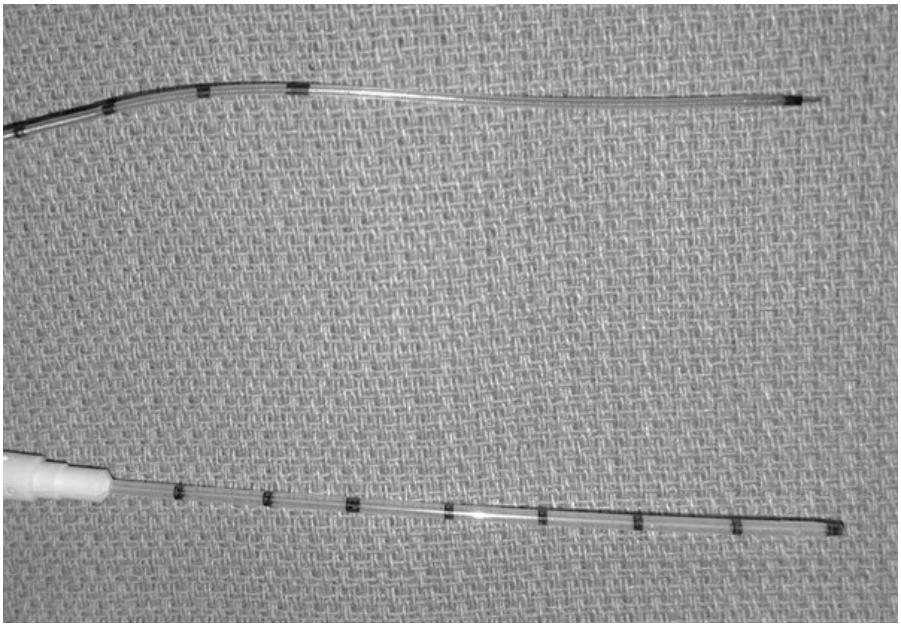

Image showing the two catheter designs included in this study: through-the-needle flexible epidural catheter (top) and over-the-needle catheter (bottom).

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
Dr. Mariano has received unrestricted educational program funding paid to his institution from Halyard Health (Alpharetta, GA) and B Braun (Bethlehem, PA). These companies had no input into any aspect of the present study design and implementation, data collection, analysis and interpretation, or manuscript preparation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1491
Medically Challenging Cases (report of up to 4 cases)

low dose caudal epidural steroid injection for chronic pelvic pain

Preetika Kataria, Aman Upadhyay, Vivek Loomba
Henry Ford Hospital

Introduction

Chronic rectal and perineal pain, of unknown etiology can be very debilitating and frustrating for both the patient and the physician treating it. In some cases, the underlying etiology can be found out like prostatitis, autoimmune disorder and can be treated, thereby relieving the pain.

In a majority of patients, this pain can have no underlying etiology. It can have a significant impact on the quality of life of the patients and can be very difficult to treat. We present here a case of 80 year old patient who was seen in our pain clinic for chronic pelvic pain and got relief from a low dose caudal epidural steroid injection.

Results/Case report

An 80 year old patient, with chronic pain in the rectum for over 5 years was referred to our pain clinic. She described it as a sharp, intermittent, burning pain worsened on sitting down. MRI of the pelvis was unremarkable. An EMG of the pudendal nerve showed prolonged latency on the right side. She had tried NSAIDs, acetaminophen and gabapentin 3600 mg daily without much relief.

We tapered her off gabapentin and initiated her on pregabalin and nortriptyline 10 mg nightly. She also underwent a pudendal nerve block and a subsequent ganglion impar block without any relief. We then performed a caudal epidural steroid injection with 3 ml of 0.25% bupivacaine, depomedrol 80 mg and 6 ml of 0.9% normal saline. She had immediate and complete pain relief after the procedure. Her pain score decreased from 8/10 pre-procedure to 0/10 post-procedure on visual analogue scale (VAS). She continues to have significant pain relief 3 weeks after the procedure.

Discussion

Chronic perineal pain can be very debilitating. The common causes of perineal pain in men are prostatitis, enlarged prostate, urinary dysfunction, pelvic pain syndrome and common causes in women are interstitial cystitis, trauma, neuropathy and urinary dysfunction. However, the pathophysiology of chronic perineal pain can be complex and multifactorial.

Medication management usually includes analgesics like acetaminophen, NSAIDS, neuroleptics, and tricyclic antidepressants. Other treatment options include acupuncture, physical therapy, psychotherapy, nerve blocks and neuromodulation. Each modality seems be effective in a different subset of patient.

There has been only one case report of pain relief with low dose caudal epidural injections in a patient with chronic perineal pain.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1494
Scientific abstract: Chronic pain

Treatment of severe gastroparesis requiring TPN with intrathecal low dose bupivacaine

Robin Slover, Seth Eisdorfer
University of Colorado - Children's Hospital

Introduction

Gastroparesis and failure to thrive is a growing problem in pediatric pain populations. If severe enough, it leads to enteral feeding protocols (gastrotomy or jejunostomy tubes) to maintain nutrition. In some children these measures fail and total parenteral nutrition (TPN) is needed, with its high risk of line infections and eventual death.

Materials and methods (NA for case report)

n/a

Results/Case report

We wish to report a case of a three year old female, diagnosed with severe gastroparesis and failure to thrive at age four months who had poor growth, severe abdominal pain without another known cause and who could not receive adequate nutrition for normal growth due to pain. She was referred to the chronic pain clinic where, after maximum medical management, a celiac plexus block was performed with a marked improvement in amount of formula tolerated for several days. Before the block she could only be fed 5 cc per hour through her gastrostomy tube without severe pain; after the block she could have 20 cc per hour for four days. Over time she progressed to TPN and had a number of line infections. After discussing care options, an epidural trial was done based on the successful celiac block. It was also very successful, allowing titration back to gastrotomy feeds of sixty cc per hour. An intrathecal pump was placed, using low dose bupivacaine, which has allowed full gastrotomy feeds and now a program of beginning oral feeds. She has reached normal growth parameters for the first time in her life at age three.

Discussion

This case demonstrates the use of a regional approach to help in the management of a difficult and increasingly common problem. The positive celiac block response with marked improvement from 5 cc to 20 cc an hour suggested that blockade of her plexus could be helpful. Due to her age, medical management was tried as long as possible. When she started to develope life threatening infections then an intrathecal pump was considered. Bupivacaine is an approved drug but this use is unusual if not technically off label due to age. Baclofen was added to the pump for smooth muscle relaxation and to replace her oral Baclofen. Her response has been very positive. We suggest that this protocol be considered in other children with gastroparesis of unknown origin and continued failure to thrive despite adequate medical intervention.

References

n/a

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1495
Scientific abstract: Case series (5 or more patients)

Effectiveness of Regional Anesthesia for En Route Pain Control in Amputee Patients Undergoing Aeromedical Evacuation

Michael Prokop, Jeffrey Carness, Mark Lenart, Melissa Wilson, Danny Smith, Susan Dukes
Naval Medical Center Portsmouth

Introduction

There is much debate and little data regarding the appropriate analgesic management of patients undergoing medical evacuation following combat trauma. Regional anesthesia is an established modality for providing perioperative analgesia with applications now expanding beyond the operating room and closer to the point of injury. This may meet a growing need for effective analgesic therapy for the ever increasing number of combat wounded military service members. Thus, our objective was to qualify and quantify the utility of regional anesthesia throughout the medical evacuation process when applied to the treatment of acute pain associated with combat trauma.

Materials and methods (NA for case report)

A retrospective cohort study was conducted upon IRB approval, whereby amputee patients were identified through the use of the US Transportation Command's patient movement database. The Theater Medical Data Store was then cross-referenced for additional patient data collected from the medical documentation as they were transported from Kandahar Air Field or Camp Bastion, Afghanistan, through the evacuation process until arrival in the US.

Results/Case report

Eighty-four records (42 regional and 42 controls) were retrieved from TMDS. All 84 subjects were men with traumatic amputations ranging in age from 19-40 with a mean of 24 years. Twenty-one patients in the regional group and 26 patients in the non-regional group suffered double limb amputations. All 84 patients were victims of Improvised Explosive Devices. Of the 42 regional techniques, 33 patients received isolated epidurals, 4 patients received upper extremity peripheral nerve catheters in addition to an epidural, and 5 patients received sole peripheral nerve catheters (femoral / sciatic). The majority of interventions remained in place in direct relation to the duration of en route care provision (26/42). This averaged approximately 5.26 (± 1.81) days for the regional patients and 5.98 (± 3.22) days for the control patients ($p = .393$). Additionally, there was a significant difference between opioid consumption (measured in morphine equivalents) between regional and non-regional patients at each leg of the medevac process ($p < .01$). Pain scores were sporadically reported and not statistically different. Both descriptively and anecdotally, the rate of supplemental ketamine administration seemed to progressively decrease from 16 ketamine infusions in the non-regional anesthesia group in theater, to 3 ketamine infusions in the non-regional anesthesia group during transport from Landstuhl to the Continental United States. Despite the apparent difference, it was not deemed statistically significant (likely secondary to a small data pool – p-values .162 – .637 for the different legs of medical evacuation). As a secondary endpoint, a statistically significant difference in sedation and intubation between patients in the regional anesthetic and non-regional anesthetic groups was noted throughout the medical evacuation process.

Discussion

Our analysis demonstrates the utility of applying regional anesthetic techniques for pain management to our combat wounded trauma patients throughout multiple stages of aeromedical evacuation with en route care. The benefits include the potential for less sedation and less opioid consumption while foregoing the need for intubation during transport. Additionally, we identified the need for an improved method of pain score data recording, which would facilitate further studies to better characterize the role of regional anesthesia in our combat wounded veterans.

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Tables/images

Kandahar Airfield


Bagram Airfield

Landstuhl --> CONUS

Landstuhl --> CONUS

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1497
Scientific abstract: Acute pain

Addition of transversus abdominis plane infiltration with liposomal bupivacaine to intrathecal morphine for postoperative analgesia after caesarean delivery: a retrospective study.

MacKenzie Quale, Grace Cunningham, Cody Foster, Jacob Hutchins
University of Minnesota

Introduction

Studies suggest that TAP infiltration is an effective analgesic option capable of reducing 24 hour opioid consumption, 24 hour rest pain scores, and PONV in patients undergoing cesarean delivery who receive a multimodal analgesic regimen that excludes intrathecal morphine [1], but no study has combined the use of liposomal bupivacaine and intrathecal morphine. The purpose of this study was to determine if the addition of a TAP block with liposomal bupivacaine to intrathecal morphine provided any benefit over intrathecal morphine alone following scheduled cesarean section.

Materials and methods (NA for case report)

This was a retrospective University of Minnesota IRB approved review of 105 patients who underwent cesarean delivery from March 2015 to May 2015. The TAP blocks were placed bilaterally under ultrasound guidance in the PACU by trained anesthesiologists or a supervised resident. The TAP infiltration consisted of 10 mL of 0.25% bupivacaine followed by 20 mL of 50:50 mixture of liposomal bupivacaine and saline. This was repeated on the contralateral side. Pain scores were obtained by OB nursing staff or by pain nurse practitioners multiple times a day. EMR charts were reviewed to obtain opioid use, non-opioid pain medication use, pain scores, adverse events, and length of stay.

Results/Case report

There were 65 patients in the no TAP group and 40 patients who received a TAP block. There was no significant difference in the baseline characteristics of the two groups. The mean dose of intrathecal morphine was 0.22mg (SD 0.04) for no block versus 0.22mg of morphine (SD 0.05) TAP. The mean opioid usage in mg of morphine equivalents was 1.08 (SD 2.5), 9.9 (SD 8.9), 16.9 (SD 8.9), 16.5 (SD 10.2), and 43.1 (SD 22.7) in the PACU, at 0-24 hours, 24-48 hours, 48-72 hours, and total for TAP block. The mean opioid usage in morphine equivalents was 1.5 (SD 4.1), 57 (SD 7.0), 15.4 (SD 8.7), 13.4 (SD 9.5), and 34.4 (SD 20.2) in the PACU, at 0-24 hours, 24-48 hours, 48-72 hours, and total for patients who did not receive a TAP block. There was a significant decrease in maximum pain score in the TAP group compared to no TAP group from 0-24 hours ($p=0.006$), 24-48 hours ($p<0.0001$), and 48-72 hours ($p=0.007$). There also was significant decrease in opioid use in the TAP group compared to no TAP group from 0-24 hours ($p=0.01$), and total opioid usage ($p=0.048$). 13 patients in the control group had reported nausea and vomiting and 2 patients in the TAP group reported nausea and vomiting, which was also significantly different ($p=0.04$). There was no difference in length of stay.

Discussion

These findings suggest that the use of liposomal bupivacaine in TAP blocks when combined with intrathecal morphine may provide superior pain relief when compared to intrathecal morphine alone. Future studies should focus on a randomized prospective trial.

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Disclosures

I confirm that I am aware of conflicts of interest in my presentation.

Details:
Jacob Hutchins is on the speaker's bureau, is a consultant, and has funded research from Pacira Pharmaceuticals. He also is on the speaker's bureau of Halyard Health.
The others have nothing to disclose.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1501
Medically Challenging Cases (report of up to 4 cases)

Gluteus Tendon Tear: Often Unrecognized Cause of Hip pain

Markand Patel, Aman Upadhyay, Vikas Shah
Henry Ford Hospital

Introduction

Greater trochanteric pain syndrome (GTPS), also known as Trochanteric Bursitis, is a term used to describe chronic pain overlying the lateral aspect of hip. This pain syndrome is thought to origin from inflammation of trochanteric bursa overlying greater trochanter between the insertion of gluteus medius and gluteus minimus muscles. The incidence of greater trochanteric pain is reported to be approximately 1.8 patients per 1000 per year with the prevalence being higher in middle age women, and patients with coexisting low back pain, osteoarthritis, iliotibial band tenderness, and obesity. It is characterized by pain in the lateral hip, sometimes radiating to groin, lower back and up to the lateral part of knee. It may be a manifestation of an injury but in most cases, etiology is unknown. Sometimes, inflammation of bursa may be secondary to disease of gluteal tendons. Physical examination reveals point tenderness over the posterolateral part of greater trochanter. Generally, imaging studies fail to show exact pathology and diagnosis is often solely clinical. Most cases of trochanteric bursitis are self limiting but sometimes can be very debilitating, affecting quality of life, missed days at work and inappropriate opioid use. Most cases respond to NSAIDS, muscle relaxants, physical therapy and lifestyle modification. Cases unresponsive to conservative treatment respond very well to local anesthetic and steroid injection. Very rarely, in severe cases, surgical resection may be necessary. Recently, extra corporeal shockwave therapy has been described for associated tendinopathy with variable success

Materials and methods (NA for case report)

NA

Results/Case report

We have a 64 years old female with past medical history of CAD, depression suffering from bilateral lower back and hip pain for more than 6 months. She had pain over the lateral aspect of both hips with point tenderness over the trochanter that would prevent her from sleeping on side. Pain got worse with activity, climbing stairs and lifting heavy objects. Provocative tests for lumbar facet, SI joint and HIP joint were either negative or equivocal. Patient denied trauma or accidents. She had failed multiple conservative measures including NSAIDS, trial of Opiates, physical therapy and lifestyle modifications. Initial imaging studies of Hip joints and lower lumbar spine failed to explain her symptoms. She received multiple interventions including steroid injection of bilateral Hip joint, bilateral sacroiliac joint, bilateral trochanteric bursa and lumbar facet joint, without any significant pain relief. It was very frustrating to her as it affected quality of life and activities of daily living. We ordered MRI without contrast of both hip joints with pelvis that showed tear of bilateral gluteus minimus muscles at the site of insertion. We referred her to orthopedic surgery for possible surgical intervention.

Discussion

As discussed earlier, trochanteric bursitis is fairly common and easily treatable condition. But in unique cases as ours, high level of suspicion and vigilance should be maintained and other uncommon pathologies should be sought for, especially after multiple failed interventions. From our case, once again, we learn that along with clinical acumen, support from imaging studies may guide us to correct treatment, lessen suffering and improve patient outcomes

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1503
Medically Challenging Cases (report of up to 4 cases)

Erythromelalgia : A dilemma for the pain physician

Preetika Kataria, Shawn Patel, Aman Upadhyay, Vivek Loomba
Henry Ford Hospital

Introduction

Erythromelalgia is a rare condition which primarily affects the feet and less commonly the hands. It is characterized by an intense burning pain of the extremities, erythema and increased skin temperature that may be episodic or continuous in nature. The incidence of this disease has been estimated at 1.3/ 100,000 and it can be primary or secondary. While primary is caused by mutation of the sodium channels, secondary is caused by small fiber peripheral neuropathy of any cause like polycythemia vera, essential thrombocytosis, autoimmune disorders.

Results/Case report

A 68 year old female with erythromelalgia presented to our pain clinic with a 5 year history of episodic, burning pain and flushing of the bilateral lower extremities worsened with standing and walking. Elevation and cooling of lower extremities provided her some short term relief of pain. She had been on acetaminophen, NSAIDs, and gabapentin 800 mg tid without much relief of symptoms. We started her on Nortriptyline 25 mg HS. Within 2 weeks of initiation of nortriptyline therapy, she had good pain relief. She continues to have excellent relief of symptoms with a profound improvement in her functionality.

Discussion

Erythromelalgia , also previously known as Mitchell's disease is a rare neuropathic pain disorder in which blood vessels, usually in the upper or lower extremities become blocked episodically. There is severe pain in the small fiber sensory nerves. There is no characteristic diagnostic test. Diagnosis is usually made based on history and physical examination during the episodes. Thermography can reveal increased temperature in the affected area, however it is not required for diagnosis. An abnormal expression of the sodium channel is linked to the neuropathic pain in this disorder. Yang et al reported that mutations in SCN9A gene which encodes Nav 1.7 sodium channel produces a hyperpolarization shift in activation and slow deactivation of sodium channels causing the sodium channels to remain open for extended periods of time. A universally effective treatment for erythromelalgia is unknown. The first line of treatment for this condition is serotonin/ norepinephrine reuptake inhibitors, selective serotonin reuptake inhibitors, gabapentin and calcium channel antagonists. The second line of treatment is considered to be propanolol and serotonin antagonists. There has been only one case report of remission with amitriptyline. Nortriptyline is a tricyclic antidepressant (TCA), which at higher doses is used as an antidepressant, but at lower doses stabilizes sodium channels to help decrease neuropathic pain. Our case is one of the rare cases of erythromelalgia in which the patient had complete pain relief with a TCA and did not need any further procedures.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1505
Scientific abstract: Regional anesthesia

A Cadaveric Study of Injectate Spread Associated with the Transmuscular Quadratus Lumborum Block

Kariem El-Boghdadly, Sanjib Das Adhikary, Zeinab Nasralah, Nabeel Sarwani, Anne M. Nixon, Ki Jinn Chin
Toronto Western Hospital, University of Toronto

Introduction

The ultrasound-guided transmuscular quadratus lumborum block (TM-QLB) involves deposition of local anesthetic in an interfascial plane between the quadratus lumborum and psoas major muscles with the aim of achieving cephalad spread to the thoracic paravertebral space under the transversals fascia (1). However, there is evidence that local anesthetic may also track caudally under the transversalis fascia to involve branches of the lumbar plexus (2, 3). The aim of this cadaveric study was to elucidate the extent of spread following ultrasound-guided TM-QLB, using both radiographic imaging and anatomic dissection.

Materials and methods (NA for case report)

Following Institutional Review Board approval, ultrasound-guided TM-QLB was performed on each side in 5 fresh cadavers (10 hemi-abdomens) using 20 ml of a mixture of methylene blue with radio-contrast dye. Computed tomography (CT) imaging was performed on 4 cadavers (8 hemi-abdomens) 30 minutes post-injection, and the radiographic distribution of injectate was assessed. Anatomic dissection was performed on each cadaver within 24 hours of injection to identify the extent of methylene blue staining.

Results/Case report

Radiographic Spread (8 specimens)

There was medial spread of the injectate involving the psoas muscle in all specimens. There was further medial spread to the lumbar paravertebral space in 5 (63%) specimens. Lateral spread reached the lateral border of quadratus lumborum in all cases, and further to the transversus abdominis muscle in 50% of specimens. The caudal extent of spread reached the level of the L4 transverse process in all specimens, the anterior superior iliac spine in 5 (63%) specimens, and extended below the pelvic rim in 2 specimens. The cephalad extent of radiographic spread reached the L1 transverse process in all specimens, and extended to the T12 transverse process in 2 (25%) specimens (see Figure 1). There was no visible injectate spread beyond the diaphragm into the thoracic cavity in any specimen.

Anatomical Spread (10 specimens)

Methylene blue staining of the quadratus lumborum was seen in 8 (80%) specimens, whilst psoas staining was visible in 6 (60%) specimens. There was dye staining of the lumbar plexus branches as follows:

- Ilioinguinal nerve - 100%
- Iliohypogastric nerve - 70%
- Lateral femoral cutaneous nerve - 70%
- Genitofemoral nerve - 20%
- Subcostal (T12) nerve - 50% of specimens

Discussion

We have demonstrated that the TM-QLB in fresh cadavers produces spread extending over the entire ventral aspect of the posterior abdominal wall in the lumbar region (L1-L5). There was observed spread to the lumbar paravertebral area and upper branches of the lumbar plexus in the majority of specimens. Contrary to preliminary reports in live subjects (1), we did not observe cephalad spread under the arcuate ligaments of the diaphragm into the thoracic paravertebral space. The TM-QLB may therefore be less an abdominal wall block, and more an alternative to lumbar plexus block

in providing analgesia of the inguinal region, hip and upper thigh. Fall precautions should be observed in patients receiving this block (3).

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Tables/images

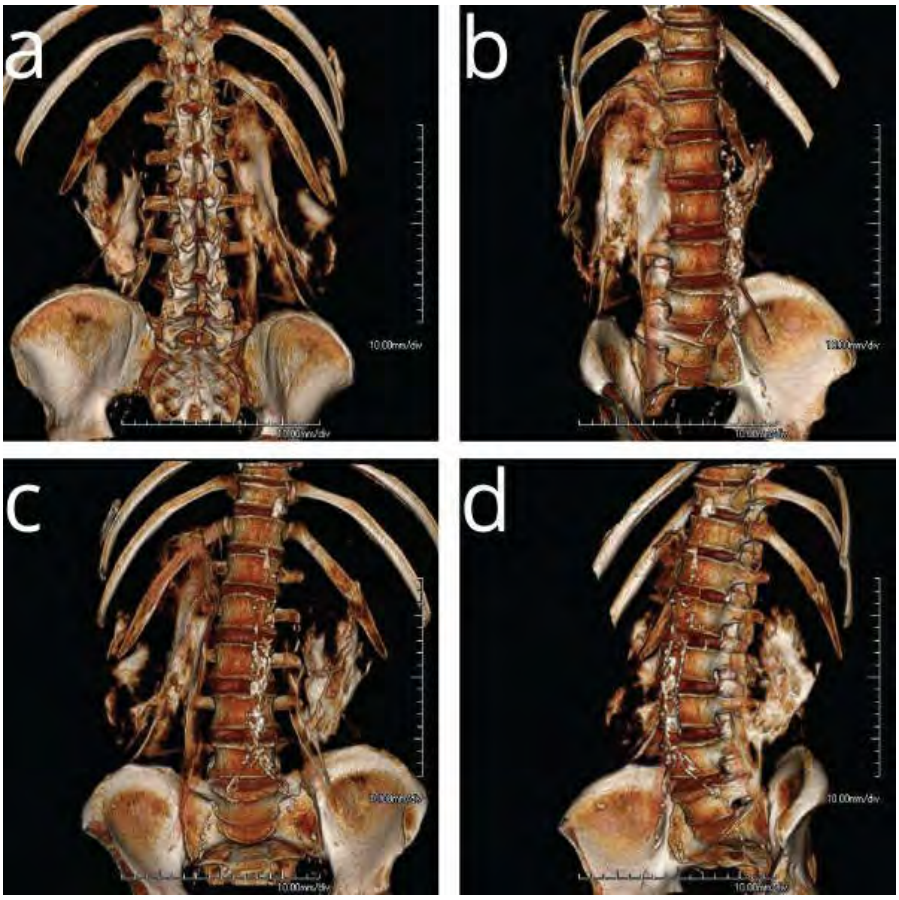

Figure 1. Three-dimensional reconstructions of dye injectate in a single cadaver showing spread to T12 and lumbar paravertebral area. a. posterior; b. right oblique; c. anterior and d. left oblique.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1507
Scientific abstract: Chronic pain

A Case Report of Phantom Limb Pain Relief with Selective Dorsal Root Ganglion Stimulation over Spinal Cord Stimulation Following a Simultaneous Implantation Trial.

David Mills, Eric Helm
University of Pittsburgh Medical Center

Introduction

Phantom limb pain following traumatic amputation has long been documented in the medical literature. As a result, multiple pain generators have been targeted over the years. Neuromodulation interventions, primarily spinal cord stimulation (SCS) and dorsal root ganglion stimulation (DRG), are gaining increased interest. Several studies have looked at the efficiency of these treatments individually. We are reporting a case study of a 56 year-old female trialed simultaneously with a SCS and DRG for phantom limb pain following traumatic transtibial amputation. We obtained patient approval for presenting this case.

Results/Case report

The patient was referred for interventional neuromodulation evaluation after three years of persistent right lower extremity phantom limb pain. The phantom limb pain was specifically localized to the entire foot region. She had undergone multiple treatment modalities including physical and occupational therapy, prosthesis adjustments, and medications. Her current medications were Pregabalin 150mg BID, Amitriptyline 100mg HS, and Hydrocodone-Acetaminophen 5/325mg. After evaluation, she first underwent SCS lead advancement into the posterior epidural space under live fluoroscopic guidance with placement of a 16 contact electrode spanning from the bottom of the T10 vertebral body to the top of the L1 vertebral body. She reported appropriate paresthesias in the area of her previously documented right ankle and foot phantom pain. Because she was not getting strong enough stimulation in the right phantom foot, an eight contact electrode was then placed at the L5 dorsal root ganglion. She reported much better paresthesias in the right phantom ankle and foot. On follow-up 5 days later, for trial stimulator removal, she reported about a 50% relief from the posterior epidural spinal cord stimulator but an 80% relief from the dorsal root ganglion stimulator at the right L5 level. She reported that the burning pain in her right phantom foot still persisted slightly but that it gave her a sense of proprioception when walking or climbing ladders. She subsequently elected to undergo definitive placement of the DRG stimulator at the right L5 nerve root 11 weeks later. On six week follow-up from definitive placement she reported a 75% improvement, was no longer taking pregabalin, and had significantly decreased her usage of hydrocodone-acetaminophen.

Discussion

This is a unique case in that the same patient was trialed simultaneously with a SCS and DRG. Recent studies have reported mixed efficacy of SCS and DRG in the treatment of phantom limb pain, but have noted that a benefit of DRG over SCS is its ability for more targeted coverage. This benefit was supported in the aforementioned case as her phantom pain was better covered by the DRG stimulation. Limited in this case report is the long-term efficiency, which has also been called into question in recent reports. Moving forward simultaneous trials of SCS and DRG may be of benefit in further distinguishing the benefits and challenges of each approach.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1509
Scientific abstract: Chronic pain

Telemedicine Delivered Cognitive Behavioral Therapy (CBT) Reduces Pain Catastrophizing

Asokumar Buvanendran, John W. Burns, Mario Moric, Patricia Merriman, Andrea Embrechts, Jeffrey S. Kroin
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Introduction

As supported by the biopsychosocial model of pain, thoughts, both conscious and unconscious can have a profound impact on both short-term pain perception and long-term adjustment to a chronic pain condition. Cognitive-behavioral therapy (CBT) focuses on cognitive processes, underlying beliefs and coping mechanisms, as well as mitigating errant beliefs and processes though reinforcement of positive cognitions and elimination of maladaptive thoughts and processes. Due to scheduling and location/transit issues, in-person CBT session are often not feasible for the patient, but recent telehealth innovations may be able to enhance patient access. Since CBT interventions are provided through educational and interactive therapy sessions, they can be naturally transitioned into the telemedicine and telehealth paradigm. Utility of CBT for improving the pain experience is well known1 but implementation through telemedicine is still in its infancy, although there has been promising progress.2 The emerging key psychosocial factor in moderating the pain experience is pain catastrophizing.3 CBT has been used extensively to reduce pain catastrophizing in samples of chronic pain patients, and has shown consistent efficacy with a strong pre-post treatment effect size.3 The aim of this pilot study is to determine whether video teleconference sessions (telemedicine) of CBT are effective in reducing Pain Catastrophizing Scale (PCS) scores in high-risk subjects. The PCS is a 13-item 5-point Likert scale measure (total scores 0-52 points) with higher scores reflecting increased catastrophizing thoughts and feelings when experiencing pain.4

Materials and methods (NA for case report)

Chronic pain subjects with high PCS scores (top tertile) were recruited after IRB approval. Subjects were randomized to 2 treatment groups; a CBT telemedicine group with 8 weekly CBT sessions and a Routine care group with no CBT sessions. For the CBT group, the first and last session were in-person individual CBT sessions with psychology staff and the remaining six sessions were provided by video teleconference (Skype, Microsoft software, free version). PCS scores were obtained prior to CBT and a few days after the last session. Changes in PCS scores were analyzed with paired t-tests.

Results/Case report

The CBT telemedicine group had had an average reduction in PCS scores of 18.3 points (P=0.0092) while the routine care subjects did not show a significant reduction in PCS scores over a similar time period (P>0.05) with an average reduction of only 7.8 points.

Discussion

CBT sessions, primarily by telemedicine through Skype interactive video, reduced pain catastrophizing in chronic pain patients. There is growing evidence that cognitive and emotional activity, such as pain catastrophizing, hypervigilance to potential pain and fear of re-injury, can amplify pain signals, effectively rewiring the brain, and so increasing the experience of pain. CBT maybe able mitigate these effects, with effective and easily accessible sessions through telehealth video conferencing.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1511
Scientific abstract: Education

Perioperative Disaster Simulation Team Training Program for Complications following Regional Anesthesia Administration

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Introduction

Regional anesthesia is a useful alternative to General anesthesia and a vital component of an effective perioperative pain management program. Complications associated with regional anesthesia, while rare, can be life threatening. In community healthcare facilities with experienced anesthesia providers, the high success and infrequent regional anesthetic complication rate can lead to complacency among staff, with regards to preparation, monitoring, recognition, and treatment of these dangerous events. To assess and enhance readiness among our OR and PACU staff in managing these high risk, low frequency complication, we designed and implemented a simulation program associated with regional anesthesia administration, and other perioperative disaster events.

Materials and methods (NA for case report)

The program included a pre-test to assess initial knowledge and to target focused training, a simulation exercise followed by a debriefing involving a focused didactic session, and a post- test to measure improvement. The participants included the anesthesia and surgical staff as well as the OR and PACU nurses. The simulation began in the PACU after an interscalene nerve block had been administered prior to arthroscopic shoulder surgery. There were two different scenarios created around this simulation in the first the patient (Laerdal SimMan 3G) developed local anesthetic toxicity, which initially began as tachycardia, then progressed to a seizure. After the seizure episode, the simulated patient developed a wide-complex tachyarrhythmia, degrading into asystole, complicated by a difficult airway. In the second scenario the patient was transferred to the OR table after the block and after the induction of general anesthesia the patient was intubated. When in the beach chair position, the patient developed progressive oxygen desaturation, wheezing, and hypotension. The team had to establish a differential diagnosis to treat a pneumothorax and/or anaphylaxis. Regardless of which treatment they picked the patient continued to deteriorate, culminating in cardiac arrest on the shoulder table, necessitating resuscitation. Each scenario was followed by an immediate debriefing session. A subsequent didactic session with review of the videotaped team actions was conducted in a second session. The post-test was conducted following the completion of the educational program.

Results/Case report

The efficacy of the simulation program was assessed using a pretest and post-training written exam. The results were collected and grouped by work specialty. Every group demonstrated an improvement in test scores. OR nursing had a 28% increase, anesthesia increased by 30%, and PACU nursing test scores increased by 72%.

Discussion

This program was designed as an evaluative program to identify knowledge gaps and to tailor didactic education to meet the team's needs. What made this program unique is that the training was conducted in the OR/PACU environment. This allowed the team to perform in their normal environment using the same tools and supplies available to them during an average work day, increasing the fidelity of the simulation. The overall staff response to the program was very positive and will pave the way for more frequent in situ simulation training events in the future.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1512
Scientific abstract: Regional anesthesia

Tranexamic Acid Dose and Perioperative Blood Loss in Total Hip and Knee Arthroplasty: A prospective, randomized, double-blind trial

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Introduction

Tranexamic acid (TXA) is an antifibrinolytic medication that has been shown to reduce blood loss in patients undergoing total joint replacement.[1-3] There is evidence that a regimen of two perioperative doses is superior to a single bolus, but few trials have compared escalating doses of TXA and no dose-finding study exists using a two-bolus regimen for joint replacement.[4] We hypothesized that increasing dose of TXA would correlate with a smaller drop in hemoglobin from pre- to postoperative value in patients undergoing total hip (THA) and total knee arthroplasty (TKA).

Materials and methods (NA for case report)

After IRB approval, we performed a prospective, randomized, double-blind trial evaluating three doses of TXA administered for THA and TKA surgery performed under spinal anesthesia. Subjects were randomized to receive 5 (TXA5), 10 (TXA10) or 15 (TXA15) mg/kg of TXA 20 minutes before incision and again at wound closure. Target enrollment was set at 84 subjects and powered to detect a difference of 0.25 g/dL between groups. The primary outcome was the absolute change in hemoglobin from preoperative value (PRE) to that on postoperative day 1 (POD1). Secondary outcomes included the change in hemoglobin level from PRE to that immediately following surgery (POD0) and to POD2, intraoperative crystalloid volume, estimated blood loss (EBL), postoperative mobility and wellbeing scores, and the incidence of adverse events.

Results/Case report

We randomized 84 patients into three groups, stratified by surgery type (51 THA and 33 TKA). Data for the primary endpoint of hemoglobin difference between PRE and POD1 values was collected on all patients. Two patients were converted to general anesthesia for reasons unrelated to the study medication but remained in the study and in the data analysis under the intention to treat principle. The average baseline hemoglobin level among all patients prior to surgery was 13.03 g/dL and the average hemoglobin levels on POD0, POD1, and POD2 were 11.79 g/dL, 10.93 g/dL, and 10.52 g/dL, respectively ($p<0.01$). The average drop in hemoglobin from PRE to POD1 was 2.15 g/dL for TXA5, 2.06 g/dL for TXA10 and 2.11 g/dL for TXA15 ($p=0.87$) with no detectable difference between groups. Likewise, there was no difference between groups in hemoglobin drop from PRE to POD0 or to POD2, or when stratified for surgery type or surgeon. There was no difference between groups in EBL, crystalloid volume, or postoperative mobility or wellbeing scores. There was one pulmonary embolus in the TXA15 group but no myocardial events, cerebrovascular events, seizure, or isolated DVT. One patient in the TXA5 group was transfused one unit of red blood cells on POD2 after THA for a hemoglobin value of 6.3 g/dL. No other patients were transfused blood product.

Discussion

Incremental increase in TXA dose from 5 mg/kg to 15 mg/kg in a two-bolus dosing regimen did not result in a detectable difference in hemoglobin drop after THA and TKA. Therefore, lower doses of TXA than that currently administered may be sufficient to produce desired effects and limit side effects.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1513
Medically Challenging Cases (report of up to 4 cases)

How Can We Avoid General Anesthesia and Conscious Sedation in Patients with Decompensated Pulmonary Function Presenting for Thermal Ablation of a Thoracic Tumor?

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Introduction

Pulmonary thermal ablation (PTA) is a technique used to treat limited primary and metastatic pulmonary disease in patients that are not surgical candidates. In patients with advanced and symptomatic disease, PTA can be part of a palliative therapeutic treatment regimen. Electric currents, cryoablation, microwave energy, or other external energy sources applied directly to a parenchymal or osseous lesion causes destruction of the tumor cells [1,2,3]. PTA procedures – which are painful and require immobility – can be performed under conscious sedation with local anesthesia or general anesthesia; however, these modalities may be inappropriate for patients presenting with advanced pulmonary disease [4,5]. We present a case of a thoracic paravertebral block (TPVB) used as the sole anesthetic for cryoablation of a thoracic tumor in a patient whose pulmonary function was severely reduced.

Materials and methods (NA for case report)

An 88 year-old female with a past medical history of emphysema, esophageal cancer, and breast cancer presented for palliative cryoablation of a painful right lower lobe lung tumor invading her seventh rib. She had a 75 pack year tobacco history and now suffered from COPD requiring five liters per minute (LPM) via nasal cannula (NC). At rest her oxygen saturation was 92-98% but dropped to 80% with ambulation. She was not an ideal candidate for sedation nor general anesthesia due to her limited pulmonary reserve and inability to tolerate any respiratory depression. On arrival to the block area the patient was conversant and oriented. Her oxygen saturation after moving to the stretcher was 67% on five LPM via NC. She eventually returned to her baseline saturation with increased oxygen delivery via face mask. She was placed in a sitting position and 0.5mg of midazolam was administered to help reduce her anxiety. The transverse processes of the 6^{th}, 7^{th}, 8^{th}, and 9^{th} vertebra and pleura were visualized with ultrasound. Under aseptic precautions, 2ml of Mepivicaine 1.5% and 4ml of Bupivicaine 0.5% with 1:200,000 epinephrine was deposited via an echogenic 21G Pajunk needle at each level (for a total of 4 injections) using an in plane approach. A total of 6mg of dexamethasone was also administered in the paravertebral space. During the TPVB the patient required another 0.5mg of midazolam and 25mcg of fentanyl to treat anxiety and discomfort. Her oxygen saturation did not change during the procedure nor did she experience any respiratory depression. There were no signs of pneumothorax, intravascular injection, nor CSF injection.

Results/Case report

The patient tolerated the 53 minute cryoablation in the left lateral decubitus position without requiring any further medication for sedation, anxiolysis, or pain control. Post-procedure her oxygen saturation was 97% on 3 LPM via face mask and she denied having pain.

Discussion

This case illustrates that multiple single shot TPVB's can be used as the sole anesthetic for thoracic cryoablation. TPVB as the sole anesthetic has been shown to be effective in thermal ablation of hepatic lesions [6]. Further study is warranted to verify the feasibility of using TPVB's as the only anesthetic for various forms of PTA in patients with decompensated pulmonary function.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1516
Scientific abstract: Regional anesthesia

Concentrations of clotting factors at different International Normalized Ratios (INRs) five days after discontinuation of warfarin

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Introduction

After warfarin is discontinued, the American Society of Regional Anesthesia (ASRA) recommended an INR of 12 or less before a neuraxial injection is performed.[1] The European guidelines on the other hand accepts and INR of 1.4 or less.[2,3] There has been no study that looked at the levels of the clotting factors affected by warfarin (VII, IX, X, II) at slightly prolonged INR (1.3-1.4) and at normal INR (1.2 or less) values after discontinuation of warfarin therapy. We looked at the concentrations of clotting factors VII, IX, X, and II, in relation to the INR, in patients whose warfarin was discontinued for 5 days before their surgery.

Materials and methods (NA for case report)

The study was approved by our IRB and written informed consent was obtained from the patients. Patients who stopped their warfarin for 5 days and seen either preoperatively or in the pain clinic were recruited. Their repeat INR was determined as part of their clinical care. Patients with INRs of 1.4 or less were recruited. After consent, blood was withdrawn and frozen. The blood samples were studied in batches of 10-12 and clotting factors VII, IX, X, and II was determined. Descriptive analysis of the data was performed.

Results/Case report

Twenty three patients were studied; 21 had INRs of 1.2 or less while two patients had INRs of 1.3 and 1.4. The mean (SD) concentrations of clotting factors VI, IX, X, and II in the 21 patients with INRs of 1.2 or less were 116 (28) % for Factor VII, 102 (29) % for Factor IX, 56 (13) % for Factor X, and 68 (16) % for Factor II. In contrast, the patient with an INR of 1.3 had concentrations of 105%, 78%, 36%, and 46% for Factors VII, IX, X, and II respectively. The patient with an INR of 1.4 had clotting factors of 89, 66%, 20%, and 37% respectively. None of the patients with INRs of 1.2 or less had a clotting factor below 40% except one patient with an INR of 0.9; she had a clotting factor X of 37%. This patient had a BUN of 64, creatinine of 5.3, and a glomerular filtration rate of 10; her other clotting factors were 159% for factor VII, 55% for factor IX, and 41% for factor II.

Discussion

A clotting factor level of 40% has been considered as adequate for clotting.[1] Our study showed patients with INRs of 1.3 to 1.4 may not have adequate Vitamin K-dependent clotting factors to assure adequate hemostasis. These results confirm the theoretical safety of the ASRA guidelines, except in patients with severe renal disease, but not the European guidelines. Patients with renal insufficiency who have normal INRs after warfarin is discontinued may not have adequate clotting factors. This finding is consistent with the known risk factors for increased sensitivity to warfarin: elderly, female gender, low weight, and patients with renal disease.[1,4]

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1517
Scientific abstract: Regional anesthesia

Efficacy Of The Ultrasound Guided-TAP Block For Pain Control In Total Abdominal Hysterectomy

Jeffrey Wu, David Cho, Vadim Tokhner, Roberto Lopez, Eli Luong, Jichang Li
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Introduction

The transversus abdominis plane (TAP) block is an effective approach to providing postoperative analgesia. The addition of ultrasound guidance has been described to improve the safety and success of regional anesthesia. Past studies on TAP blocks for various gynecological surgeries with abdominal incisions have shown equivocal results. We evaluated the analgesic efficacy of TAP blocks with ultrasound guidance in patients undergoing a specific type of gynecologic surgery, total abdominal hysterectomy (TAH), through a retrospective chart review.

Materials and methods (NA for case report)

Institutional Review Board approval was obtained prior to any data collection. The charts of 48 women who underwent TAH surgery and received IV morphine via a patient-controlled analgesia device for postoperative pain between September 2012 and October 2014 at Harbor UCLA Medical Center were examined. Patients were categorized into two groups: with the ultrasound guided-TAP (US-TAP) block and without the US-TAP block (control). Patients' pain scores and narcotic consumption at 1,6 and 12 hours postoperatively were compared statistically.

Results/Case report

Intra-operative factors and background data were not significantly different between the two groups. No complications were observed during the procedures. The US-TAP block reduced pain intensity and morphine consumption compared to standard care at 1 hour ($p = 0.03$) but not at 6 or 12 hours ($p > 0.05$).

Discussion

The US-TAP block, as part of a multimodal analgesic regimen, for TAH procedures is an effective tool for anesthesiologists to lower post-operative pain, narcotic usage and unwanted side effects from opioid use during the recovery period. Our results suggest maximum benefit of the US-TAP block at 1 hour postoperatively.

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Tables/images

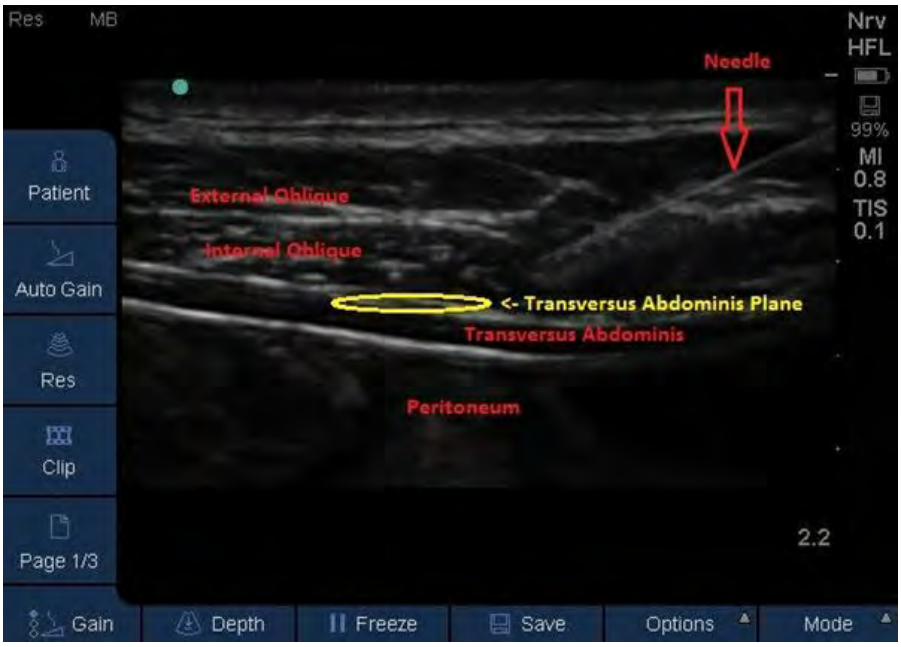

Figure 1. Anatomy of the Transversus Abdominis Plane

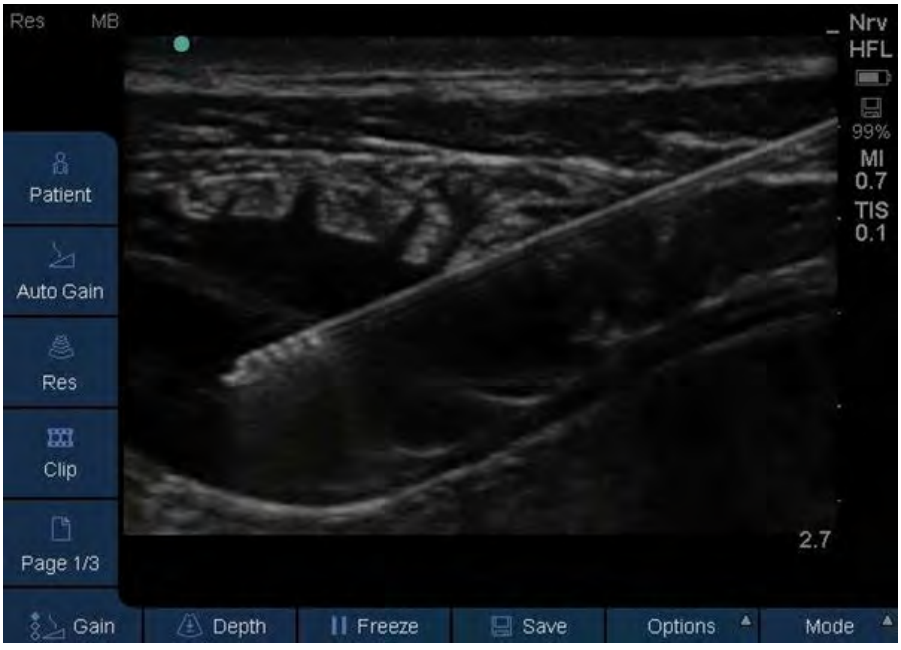

Figure 2. The Transversus Abdominis Plane Block with Proper Local Anesthetic Spread

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1518
Scientific abstract: Regional anesthesia

A comparison of programmed intermittent bolus versus continuous infusion local anesthetic regimens for continuous popliteal nerve block

Anthony Short, Ki Jinn Chin, Shayanti Meela Ghosh, Rongyu Jin, Vincent Chan
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Introduction

Continuous popliteal sciatic nerve block plays an important role in post - operative pain control after major foot and ankle surgery. Patients currently receive a local anesthetic infusion regimen consisting of continuous infusion (CI) combined with local anesthetic patient-controlled analgesia (LAPCA) boluses. There is some evidence that a programmed intermittent bolus (PIB) regimen of local anesthetic delivery may improve perineural spread of local anesthetic and thus improve the quality of post-operative analgesia[1,2]. We therefore undertook a prospective randomized double – blind trial comparing CI and PIB infusion regimens in patients receiving continuous popliteal sciatic nerve block for major foot and ankle surgery.

Materials and methods (NA for case report)

Patients were randomized to receive either a PIB regimen of 0.2% ropivacaine 10mls every 2 hours or a CI regimen of 0.2% ropivacaine 5mls/hr. Pain and satisfaction scores were collected in PACU and at 6hrs, 12hrs, 24hrs, 36hrs and 48hrs. The degree of sensory and motor block and the presence of side effects were also evaluated at these intervals. The number of LAPCA boluses and narcotic use (in IV morphine equivalents) was recorded at 2-hourly intervals from the time of infusion initiation. The infusion was discontinued at the discretion of the acute pain service and surgical team.

Results/Case report

A total of 23 patients were enrolled in the study. The median duration of infusion was 21.0hrs (IQR 18.3–42.4) in the CI group and 23.0hrs (IQR 20.6-44.0) in the PIB group. Pain scores at 6 and 12 hours were similar between the two groups. At 6, 12 and 18 hours there was no difference in either the number of LAPCA boluses or narcotic use (table 1). There was a non-significant trend towards a more intense overall sensory and motor block in the PIB group, with a significantly greater proportion of patients experiencing complete loss of dorsiflexion at 6 and 12 hours (table 2). Satisfaction scores at 6 and 12 hours (0-10 scale) were high in both groups (CI – 10.0 (IQR 9.6-10.0) vs. PIB 10.0 (IQR 8.5-10.0)). Side effects (pruritus, sedation, confusion, nausea, vomiting) occurred infrequently and were similar between the two groups.

Discussion

Both CI and PIB infusion regimens provide excellent analgesia in continuous popliteal nerve blockade with low post - operative narcotic usage and high patient satisfaction. Our results for block intensity suggest the PIB infusion regime may provide a denser block; however further data is required to confirm if this affects patient analgesia and satisfaction.

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Tables/images

		CI group median (IQR)	PIB group median (IQR)	p-value
Pain score (0-10)	at 6 hours	1.0 (0-2.5)	1.3 (0-3.1)	0.98
	at 12 hours	1.7 (0.8-2.3)	1.8 (0.3-4.5)	0.74
Narcotic use (mg IV morphine)	at 6 hours	1.6 (0-2.1)	0.8 (0-1.6)	0.52
	at 12 hours	2.8 (1.6-5.0)	3.2 (0.4-4.0)	0.56
	at 18 hours	5.6 (2.3-8.0)	5.2 (1.6-8.8)	0.73
LAPCA boluses	at 6 hours	1.0 (0-2.0)	1.0 (0-2.0)	0.98
	at 12 hours	2.0 (0.8-3.0)	2.0 (1.0-3.5)	0.61
	at 18 hours	3.5 (1.5-7.0)	5.0 (3.0-6.5)	0.79

Table 1

table 1

	CI group (n=10)	PIB group (n=13)	p-value
6 hour assessments	Number of patients with complete block		
Sensation – dorsum foot	4 (40%)	9 (69%)	0.16
Sensation – plantar foot	2 (20%)	7 (54%)	0.11
Motor - plantarflexion	3 (30%)	8 (62%)	0.14
Motor - dorsiflexion	4 (40%)	12 (92%)	0.01*
12 hour assessments	Number of patients with complete block		
Sensation – dorsum foot	1 (10%)	2 (15%)	0.60
Sensation – plantar foot	0 (0%)	2 (15%)	0.31
Motor - plantarflexion	1 (10%)	6 (46%)	0.08
Motor - dorsiflexion	1 (10%)	7 (54%)	0.04*

Table 2

table 2

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1519
Scientific abstract: Case series (5 or more patients)

Combined Interscalene Brachial Plexus Block and Superficial Cervical Plexus Block - A Novel Approach for Post-Operative Analgesia for Clavicle Surgery

Kay Lee, Sudheera Kokkada Sathyanarayana, Karina Gritsenko
Montefiore Medical Center

Introduction

Clavicle fractures represent 2.6-5% of all fractures; mid-shaft fractures account for 69-82% of them. Non-surgical management is indicated for non-displaced or minimally displaced fractures, and surgery is indicated for open fractures, skin changes, vascular or neurological injury. Fracture displacement >1.5cm is predictive of increased risk of pain, limitation of motion, and non-union; thus, perioperative analgesia is important in early recovery of function.

Regional anesthesia options for clavicle surgery are not well described in the literature. Treating clavicular pain may require combination nerve blocks due to variations in fracture locations and associated innervation and one method has not been proven superior. [1] Peri-clavicular skin is innervated by the superficial cervical plexus (C1, C2, C3, and C4), while the clavicle itself mainly is supplied by the brachial plexus with cervical plexus involvement. Combined superficial cervical plexus and selective C5 nerve root catheters has been effective. [1] Another case describes superficial cervical plexus block for anesthesia and analgesia in emergency care settings. [2] The interscalene nerve block alone provides coverage of the lateral 2/3 of the clavicle, shoulder, and the proximal humerus.

In this series, we present six patients undergoing open clavicle surgery receiving pre-induction ultrasound-guided combined interscalene and superficial plexus blocks showing excellent analgesia with minimal opioid requirements.

Materials and methods (NA for case report)

Risks, benefits, and alternatives of the nerve block were explained to the patient; informed consent was obtained. Intravenous access was obtained, vital signs were monitored, and oxygen via nasal cannula and sedation were provided. Procedure was done in supine position with head rotation to contralateral side. Sterility was maintained using chlorhexidine skin preparation and sterile ultrasound probe cover. Ultrasound and nerve stimulator confirmed the interscalene brachial plexus block using a 2 inch, 21G needle with 20ml 0.5% Ropivacaine and Dexamethasone 4mg. Superficial cervical plexus block was performed by anatomical landmarks using a 23G needle with 10ml 0.5% Ropivacaine distributed subcutaneously. Intra-operatively, general anesthesia via endotracheal tube was maintained with oxygen, sevoflurane, and fentanyl on induction only. All patients were extubated at the end of surgery. No complications were noted for all patients.

Results/Case report

Please see attached tables.

Discussion

All six patients had excellent post-operative pain control requiring minimal additional intravenous or oral analgesic agents. Known advantages of regional anesthesia include decreased opioid requirements, early patient ambulation, decreased incidence of nausea/vomiting, reduced hospital stay, and better patient satisfaction. [3] One confounder in this specific patient group is that pain relief is cited as one possible benefit of the surgical intervention itself.

This case series illustrates a sample of an effective perioperative combined nerve block technique for analgesia which allows for transition to successful PO analgesic regimen and may be considered as an option for patients presenting with clavicle surgery, especially in those patients who are eligible for same day discharge.

Future goals include a retrospective study comparing outcomes of other regional block combinations for this population. Ultimately, a randomized, blinded, and prospective study is needed to validate efficacy of different nerve block options for clavicle surgery.

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Tables/images

Patient Demographics

	Patient-1	Patient-2	Patient-3	Patient-4	Patient-5	Patient-6
Age(yrs)/ Sex/Wt	58 F, 61Kg	41 M, 88Kg	18 M, 83Kg	35 M, 104Kg	23 M, 118Kg	35 M, 79Kg
Surgery	ORIF-Right midshaft clavicle comminuted fracture	ORIF-Left midshaft clavicle comminuted fracture	ORIF-Left midshaft clavicle comminuted fracture	Left arthroscopic acromioclavicular joint resection	ORIF-Right midshaft clavicle comminuted fracture	ORIF-Right midshaft clavicle comminuted fracture
Pre-Op Pain Score	7/10	10/10	2/10	5/10	6/10	2/10

Patient Demographics

Perioperative Analgesia

	Patient-1	Patient-2	Patient-3	Patient-4	Patient-5	Patient-6
Intra-Op Analgesia	Fentanyl 150mcg	Fentanyl 200mcg	Fentanyl 100mcg	Fentanyl 100mcg	Fentanyl 125mcg	Fentanyl 100mcg
Pain Score in PACU	0/10	4→3/10	0/10	0/10	0/10	0/10
PACU Analgesia	Ketorolac 30mg IVP x1	Morphine 4mg IVP x1; Percocet 1tab	None (Dexamethasone 10mg for nausea)	Codeine 30mg PO x1	None	None
Time to Discharge Home	2hr 45min	2hr 35min	3hr55min	2hr	65min (Inpatient Admission)	56min (Inpatient Admission)
Pain Free Time at Home (Hrs)	24 hrs	24 hrs	14 hrs	20 hrs	12 hrs	
Analgesics at Home	None	Percocet tab x2	Oxycodone 1tab x1	Vicodin 1tab q5hrx5	Percocet 6tabs/24hrs	Oxycodone 5mg x1, Oxycodone 10mg x2, Ketorolac 15mg IVP x2

Perioperative Analgesia

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1521
Medically Challenging Cases (report of up to 4 cases)

Management of Unintentional Neuroaxial Block from Lumbar Paravertebral Block

Ankur Manvar, Rachel Waldinger, Christopher Chiang
University of Illinois-Chicago

Introduction

We present a case of a patient undergoing a right hip arthroscopy who received a post-op lumbar paravertebral (L1) block progression to a dense neuroaxial block.

Results/Case report

A 48F ASA II patient with hypertension and bilateral trochanteric bursitis s/p multiple steroid injections scheduled for right hip bursoscopy / arthroscopy. Initial exam revealed pain rated 10/10 over the right greater trochanter, 8/10 over the left, full ROM, and intact neurological exam.

In the PACU, the patient complained of 10/10 pain, refractory to IV / PO opioids. Ultrasound visualization for rescue lumbar paravertebral was difficult due to body habitus, but after identifying L1-L2 transverse process, a Pajunk Sonoplex 80mm needle was advanced under continuous visualization and a total of 20cc bupivacaine 0.25% was injected, with visualized drug spread, negative aspiration every 5ccs and at a low pressure using ‘compressed bubble’ technique.

Prior to completion of the injection, the patient reported significant and immediate pain relief of right sided pain followed almost immediately by relief of contralateral hip pain, which then rapidly progressed to bilateral lower extremity weakness and motor blockade below the level of the knee. Despite stable vitals and wakefulness throughout the procedure, the patient became hypotensive and intermittently arousable, suggestive of possible LAST. IV lipid emulsion was started in conjunction with pressors. Ten minutes post block, she reported bilateral upper extremity weaknes with no pinprick sensation below T10 level, followed by progressively decreasing head/neck strength. She was promptly intubated and observed in the ICU overnight with uneventful extubation and discharge the following morning with full return of neurological function. Despite unexpected neuroaxial blockade, patient indicated satisfaction with block, and consented use of this case for educational purposes.

Discussion

A 2008 case report identified two patients who received L1 and L2 PVB pre-operatively for hip arthroscopy pain. Both patients rated 0/10 pain for up to 48 hours post operatively, and were able to ambulate effectively with PT. Thavaneswaran et al compared six randomized controlled trials for thoracic PVB for breast surgery and two RCT for lumbar PVB in hernia surgeries. Post op pain scores were significantly improved up to six hours with rest and up to five days with activity in patients who received a block (vs GA, field block).

Purcell-Jones et al studied the spread of solution in paravertebral injections using CT scan with a small amount of contrast dye in 45 (34 thoracic, 11 lumbar) patients with correlation to clinical effects. Up to 70% had some epidural spread, 31% with strictly epidural spread, clearly documenting the potential for neuroaxial spread from paravertebral injection despite small volumes.

Gasden et al aborted their study of eighty patients undergoing PVB with randomization to low pressure (20 psi) with 5 cc aliquots when they noted significant neuroaxial spread in the high pressure group.

These studies demonstrate that although significant potential benefits exist for patients undergoing lumbar PVB, even lovw volumes can result in neuroaxial spread as seen in this patient. High pressures significantly increase this risk.

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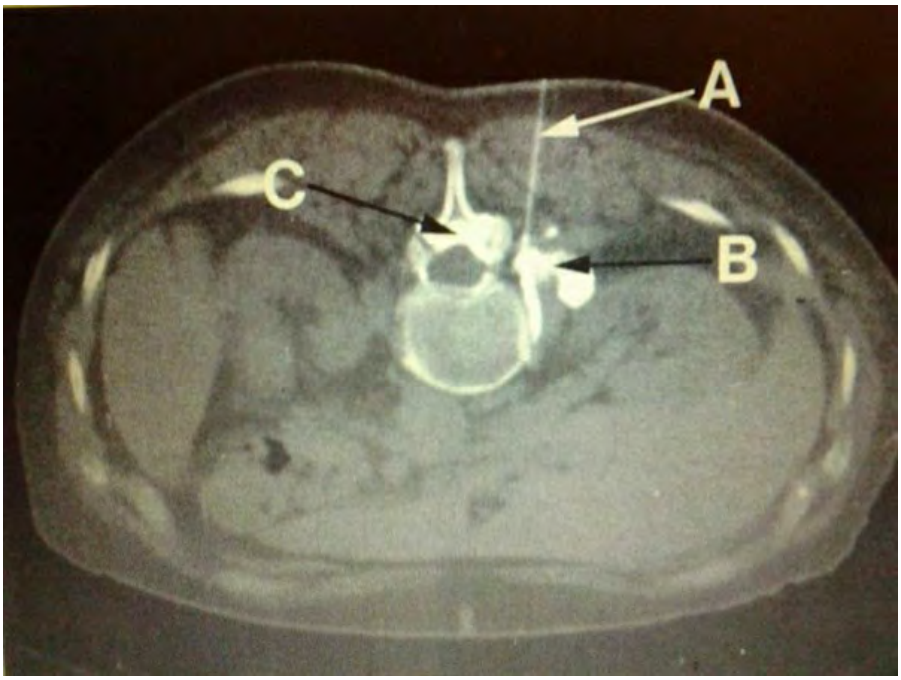
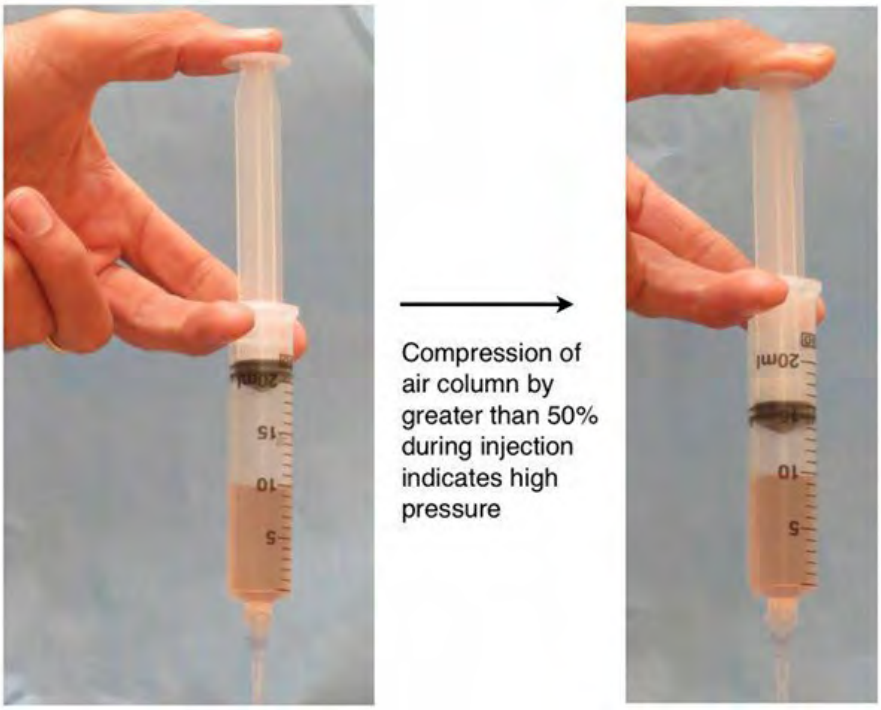
Tables/images



CT showing needle (A) injecting contrast into the paravertebral space (B) and subsequently into the epidural space (C).



High pressure (resistance to injection) can be the only indicator of an intramural injection.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
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New Orleans LA

Abstract: 1522
Medically Challenging Cases (report of up to 4 cases)

Spontaneous Resolution of Neurologic Deficits Related to Epidural Catheter Associated Epidural Hematoma

Stefanie Robinson, J. Wesley Doty, Steven Aho
Medical University of South Carolina

Introduction

Epidural hematoma is considered a rare yet extremely morbid risk of epidural anesthesia. Incidence is commonly cited in the literature as 1 in 200,000; however, it has been estimated to be more frequent in older, female populations, and patients with bleeding diathesis or coagulopathy. Best evidence suggests that surgical decompression should occur within 8 hours of onset of symptoms, but there are case reports of recovery of neurologic deficits with conservative management.[1-12] However, improvement is typically slow with full neurologic recovery occurring over days to months.[3-12] There is one case from Inoue et al of rapidly resolving neurologic deficit.[6] We present a case of flaccid lower extremity paralysis caused by epidural hematoma related to indwelling epidural catheter that resolved without surgical intervention within 6 hours of diagnosis.

Results/Case report

74 yo female with past medical history of hypertension, OSA, and low back pain without neurologic deficits presented for Whipple procedure for surgical management of duodenal tubulovillous adenoma. Preoperatively, a T7-8 thoracic epidural was placed atraumatically for pain management. Aspiration and test dose of the catheter were negative. A continuous infusion of bupivacaine was initiated for intra and postoperative pain control. Thromboprophylaxis with subcutaneous heparin 5000 units TID was initiated prior to induction of general anesthesia. Operative course was uneventful, and the patient was transferred to the floor and continued on epidural infusion of 0.15% bupivacaine at 8cc/hour, hydromorphone PCA, and IV ketorolac.

Early postoperative day two, the patient developed bilateral flaccid lower extremity weakness without back pain. No abnormalities were detected on exam of the catheter and insertion site except aspiration of 2 cc of heme. Laboratory data including coagulation parameters were unremarkable. Neurosurgical evaluation confirmed the need for urgent surgical decompression. The epidural catheter was removed 4 hours after last dose of subcutaneous heparin in accordance with institutional policy. MRI of thoracic spine revealed a T4-11 dorsal fluid collection compatible with epidural hematoma with associated mass effect of the spinal cord at these levels (Images 1,2). Within six hours, the patient's neurologic exam had improved back to normal and emergency decompression was cancelled. Clinical course was confirmed by repeat MRI of thoracic spine demonstrating decreasing size of the epidural hematoma with resolution of spinal cord compression (Image 3). Upon discharge, the patient was fully neurologically intact.

Discussion

This case supports others in the literature that some epidural hematomas associated with epidural catheters may resolve with conservative management; however, the factors associated with the success of such treatment plan are unknown, and the timeline of recovery can be quite varied.[3-12] This case also highlights questions of the safety of even prophylactic anticoagulation in combination with platelet inactivating NSAIDS, such as ketorolac, in patients receiving epidural analgesia, particularly in the elderly.[13-15] In this patient, the only alteration in heparin dosing was the second dose of heparin occur two hours early on the floor. This may have contributed to hematoma formation and emphasizes the required vigilance of anesthesia providers for appropriate thromboprophylaxis regimens and prompt evaluation of patients should neurologic deficits present.

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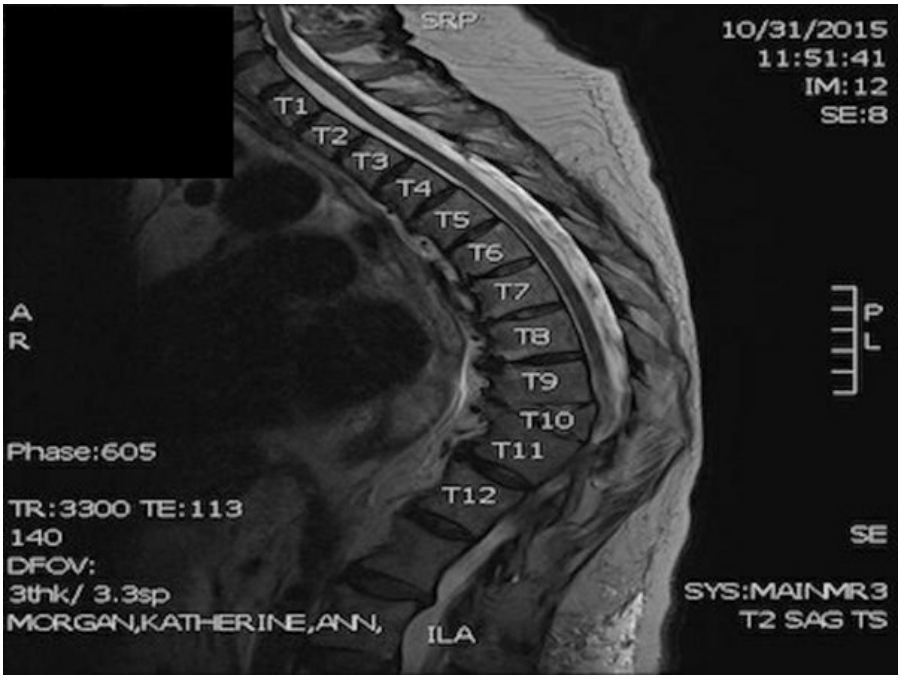
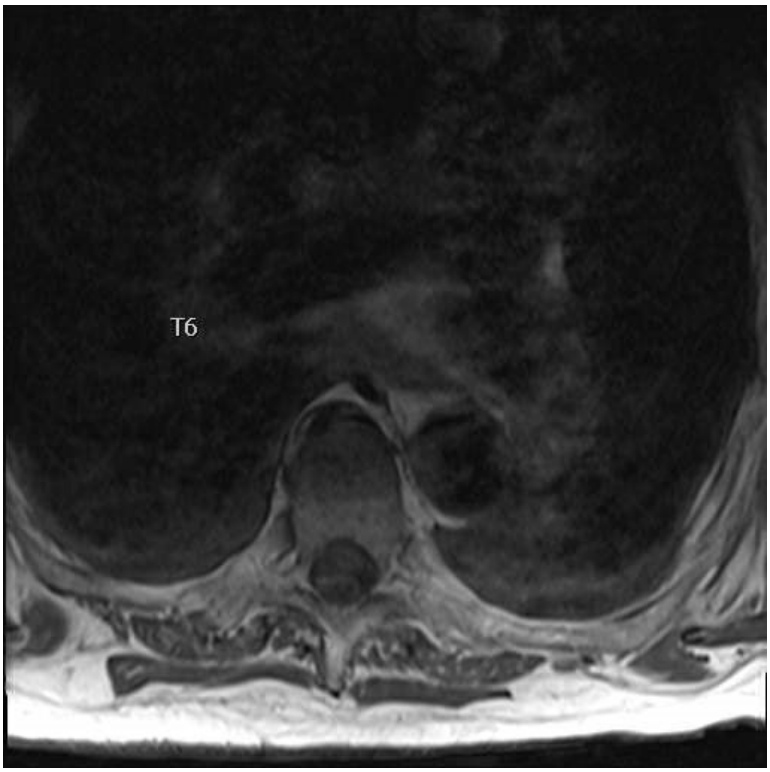
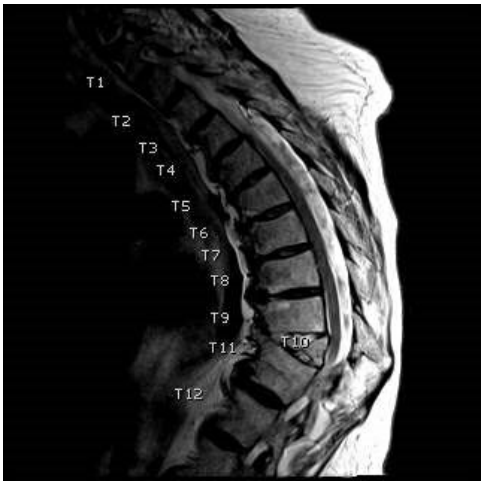
Tables/images



Initial T2 MRI sagittal image showing initial hematoma and cord compression



Initial T1 axial MRI image showing hematoma and cord compression.



Later T2 sagittal image showing improvement of cord compression and reduction in size of hematoma.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1524
Scientific abstract: Regional anesthesia

History of Regional Anesthesia: Uncovering the Rich Legacy of the University of Wisconsin and the Contributions of Dr. Ralph M. Waters

Nicole A. Katerinos, Colby L. Parks
University of Wisconsin Hospital and Clinics

Introduction

Dr. Ralph Waters once said, “The foundation of my specialty is dependent, I suppose, first upon men, second upon publications, and third upon organizations through which men meet for mutual development by exchange of ideas.”[1] It is well known that Dr. Waters played a prominent role in the advancement of anesthesiology as a field of medicine, but he also made important contributions to regional anesthesia as a subspecialty through his collaborations with other physicians, his research and publications, and his passion for continual learning and exchange of ideas. He strived to democratize analgesia as safely as possible, studying complications and adverse effects of various drugs. He established the country’s first academic anesthesiology program at the University of Wisconsin to educate and train residents, which promoted the growth of anesthesiology and spread the practice of regional anesthesia.[2] Dr. Waters and his colleagues left a lasting legacy on the specialty of anesthesiology and subspecialty of regional anesthesia. This historical research uncovers such contributions.

Materials and methods (NA for case report)

A literature review was performed by accessing the Ralph Waters Collection at the University of Wisconsin Archives. This included publications by Waters and other anesthesiology department faculty, as well as Waters’ personal correspondence with other leaders in anesthesia at that time.

Results/Case report

Dr. Waters and colleagues from the University of Wisconsin were paramount in researching and studying anesthetic agents, and subsequently teaching safe techniques to minimize complications and adverse effects. For example, they studied procaine between the years 1933-1935, to find that procaine-related circulatory complications were about 10.5%, and major respiratory complications about 1.9%.[3] They also wrote a paper on circulatory changes during spinal anesthesia, which countered the previous notion that such effects were primarily due to visceral vasodilatation from splanchnic nerve paralysis.[4] He argued for better analgesia in labor during a time when this topic was widely discussed and controversial.[5] Moreover, he trained residents at the University of Wisconsin to perform neuraxial anesthesia, as well as upper, lower, and truncal nerve blocks.[2] Anatomy, physiology, and pharmacology as they pertained to regional anesthesia were taught with tables, diagrams, and glass slides.[2] Other members of the Wisconsin department were active in regional anesthesia research as well. For example, John E. Steinhaus’ paper on local anesthetic toxicity was published in *Anesthesiology* in 1957.[6]

Discussion

Each institution has its own unique legacy. Revealing the contributions of the anesthesiologists from the early days at the University of Wisconsin, namely of Dr. Waters and colleagues, leads to an appreciation and better understanding of the roots of regional anesthesia and how it has developed to the present day. It reminds us that regional anesthesia will continue to evolve through the work of anesthesiologists and residents, through research and publications, and through organizations that allow for mutual development by exchange of ideas.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1526
Medically Challenging Cases (report of up to 4 cases)

Epidural Hematoma After Transforaminal Epidural Steroid Injection in a Patient Taking Aspirin Requiring Surgical Decompression and Complicated by Postoperative Stroke

Stephen Thorp
The Hospital for Special Surgery

Introduction

Epidural steroid injections are among the most commonly performed procedures in the United States annually, with 2.3 million among Medicare patients alone in 2011,[1] and there is tremendous interest in improving the safety and efficacy of the procedure and reducing complications.[2] One such devastating complication is the formation of an epidural hematoma. In 2015 ASRA published guidelines for interventional spine and pain procedures for patients on antiplatelet and anticoagulant medications to reduce the risk of this complication.[3] Aspirin has been associated with hematomas following interventional pain procedures,[4,5] however, the use of aspirin as prophylaxis for myocardial infarction and cerebrovascular accidents is well established, and there are also risks of discontinuing aspirin preoperatively for a procedure.

Results/Case report

An 83-year-old man presented with low back pain associated with parasthesias extending down the right lower extremity corresponding to the L2 dermatome. A MRI scan of the lumbar spine revealed a new posterior right paracentral disc protrusion at L2-L3 causing right foraminal stenosis and the patient underwent an epidural steroid injection at the L2 level. A 22-gauge 3.5 inch spinal needle was advanced under fluoroscopic guidance into the L2-L3 foramen. No blood, parasthesias, or cerebrospinal fluid was evident. Entry into the epidural space was confirmed with contrast under live fluoroscopy and digital radiography confirmed negative vascular uptake. Subsequently, 10 mg of dexamethasone was administered and the needle withdrawn.

Two days later the patient reported persistently worsening low back pain radiating into the right buttock and thigh with difficulty ambulating. An emergent MRI revealed an epidural hematoma extending from L2 to T12 with significant thecal sac compression. The patient underwent emergent surgical decompression and evacuation of the hematoma. Postoperative course was uneventful until day number two when the patient became aphasic and a MRI of the brain revealed a focus of restricted diffusion in the left ACA territory, indicating an acute cerebrovascular accident. The patient was immediately started on aspirin 325 mg daily and on postoperative day number eleven the patient was converted to apixaban for long-term anticoagulation.

Discussion

An epidural hematoma is one of the most severe complications of neuroaxial procedures and guidelines have been developed to prevent them. This case presents a patient taking aspirin with no other known risk factors for bleeding developing an epidural hematoma after an epidural steroid injection. The ASRA guidelines classify epidural steroid injections as intermediate-risk procedures and recommend a shared assessment and risk stratification for individuals taking aspirin, noting that, “consideration should be given to the discontinuation of aspirin for certain intermediate-risk procedures”[3].

This case was further complicated when the patient developed a stroke postoperatively, requiring anticoagulation for treatment that also increased his chance of bleeding postoperatively. The management of a stroke following lumbar decompression requires input from the neurology, surgery, and hematology teams to weigh the risks and benefits of starting anticoagulation. This case illustrates the devastating consequences of an epidural hematoma, and suggests that strong consideration should be given to discontinuing aspirin in the perioperative period for intermediate-risk interventional pain procedures.

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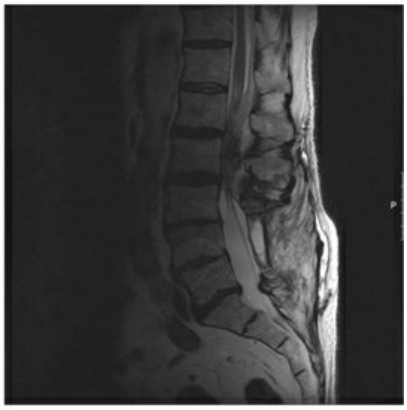
Tables/images



Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1527
Scientific abstract: Regional anesthesia

Is Retrolaminar Approach to the Paravertebral Space Possible? A Radiographic and Cadaveric Model.

Lane Crawford, Masoud Hashemi, Thomas Anthony Anderson, Susan Briggs, A. Sassan Sabouri
Massachusetts General Hospital

Introduction

Classically, paravertebral block has been performed by injecting local anesthetic (LA) directly into the paravertebral space. The retrolaminar approach to paravertebral block (RPVB) has recently been described as a simpler, potentially safer technique that achieves similar patterns of analgesia without requiring needle placement in close proximity to the neuraxis and pleura. This approach involves injection of LA into the plane between lamina and paraspinous muscles, and has been used for analgesia for breast surgery and rib fractures (1, 2). However, the pattern of LA spread and the mechanism of spinal nerve blockade with this technique is unknown. We used radiologic and cadaveric models to determine the pattern of injectate spread in RPVB.

Materials and methods (NA for case report)

1) Radiologic Model: A 66 year-old cancer patient presented for RPVB for painful metastases to the right 9th and 10th ribs. Informed consent was obtained. In a prone position, fluoroscopy was used to identify the right T9 lamina. An 18-gauge Tuohy needle was inserted under fluoroscopic guidance and advanced to contact lamina. 16 cc of a 1:1 mixture of Omnipaque 240 contrast and 0.5% bupivacaine was injected. Injectate spread was evaluated with fluoroscopy using posteroanterior and lateral views (Fig A, B).

2) Cadaveric Model: In a prone cadaver, ultrasound was used to visualize the left T4 lamina in the sagittal plane. An 18-gauge Tuohy needle was inserted at the caudal edge of the probe and advanced in plane to contact lamina. 20 ccs of 5% methylene blue dye was injected. The paraspinal area was dissected to examine the extent of dye spread in the retrolaminar space (Fig C). A left T4 laminectomy was performed to examine the epidural space. The cadaver was turned supine. The left parietal pleura was removed to examine the paravertebral and intercostal spaces (Fig D).

Results/Case report

1) Radiologic Model: Contrast spread from T8 to T11 between the spinous processes and the lateral costovertebral facets. A small amount of contrast in the epidural space at T11-12 could not be excluded. No contrast was identified in the paravertebral or intercostal spaces. The patient's pain improved after injection.

2) Cadaveric Model: Dye spread more than 13 cm cephalocaudally and 2.5 cm laterally in the retrolaminar space. A small amount of dye was noted around the intervertebral foramina. No dye was identified in the paravertebral, intercostal, or epidural spaces.

Discussion

In neither model did this injection technique result in significant initial spread of injectate to the paravertebral space. Sensory block in RPVB may result from delayed spread of LA between the lateral edge of lamina and the medial border of superior costotransverse ligament to the intervertebral foramina, i.e. the path traveled by the dorsal ramus of the spinal nerve as it exits the paravertebral space. Alternately, LA may eventually reach the paravertebral space by gradual diffusion through the superior costotransverse membrane and endothoracic fascia. Delayed injectate spread would not be observed in these models as fluoroscopy and dissection were performed immediately after injection. More extensive radiologic and cadaver studies are needed to definitively describe the pattern of LA spread in RPVB.

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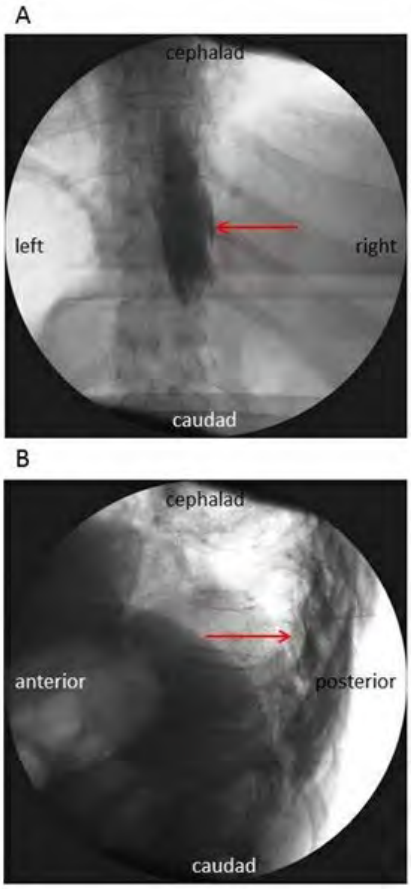
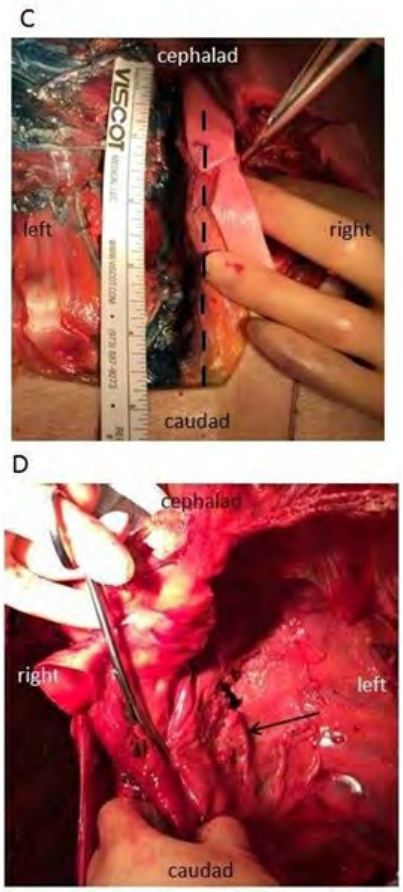


A) PA view after injection. Contrast (arrow). B) Lateral view after injection. Contrast (arrow).



C) Posterior dissection of left paraspinal area. Midline (dashed line). D) Anterior dissection of left paravertebral space (arrow).

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1529
Scientific abstract: Regional anesthesia

Comparing Quality of Analgesia and Recovery Between Adductor Canal Catheters and Intra-articular Catheters (IAC) Following Primary Total Knee Arthroplasty

Marc Kaufmann, David Beausang, John-Paul Pozek, John Wenzel, Eric Schwenk, Antonia Chen, Mark Torjman, Jaime Baratta
Thomas Jefferson University Hospital

Introduction

Adductor canal blocks (ACB) have emerged as adjuncts for post-operative pain after TKA. The ACB reduces quadriceps strength by 8% with no difference in opioid consumption, pain at rest, or mobilization compared to femoral nerve blocks (FNB) [1,2]. ACC have superior pain control compared to single shot injections with similar recovery [3]. Recent data comparing ACC to IAC, suggests that ACC provides equivalent to superior pain control while also trending towards a reduction of opioid consumption 48 hours postoperatively. This study compares the location of postoperative pain and quality of recovery in the ACC vs. IAC groups.

Materials and methods (NA for case report)

After IRB approval, 94 subjects undergoing TKA were randomized to intraoperative IAC or postoperative ACC. The IAC group received 0.5% bupivacaine at 4 ml/hr while the ACC group received 0.2% ropivacaine at 10 ml/hr. Outcomes measured were presence of and location of pain and adverse symptoms on POD # 0, 1, and 2. Data analysis was performed using the Chi-Square, Fisher Exact, and Mann-Whitney U Tests. The p value was set at 0.05 for statistical significance.

Results/Case report

Of the 94 patients, 49 were randomized to the ACC and 45 to IAC. Preoperatively, 49% of patients in the IAC group vs. 27% of patients in the ACC group reported no pain. Of those with pain, median pain scores on a scale of 0-10 were 2 in ACC group vs. 0 in the IAC group ($p = 0.04$). On POD # 2 when assessed for worst pain in past 12 hours, 0% of patients in the ACC group vs. 12% in the IAC group reported no pain, while 78% in the ACC group vs. 36% in the IAC group localized pain to the anterior aspect of their knees ($p = 0.003$) (Figure 1). On POD #1 the ACC group had lower median pain scores compared to the IAC group with getting out of bed (3 vs. 4), walking (4 vs. 6), participation with physical therapy (PT) (6 vs. 7), falling asleep (1 vs. 2), and with staying asleep (0 vs. 2). Only pain with getting out of bed showed statistical significance ($p = 0.024$). Using a scale of 0 (none) to 10 (severe), fatigue, nausea, and drowsiness/sedation was found to be greater in the IAC vs. ACC groups on POD #1. (Table 1).

Discussion

Patients in the ACC group experienced greater pain on POD #1, which may be related to increased baseline pain scores. Patients with IAC suffered more from nausea, fatigue, and drowsiness on POD #1 compared to the ACC. Based on recent data this could be secondary to reduced opioid consumption seen with ACC. Also of interest was the greater anterior knee pain seen in the ACC group and greater posterior knee pain in the IAC group on POD #2. Although significant, the number of patients at this point was 57 secondary to discharge of the other 37. Combined with recent data, the ACC shows promise to reduce opioid consumption and improve quality of recovery compared to the IAC.

References

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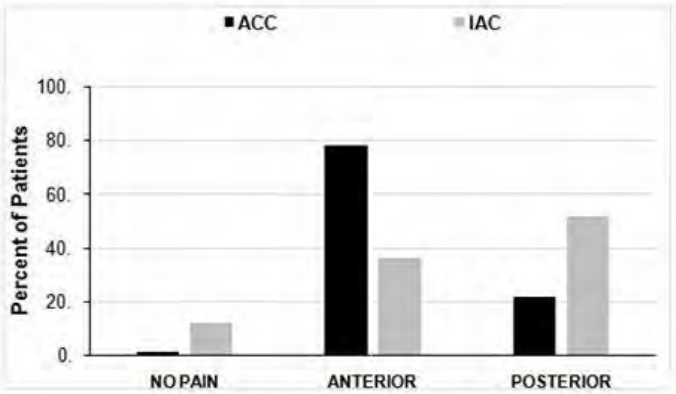

Figure 1:A significant relationship with more ACC patients having anterior pain compared to IAC on postoperative day 2 when pain was assessed as worst pain over last 12 hours. Posterior pain was more prevalent in IAC group.

Symptoms	Scale 0 (none) – 10 (severe)		p value
	ACC	IAC	
Fatigue	2 (IQR = 4)	3.5 (IQR = 5)	0.047
Nausea	0 (IQR = 4.3)	3 (IQR = 6)	0.012
Drowsiness/Sedation	1 (IQR = 4)	4 (IQR = 5)	0.01

Table 1: Severity of adverse symptoms on POD #1, presented as median scores.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1530
Medically Challenging Cases (report of up to 4 cases)

Post Dural Puncture Headache or Something More Serious?

Mark Johnson, Jonathan Jaffe, Daryl Henshaw
Wake Forest Baptist Hospital

Introduction

Headache (HA) following delivery in parturients is most commonly a primary headache followed by pre-eclampsia/eclampsia, and post dural puncture headache (PDPH) for those receiving neuraxial techniques(1). PDPH presents as postural headaches (PHA) relieved at times with conservative measures but an epidural blood patch (EBP) is the definitive treatment. When an initial EBP does not provide relief additional diagnoses must be considered to include venous sinus thrombosis, pituitary apoplexy or subarachnoid hemorrhage. We present a case of a 28 year old female (yoF) who had lumbar epidural analgesia(LEA) and developed PHA in the immediate post-partum period and was subsequently diagnosed with Chiari Type I malformation (CIM). CIM can present as a severe headache related to upright posture and may include symptoms related to cranial nerve involvement, which may mimic PDPH. She received EBP over one year following delivery with temporary relief and a second two months later that provided minimal relief.

Results/Case report

A 28 yoF presented for EBP following uneventful vaginal delivery 15 months prior managed with LEA. Past medical history was significant for medically managed migraines since the age of 13 with two normal magnetic resonance images (MRI) of the brain previously with no abnormalities reported. Immediately after delivery the patient developed severe occipital HA, 10/10 pain on the numeric pain scale, lasting for several minutes related to upright posture or straining and not relieved with conservative measures. She was not offered an EBP at that time. Subsequent follow-up with her primary physician and obstetrician resulted in referral to a neurologist after 4 months with continued daily PHA. An MRI at that time showed 4 mm of cerebellar tonsillar ectopia. She was treated conservatively for one year then referred to our center for further management. A repeat MRI showed further tonsillar herniation to 13 mm at that time. The acute pain service was consulted 15 months after delivery and EBP performed with improvement in the frequency and severity of HA for one month but with continued symptoms when straining or standing. She returned for placement of a second EBP with minimal improvement. Five months later a third MRI showed 14 mm of herniation. She then underwent a myelogram which showed sacral dural sac tears and had a repeat EBP under fluoroscopy with a decrease in frequency of HA but otherwise unchanged symptoms. The patient continues to be followed by neurology, interventional radiology and neurosurgery and is considering decompressive surgery if symptoms continue. Consent was obtained for the use of all information regarding this patient's case.

Discussion

PDPH following LEA is common, but persistent HA following EBP should be evaluated with referrals made to specialists to rule out and treat any other causes of continued PHA. CIM following LEA is rare but may represent a preexisting condition or an iatrogenic event following unintentional or purposeful dural puncture (2). This case is likely iatrogenic given the temporal relationship to her LEA and normal brain imaging prior. It is hoped that with more awareness of this potential sequela of childbirth and LEA earlier diagnosis and more definitive treatments will assist patients in managing PHA.

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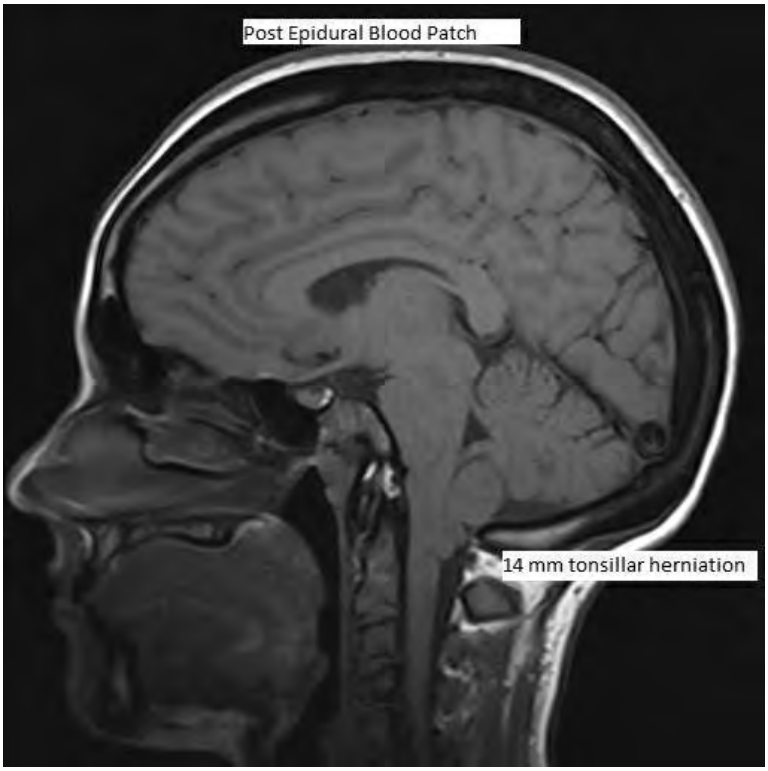

Post EBP MRI

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1531
Scientific abstract: Regional anesthesia

A comparison of hospital costs for common interventions used to manage postsurgical pain following total knee arthroplasty (TKA): results of a database analysis

Shelby Corman, Simon Dagenais, Shan Jiang, Jennifer Stephens, Jeffrey Gonzales, Tong Joo Gan
Pharmerit International

Introduction

Common interventions used to manage postsurgical pain include single-shot peripheral nerve block (sPNB), continuous peripheral nerve block (cPNB), and continuous wound infiltration (CWI) of local anesthetics. The objective of this study was to estimate hospital costs associated with providing these interventions to patients undergoing TKA.

Materials and methods (NA for case report)

Data were acquired from the Premier Perspective Database, which includes patient-level billing records from over 600 hospitals in the United States. Hospitalizations of adult patients undergoing TKA (ICD-9 code 81.54) between 7/1/2013 and 9/30/2014 were included. Patients were classified by the type of intervention received based on Current Procedural Terminology codes or standard charge descriptions. Hospital costs were estimated for the main components of these interventions, including local anesthetics (bupivacaine or ropivacaine), opioids (patient-controlled analgesia [PCA] and other opioids), equipment/supplies (including ultrasound guidance), elastomeric pumps, and professional services (sPNB and cPNB only). Hospital costs were estimated from charges using hospital-specific cost-to-charge ratios developed by Premier. Costs of IV PCA opioids, other opioids, and equipment/supplies were weighted by the proportion of patients receiving them. Costs were summarized using means and standard deviations; no formal statistical comparisons were made.

Results/Case report

There were a total of 12,255,018 inpatient admissions and 136,300 TKA procedures during the study period. Of these, 5,820 were performed with sPNB, 2,108 with cPNB, and 3,999 with CWI. Regardless of whether costs for professional services were included, hospital costs were highest for cPNB, followed by sPNB and CWI (Table). Costs for local anesthetics, professional services, PCA opioids, and other opioids were highest with cPNB, costs for equipment and supplies were highest with sPNB, and pump costs were highest for CWI. Costs for ultrasound guidance were 72% and 81% of equipment and supply costs with sPNB and cPNB, respectively. With sPNB, equipment and supplies were the largest proportion of costs (67%). With cPNB, it was local anesthetics (32%), followed by equipment and supplies (30%), pumps (22%), and opioids (15%). With CWI, pump costs were 62% of total costs.

Table: Mean Cost by Post-Operative Analgesia Modality and Component among TKA Patients

Cost Type	**sPNB N=5,820**	**cPNB N=2,108**	**CWI N=3,999**
Local anesthetic drug*	$59.80	$212.50	$59.92
PCA opioids	$14.20	$22.59	$22.31
Other opioids	$71.16	$77.97	$51.12
Equipment/supplies	$292.67	$202.67	N/A
Pump	N/A	$148.86	$216.21
Total, excluding professional services	**$437.83**	**$664.59**	**$349.56**
Professional services	$259.60	$711.20	N/A

Total, including professional services	**$697.43**	**$1,375.79**	**$349.56**

* Bupivacaine and ropivacaine

Discussion

This study provides a comprehensive analysis of hospital costs related to providing common interventions to manage postsurgical pain following TKA. Among the interventions examined, costs were highest for cPNB, which had higher drug costs compared to sPNB and CWI, and also required ultrasound guidance and an elastomeric pump. These findings may be useful to anesthesiologists and other stakeholders as they evaluate existing and novel interventions to manage postsurgical pain.

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
Consultant to Pacira Pharmaceuticals, Inc.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1532
Scientific abstract: Regional anesthesia

Novel adaptation of 2014 ASRA guidelines for regional anesthesia time out

Nili Mehta, Jasmine Swaniker, Katie Yang, Ryan Guffey
Washington University

Introduction

Due to the complex and intricate nature of medicine, errors are inevitable. A major cause of error in medicine is due to wrong site and wrong patient surgeries. To address this issue the Joint Commission published their Universal Protocol in 2003. Due to increased recognition of this problem in regional anesthesia ASRA created specialty specific recommendations in 2014.1 Using the ASRA recommended nine point checklist as a starting point we have created a standardized time out checklist that both strengthens the processes' ability to prevent errors as well as improves efficiency for the anesthesia team.

Discussion

The Time Out document created by our team is strategically separated into three sections each stressing a different portion of the time out process. The first of these section details the steps that should be taken before the actual time out is performed. This section ensures all important preparatory steps have been completed and that the time of the regional anesthesia attending anesthesiologists and perioperative nurses is not wasted. Significant additions to the ASRA guidelines include: an anesthesiologist has seen and cleared the patient for surgery and discussed the main anesthetic plan, specific language that the anesthesia mark must be visible in the nerve block field (on the back for paravertebral nerve block), the ultrasound equipment must be on the proper side before time out, and the patient should be positioned before time out. In an academic environment, with residents that constantly change roles and anesthesiologists that are not involved in the main anesthetic, we have found this section invaluable. It specifically tells the resident what must be done in active voice while expanding on vagaries.

The second section is the true time out. While this closely mirrors the ASRA recommended form there is an important addition. Since the patient is already positioned with supplies and ultrasound on their appropriate sides and a mark is present in the block field, it is possible for the nurse to independently and visually confirm that we are working on the correct side in the final step before performance of the block. While one could infer that is the intended plan of point 9 in the ASRA recommendation, it is not specifically written.

The final section is after the time out but occurs before any sedating medications are given. During this time the block team reviews any pertinent medical history that may impact whether or not the patient will receive sedating medications prior to the block. These important changes help us to: prevent wrong sided blocks, decrease the incidence of cancelled surgeries after the block is placed, improve safety, and increase efficiency.

References

1. Mulroy M et al. A checklist for Performing Regional Nerve blocks. Reg Anesth Pain Med. 2014 May-Jun;39(3):195-9.

Tables/images

Washington University in St.Louis
SCHOOL OF MEDICINE **Department of Anesthesiology**
BARNES JEWISH Hospital

Regional Anesthesia Time Out

Pre time out (regional team member alone)

1) Verify name, DOB
2) Verify allergies
3) Verify site of procedure with written consent (surgical approach must match, dated within 60 days)
4) Surgical mark is optional
5) Perform anesthesia mark (ANE)
   a. If surgical mark not present verify with OR schedule, consent, and patient as verification
   b. If paravertebral, lumbar plexus, or subgluteal sciatic (posterior approach sided nerve blocks) mark both sides if bilateral, mark should say ANE and be on shoulder or hip
6) Verify patient is not on any blood thinners and that pertinent laboratory values (platelets, PT/INR/PTT) have been reviewed
7) Primary OR anesthesiologist has seen and cleared the patient for surgery and discussed anesthesia plan
   a. Discussion can be delegated to regional attending if not possible
   b. OR attending will still do attestation, ensure patient appropriate for surgery
   c. Patient is NPO, not pregnant, no changes in medical health since CPAP
8) Resident or attending to verify laboratory results, medications (blood thinners), medical history that pertains to block or sedation
9) Oxygen on patient (2 LPM (or greater if baseline O2))
10) Monitors on patient (SpO2, BP, EKG)
11) SpO2 audible (3 or greater with tone modulation)
12) Ultrasound equipment on proper side (opposite from block)
13) Block supplies on proper side of patient (drugs labeled and dated)
14) Holding help available if sitting procedure (Tech or RN)
15) Position patient

Time out (RN, regional anesthesia attending or fellow, and regional resident that will perform block must be present)

1) All activities/conversations but time out discussion must cease around bedside
2) Verify name, DOB
3) Verify allergies
4) Verify site of procedure with written surgical consent at bedside (surgical approach must match)
5) Verify anesthesia mark against surgical mark
   a. If surgical mark not present verify with OR schedule, consent, and patient as verification
   b. If paravertebral, lumbar plexus, or subgluteal sciatic (posterior approach sided nerve blocks) mark both sides if bilateral, mark should say ANE and be on shoulder or hip
6) Verify block planned
7) Verify patient is not on any blood thinners and that pertinent laboratory values (platelets, PT/INR/PTT) have been reviewed
8) Verify ASRA monitors are applied (Pulse Ox, BP, EKG); intravenous access, sedation, and supplemental oxygen are provided
9) Verify block equipment available, drugs labeled and dated
10) Verify resuscitation equipment is immediately available: airway devices, suction, vasoactive drugs, lipid emulsion
11) Verify aseptic technique is used: hand cleansing is performed, mask and sterile gloves are used.
12) "Time out" is performed again before needle insertion for each new block site if the position is changed or separated in time or performed by another team.

After time out, pre sedation

1) Discuss medical history that would affect sedation
2) Start Q5min BP

Rev 1.0 4/24/15

Washington University in St.Louis
SCHOOL OF MEDICINE **Department of Anesthesiology**
BARNES JEWISH Hospital

Regional Anesthesia Time Out

Pre time out (regional team member alone)

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Rev 1.0 4/24/15

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1533
Medically Challenging Cases (report of up to 4 cases)

Sarcoid Derived Autonomic Dysfunction in a Patient Undergoing Achilles Tendonitis Repair

Jeremy Epstein, Vinh Nguyen
Medstar Georgetown University Hospital

Introduction

Sarcoidosis is a systemic inflammatory disease that forms granuloma collections that invade multiple organ systems and arrange as nodules. Commonly, the granulomas collect in the surrounding lymph nodes of the lungs. Cranial nervous system (CNS) involvement is present in 10-25% of cases (1).

Neurosarcoidosis forms CNS granulomas with a high involvement of the cranial nerves. It has no know cure. Autonomic dysfunction can present with significant systemic perturbations making anesthetic management unpredictable.

Results/Case report

A 64-year-old female with systemic sarcoidosis and achilles tendonitis presented for a right Haglund's excision by orthopaedics. Relevant past medical history included: CAD s/p LAD stenting, and dyslipidemia. Stress echocardiogram noted a preserved ejection fraction with no inducible ischemia. Preoperative evaluation revealed presyncopal episodes provoked by micturation. Of note, she detailed multiple ER visits with extensive cardiopulmonary evaluations that were unrevealing. She was referred to a specialist that diagnosed her with small fiber neuropathy secondary to neurosarcoidosis. We selected ultrasound-guided regional anesthesia to mitigate the deleterious effects of general anesthesia on dysautonomia.

We employed a right adductor canal (ACB) and popliteal sciatic block with 0.5% Ropivicaine with 1:400,000 Epinephrine with 10 mL and 20mL, respectfully. The ACB covered the femoral distribution, and the popliteal sciatic block covered the sciatic distribution of the lower extremity. Standard ASA monitors were placed. The patient was maintained on spontaneous ventilation and low dose propofol infusion at 50-65 mcg/kg/min. The blood pressure was maintained within 20% of baseline by titration of the propofol infusion, without any need for pressors. After completion of the surgical procedure, vital signs were stable and comparable to preop, with an uneventful pain-free postoperative recovery.

Discussion

Dysautonomia can present with significant alterations in vital signs and ventilation. Currently, no anesthetic management consensus exists. Furthermore, dysautonomia patients have paradoxical responses to pharmacologic and physiologic stimuli: supine hypertension, altered drug sensitivity, and hyperresponsiveness of blood pressure to hypo/hyperventilation. Additionally, liver blood flow is altered with position change; making continuous infusions of local anesthetics dangerous. Furthermore, many pressors have unpredictable effects on heart rate and blood pressure due to denervation hypersensitivity. The addition of volatile anesthetics, which diminish baroreflex control, can be life threatening. The inability to increase cardiac output through sympathetic activation makes them exquisitely sensitive to the effects of positive pressure ventilation. In order to mitigate these effects, we chose regional anesthesia. Further research involving management guidelines should be conducted in patients with dysautonomia in order to better guide anesthesiologist's perioperative management.

References

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1534
Scientific abstract: Regional anesthesia

Improving Measures of Quality and Hospital Accountability in Total Knee Arthroplasty: A Retrospective Review of Implementation of Low-Volume, Low-Concentration, Continuous Motor Sparing Blocks

Kevin King, Charles Luke, M.D., Luca LaColla, M.D., Jonathan Waters, M.D., Dan Sullivan, M.D.
University of Pittsburgh Medical Center

Introduction

Literature relevant to total knee arthroplasty (TKA) analgesia and rehabilitation have recently focused on comparison between different locations for injection or infusion of local anesthetic. (1,2,3) None have shown a large differences in length of stay (LOS) and post-hospitalizaton disposition for continued rehabilitative therapy. The purpose of this retrospective review was to assess the changes our long-established practice of placing continuous femoral nerve blocks (CFNBs) in or near the inguinal crease as the primary analgesic for TKA. In 2013, we placed inguinal-crease CFNBs preoperatively with an initial 20ml bolus of Ropivacaine 0.2%, and then postoperatively, infused dilute bupivacaine (0.0625%) at 5ml/hr. Nevertheless, we perceived that a majority of total knee arthroplasty patients at our institution exhibited moderate weakness, and generally were unable to participate in therapy until after the morning of postoperative day one. We gradually reduced the infusion rate of the CFNBs from 5ml/hr to 2ml/hr, and inserted CFNBs more distally, caudal to the groin crease (imgae 1).

Materials and methods (NA for case report)

Working with the University of Pittsburgh Medical Center (UPMC) Quality Institute after obtaining instutional review approval, retrospective data was collected using the ICD-9 and ICD-10 codes for TKA and CFNB, as well as the medicare DRG 470; primary uncomplicated unilateral total knee arthroplasty. Bilateral TKA patients and revision TKA patients were excluded. Data on patient gender, age, and length of stay was queried from institution discharge databases. Post-acute care disposition was also collected. Body composition and ASA-physical status were not available. During three consecutive years (2013, 2014, and 2015) data was collected for the same four-month period (July 1- October 31).

Continuous variables were analyzed with the t-test, ANOVA, or the correspondent non-parametric test where appropriate. Categorical variables were analyzed using the chi-square. Bonferroni correction was used for multiple comparisons where appropriate. Data are shown as median (25th-75th percentile). A p value less than 0.05 was considered significant. Analysis was performed using SPSS ver. 21.

Results/Case report

When considering age and sex, there were no significant differnces among the groups. (Graph 1 and Table 1).

There was consistent and significant trend towards a shorter length of stay over the period examined ($p<0.001$). In particular, the median LOS during the 2015 [3(3-3) days] was significantly shorter than the median LOS in 2013 [3.5(3-4) days] ($p<0.001$). In terms of post-acute care disposition, there a consistent and significant trend towards a greater percentage of patients receiving home care or outpatient therapy ($p<0.001$) for 2015 vs. 2013. (Table 2)

Discussion

Our data shows that our interventions (limiting the preoperative initial bolus to 15ml of 0.2% Ropivacaine, limiting infusion rate to 2ml/hr, and inserting the CFNB 5-7cm distal to the inguinal crease) result in a shorter LOS, and greater disposition to home after discharge. We hypothesize that the aforementioned interventions may also facilitate earlier participation in physical therapy, which, in turn, likely positively influences early discharge. Ultimately, changing to motor sparing blocks has allowed a reduced average LOS, and markedly reduced the utilization of inpatient

rehabilitation and skilled nursing facilities. Further studies are necessary to prospectively test our hypothesis.

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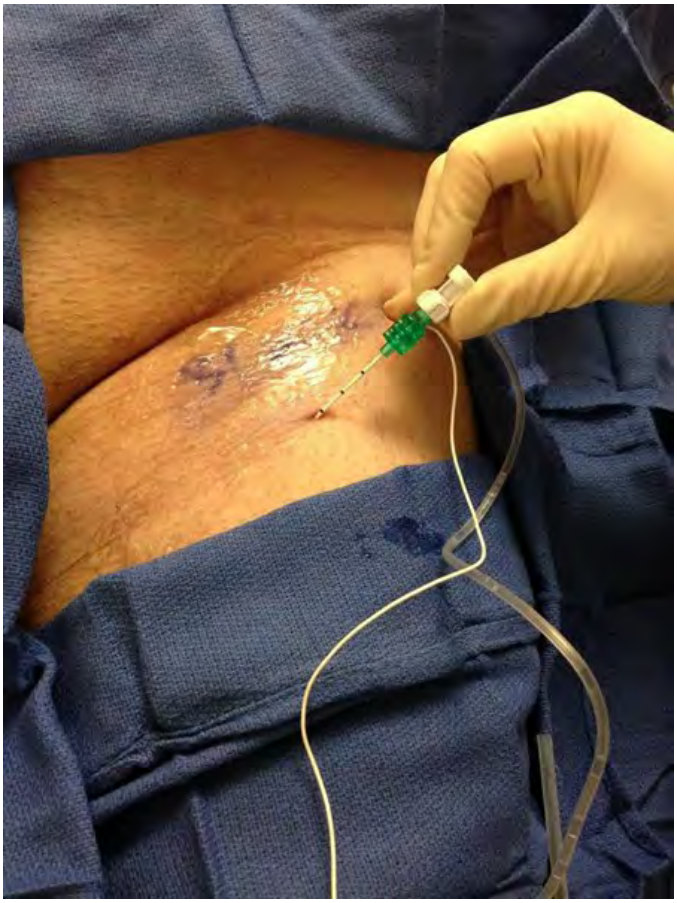
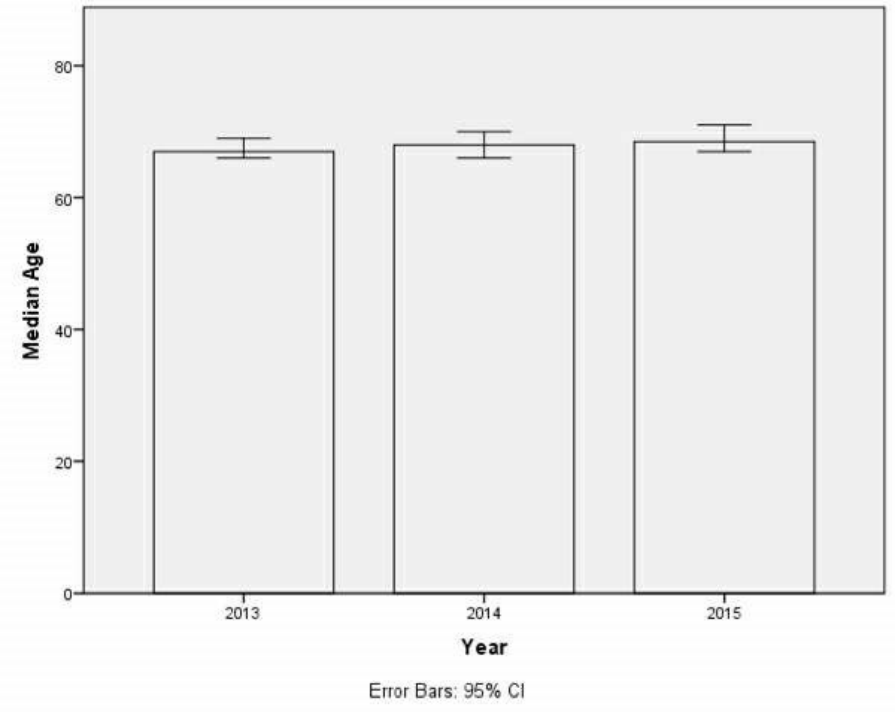


Distal CFNB insertion point (5-7cm caudal to inguinal crease)



Graph 1 - Median Age over study years

			Year			Total
			2013	2014	2015	
Sex	Female	Count	93a	106a	105a	304
		% within Year	58,1%	58,6%	62,5%	59,7%
	Male	Count	67a	75a	63a	205
		% within Year	41,9%	41,4%	37,5%	40,3%
Total		Count	160	181	168	509
		% within Year	100,0%	100,0%	100,0%	100,0%

Table 1 - Gender Effect over study years

			Year			Total
			2013	2014	2015	
Destination	Home	Count	75a	93a	111b	279
		% within Year	46,9%	51,4%	66,1%	54,8%
	Non-Home	Count	85a	88a	57b	230
		% within Year	53,1%	48,6%	33,9%	45,2%
Total		Count	160	181	168	509
		% within Year	100,0%	100,0%	100,0%	100,0%

Table 2 - Post-Acute Care Disposition over study years

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1536
Medically Challenging Cases (report of up to 4 cases)

To block or not to block? Local anesthetic systemic toxicity following a complicated lumbar plexus block.

Jillian Vitter, Alison Brainard
University of Colorado

Introduction

Preoperative lumbar plexus blocks (LPB) are commonly performed at academic medical centers for patients undergoing total hip arthroplasty (THA). A systematic review published in 2015 suggested decreased opioid consumption, improved pain scores, and reduced nausea and pruritus with LPB but quality of evidence was low. Another recent study looked at using LPB as a safe alternative for intraoperative anesthesia for other hip surgeries in patients at risk for hemodynamic instability. With conflicting and incomplete information, how do we make decisions about the suitability of LPB for a patient? How do we determine risk? The following is a case of local anesthetic systemic toxicity (LAST) following a LPB, a preliminary analysis of factors that contributed to this outcome, and discussion of alternatives to LPB.

Materials and methods (NA for case report)

Permission was given by the patient and family to present this case for education.

Results/Case report

RM was a 93 year-old male presenting for THA revision. Medical history included heart failure (EF 40-45%), three-vessel coronary artery disease treated with CABG and drug-eluding stent, hypertension, chronic kidney disease, remote right lacunar infarct, and chronic hip dislocations due to prior failed THA. Physical activity was limited by hip pain. The acute pain service discussed and completed informed consent for a preoperative LPB with intraoperative spinal anesthetic. After monitor and oxygen placement and proper positioning, the patient was sedated with minimal fentanyl and midazolam. He was cooperative during a difficult LPB under nerve stimulator. Greater than seven needle passes occurred before quadriceps twitch with loss of signal at 0.8mA. A total of 30ml bupivacaine 0.5% with 15mcg epinephrine was injected with negative aspiration every 3ml and no change in hemodynamics. The patient tolerated the procedure well. On turning the patient supine after completion, he had a seizure that resolved with additional midazolam in less than 30 seconds. Throughout he had a strong pulse, remained normotensive, and breathed spontaneously. An intralipid 1.5ml/kg bolus was immediately given and an infusion started. He regained consciousness and was admitted to the surgical ICU for hemodynamic monitoring overnight. He was transferred to the floor the following day.

Discussion

Risk factors for LAST include extremes of age, hepatic dysfunction, low or high cardiac output states, cardiac pathology, reduced plasma proteins, pregnancy, and concomitant use of beta-blockers, calcium channel blockers, or digoxin. Our patient had at least three risk factors. Additionally, this was a THA revision with abnormal anatomy complicating block placement. Lastly, despite an intravascular marker he had no indications of intravascular injection prior to seizure; this could be indicative of indirect intravascular uptake caused by vascular injury during needle passage. Because most THA patients are elderly with multiple comorbidities, risk of regional anesthesia and LAST must be carefully weighed against potential benefit of LPB in reducing respiratory complications and post-operative delirium through improved pain control and decreased postoperative opioid requirements. Alternatives to LPB exist and a change to the typical protocol may be warranted in certain patients. Finally, high suspicion for LAST must remain for unusual presentations or complications in these complex patients.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1538
Scientific abstract: Regional anesthesia

Transversus Abdominis Plane Block As Primary Anesthetic In High Risk Patients

Joseph Schoenfeldt, Rafik Tadros, Brian Butala
Allegheny Health Network

Introduction

The tansversus abdominis plane (TAP) block has been shown to decrease post-operative morphine use, VAS scores, and possibly the intensity of post-operative nausea and vomiting.[1] We present two cases of TAP blocks being utilized successfully as primary anesthetics in patients with respiratory dysfunction.

Results/Case report

A 72 female presented with abdominal pain and was found on imaging to have a left pelvic mass. Exploratory laparotomy demonstrated perforated sigmoid diverticulum with pelvic abscess, necessitating colonic resection and left salpingo-oophorectomy. After surgery, she remained intubated due to acute respiratory distress with pulmonary edema (suspected transfusion-related acute lung injury). Post-op day 5 she was extubated, but imaging showed worsening diffuse edema with new right-sided pleural effusion. On post-op day eleven she continued with respiratory dysfunction but required abdominal wall washout and closure. This was performed with only single shot TAP and rectus sheath blocks bilaterally (15cc and 10cc, respectively, of 0.5% ropivacaine on each side), 30cc of 1% lidocaine locally by surgeon in upper abdomen, and dexmedetomdine 8 mg IV. The following day she complained of mild nausea but no pain.

Second case is 69 female, presented with two weeks vaginal discharge, fever, and pain found to have colovaginal fistula with perforation of sigmoid diverticulum. Exploratory laparotomy was performed with colectomy and reanastomosis. Patient was extubated in PACU following surgery but developed acute respiratory failure requiring pulmonologist consult, regular DuoNeb treatments, and nightly BiPAP. On post-operative day seven she required secondary abdominal wound closure. This was performed with single shot TAP blocks bilaterally (30cc of 0.5% ropivacaine and 5cc of 2% lidocaine on each side), midazolam 1mg, fentanyl 50mcg, and propofol infusion (total of 140mg). Following day post-operative note found “patient resting comfortably in bed” without any complaints.

Discussion

The TAP block has provided an approach to anesthetizing the anterolateral abdominal wall since 2001. TAP blocks have continued to be refined since this time. Initially relying on a blind, landmark based technique (the “double-pop” method in the triangle of Petit), approaches have developed to include ultrasonography and more anterior, subcostal positioning. However, the underlying principle remains the same: large volumes of local anesthetic distributed between the internal oblique and transversus abdominis muscles. Within this transversus abdominis plane the thoracolumbar nerves run, supplying sensation to the muscle and skin of the anterior abdomen. As TAP blocks have been proven effective for multiple abdominal surgeries and complications remain minimal (case reports of viscera trauma exist, but statistical rates are not yet established), they provide a sound anesthetic approach especially in patient’s who are high risk for complications of general anesthesia.[2] The two cases we have outlined demonstrate TAP blocks are a viable option in cases with complexities such as poor lung function and further research is required to establish how far the limits of their utility as a primary anesthetic may be extended.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1539
Scientific abstract: Regional anesthesia

Sub Costal Quadratus Lumborum Block. A cadaver study to evaluate the two approaches of Quadratus Lumborum block (Classic versus novel Sub Costal)

Sree Kolli, Hesham Elsharkawy, Loran Mounir Soliman, Hari Kalagara, Wael Ali Sakr Esa, Kamal Maheshwari
Cleveland Clinic

Introduction

An ultrasound guided posterior approach that describes injecting local anesthetic as far posterior as the lateral border of the quadratus lumborum (QL) muscle has been described by Blanco. Since then multiple approaches to the QL block have been described. Carney et al in 2011 observed posterior spread of the contrast and extension to the thoracic paravertebral space from the fifth thoracic vertebral level to the first lumbar vertebral level. Clinically QL blocks have been shown to result in dermatomal coverage from T9 to L1, and did not show higher coverage as reported in the contrast studies.

Materials and methods (NA for case report)

Three fresh human cadavers in the anatomy lab were used after Cleveland clinic IRB approval. On one side of the cadaver a classical QL block was performed at L3- L4 level on the posterolateral aspect of the QL muscle (QL2), at the anatomical location of the LIFT (lumbar interfascial triangle). In the posterior subcostal approach (Parasagittal approach), ultrasound transducer was positioned approximately 6-8 cm lateral to the lumbar spinous process at the L1-2 level just above the cross over point of the erector spinae and the QL. Moving cranially, last rib (T12) was identified and needle was advanced in plane using a caudal to cephalad direction with the needle tip positioned anterior to the fascia of the QLM and 25 ml of dye was injected on the other side of each cadaver anterior to the QL muscle, between the QL muscle and the anterior layer of the thoraco lumbar fascia.

Results/Case report

The dye stained the QL muscle all around from the iliac crest up to the last rib, deep staining of the subcostal, ilio –inguinal and ilio- hypogastric nerves. The dye was seen inside the TAP plain in four of the 6 dissections, faint stain in one dissection and no stain in one dissection. Dye was seen under the diaphragm and arcuate ligaments in all 6 dissections. Deep staining was seen distributed in the paravertebral gutters outside the pleura and staining of the segmental thoracic nerve roots up to T6 identified in two and up to T8 in one of the subcostal block dissections while the classic QL2 did not spread beyond T12.

Discussion

Here we described preliminary work, exploring ways to modify the traditional means of placing a QL block in order to take advantage of the communication between the thoracic and abdominal paravertebral space. We termed this technique the subcostal QL approach (lumbar approach to the thoracic paravertebral space) and cadaveric dissections and early experience has shown success in achieving a satisfactory sensory blockade from L1-2 to T6-7 in patients undergoing renal surgeries. The basic premise of this new method involves directing a posteriorly placed QL block cranially to facilitate spread in the thoracic direction. Further studies in live patients are required to prove the difference and advantage of this new technique.

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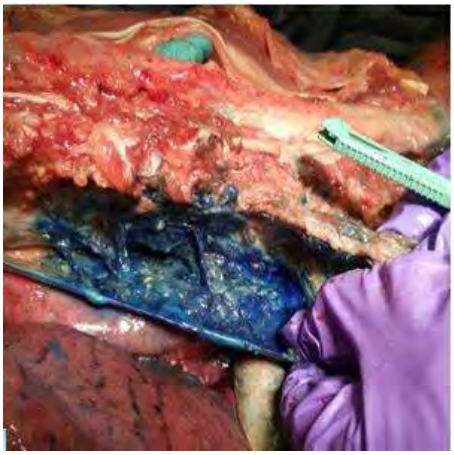

Fig 1

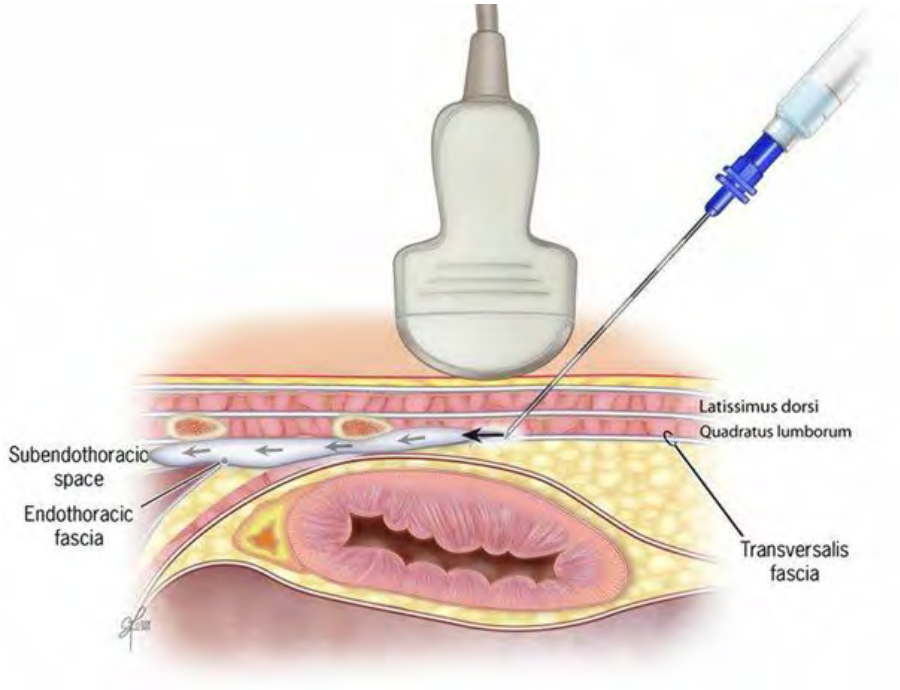

Fig 2

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1540
Medically Challenging Cases (report of up to 4 cases)

Suprascapular Nerve Block with Liposomal Bupivacaine for Infected shoulder surgery. A case Report

Sree Kolli, Hesham Elsharkawy, Loran Mounir Soliman, Hari Kalagara, Wael Ali Sakr Esa
Cleveland Clinic

Introduction

Blockade of the suprascapular nerve, which has the largest contribution to the shoulder joint in association with axillary block maybe indicated if an Interscalene block is contraindicated. All of the local anesthetics except liposomal bupivacaine, when given as a single injection have duration less than 24 hrs. Arthroscopic procedures are increasingly performed as an outpatient. Suprascapular block in association with axillary block can avoid all the complications associated with the interscalene block.

Results/Case report

A 40 year old morbidly obese female (BMI 50.1) with PMH significant for OSA, HTN and DM was scheduled for arthroscopic washout of left shoulder pyogenic arthritis. She presented with few days of pain in the left shoulder, negative cardiac work up and elevated CRP and ESR. She was allergic to Morphine and Fentanyl. Diagnostic aspiration of the joint in the ER showed frank pus and hence the decision was made not to place an indwelling catheter. She received a supraclavicular nerve block and suprascapular nerve block prior to the surgery.

After taking consent the patient was moved to the block room, standard monitoring was applied. The patient was placed in a sitting position with an assistant supporting from the front and sedation was administered. Under aseptic precautions, using the high frequency ultrasound probe in a transverse orientation initially over the scapular spine and later moving cephalad the suprascapular fossa is identified. While imaging the supraspinatus muscle and the bony fossa underneath, the ultrasound transducer was moved laterally to locate the suprascapular notch. A 22g echogenic needle is introduced in plane into the suprascapular notch and after negative aspiration 20 cc of liposomal bupivacaine (off lable use) was injected without any complications. The patient was then placed in right lateral position and an interscalene block was performed with real time ultrasound guidance using 10 cc of 0.5% bupivacaine without any immediate complications.

Results: The patient had an uneventful recovery after the surgery. Average pain scores during the first 24 Hrs was 4/10 and the next 24 hrs was 3/10. The motor block wore off completely after 32 hrs subjectively and the pain described by the patient was mainly in the front of shoulder while she had no pain in the back of the shoulder. Post operatively patient received only tylenol and toradol and no opiates. She was sent home on day 3 with 4 weeks of IV antibiotics.

Discussion

Although continuous peripheral nerve blocks can provide analgesia for multiple days, this modality is frequently not provided by health care providers due to financial, time, expertise and follow up limitations. Liposomal bupivacaine may be an alternative in peripheral nerve blocks where motor blockade is not an issue. In special circumstances like the case described where indwelling catheters have higher risk of infection, liposomal bupivacaine may be a reasonable alternative.

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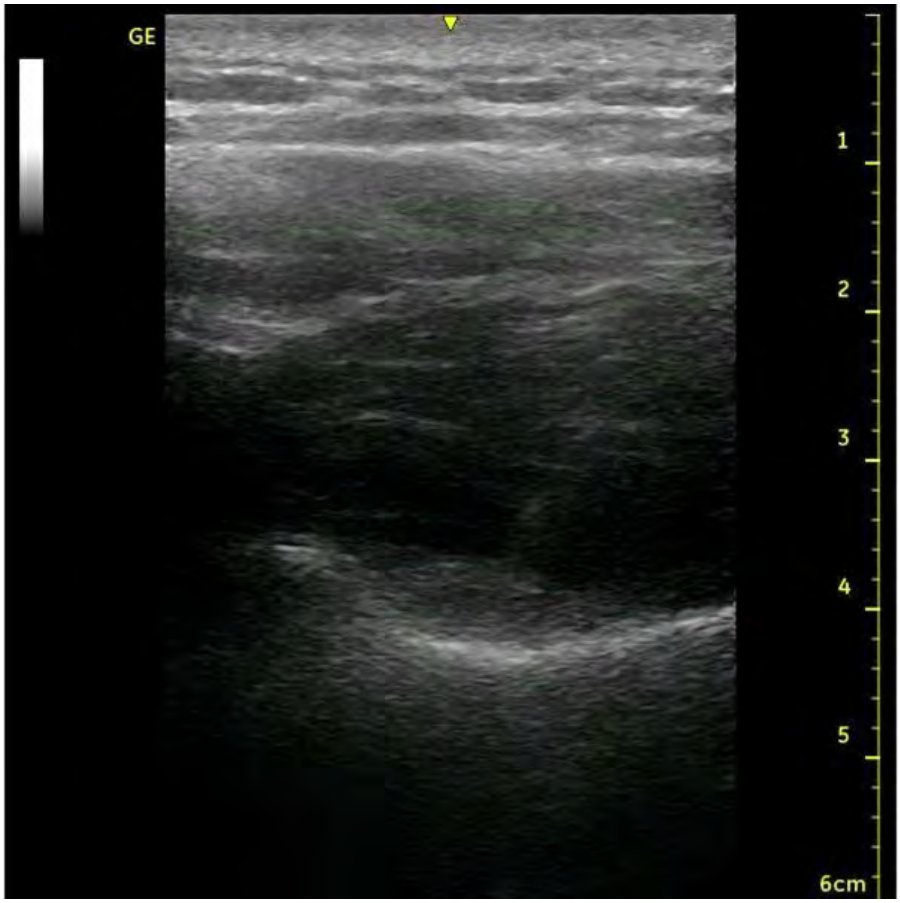

Fig 1

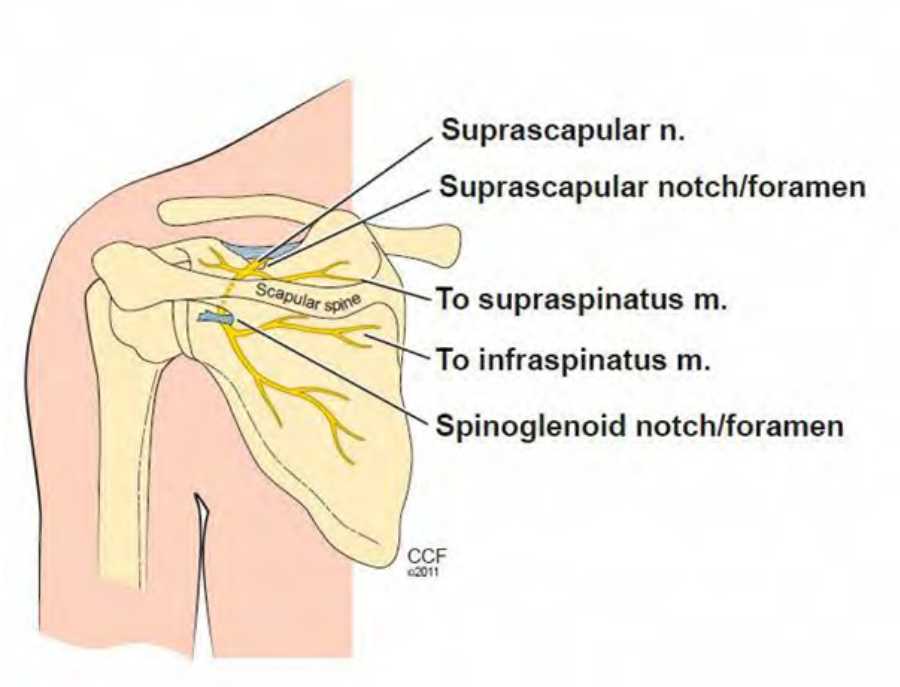

Fig 2

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1541
Scientific abstract: Regional anesthesia

A Randomized Comparison of Two Perineural Catheter Dressing Techniques in a Cadaver Model

Lindsay Borg, Steven K. Howard, T. Edward Kim, Lauren Steffel, Cynthia Shum, Edward R. Mariano
Stanford University

Introduction

Despite the benefits of continuous peripheral nerve blocks, catheter dislodgment remains a major problem especially in the ambulatory setting. Yet catheter dressing techniques to prevent dislodgment have not been rigorously studied. We designed this simulation study to test the strength of two commercially available catheter dressings.

Materials and methods (NA for case report)

With IRB exemption and VA research committee approval, one unembalmed male cadaver was used as the model. We conducted 20 trials, randomly assigning each trial to one of two dressing techniques: 1) clear adhesive dressing alone (Tegaderm, 3M, St. Paul, MN); or 2) clear adhesive dressing with an anchoring device (Statlock, Bard Medical, Covington, GA). For each trial, the same epidural catheter connector (SnapLock, Teleflex Medical, Research Triangle Park, NC) attached to Luer-lock plastic tubing fashioned in the form of a loop (Figure 1) was secured and dressed according to the randomization assignment on the lateral aspect of the cadaver's right thigh. This model was accepted after testing multiple prior iterations. Using a digital luggage scale equipped with a hook (Naftali Inc., Gardens, FL), the same investigator applied steadily increasing force on the tubing loop with a downward trajectory toward the floor until the dressing was removed or otherwise disrupted resulting in an unsecured catheter connector. The primary endpoint was the weight measured (kg) by the scale at the time of dressing disruption or removal. Normality of distribution was determined by the Kolmogorov-Smirnov test. Data of non-normal distribution were compared using the Mann-Whitney U test (SPSS, Armonk, NY). $P<0.05$ was statistically-significant.

Results/Case report

All 20 trials were completed successfully. The skin of the cadaver remained intact throughout. The weight measured [median (10^{th}-90^{th} percentiles)] at the time of dressing disruption or removal was 1.5 (1.3-1.8) kg with no anchoring device compared with 4.9 (3.7- 6.5) kg when the dressing included an anchoring device ($p <0.001$).

Discussion

A dressing technique employing an anchoring device with a clear adhesive cover withstands over 3 times the weight of a clear adhesive dressing alone. Based on this simulation study, using an anchoring device may help prevent perineural catheter dislodgement and therefore premature disruption of continuous nerve block analgesia.

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Tables/images

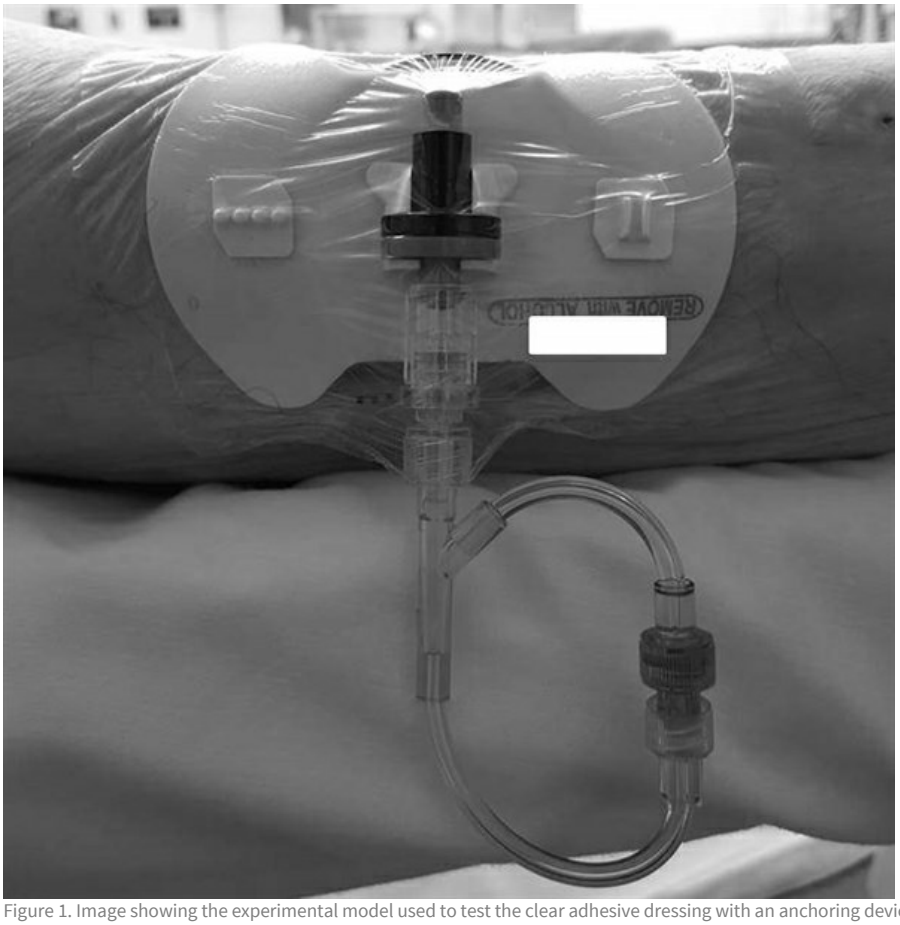

Figure 1. Image showing the experimental model used to test the clear adhesive dressing with an anchoring device.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1542
Scientific abstract: Emerging technology

Percutaneous peripheral nerve stimulation for the treatment of perioperative pain during total knee arthroplasty

Stuart Grant, Brian Ilfeld, Gavin Martin, Jeffrey Gadsden, Michael Bolognesi, Amorn Wongsarnpigoon, Joseph Boggs
Duke University Medical Center

Introduction

Over 700,000 patients undergo total knee arthroplasty (TKA) each year in the U.S for poor function and knee pain. A non-opioid pain treatment that does not interfere with function is required 1) before surgery to reduce opioid use and tolerance, 2) following surgery to improve pain control and functional outcomes, and 3) reduce/eliminate opioid-related side effects. This case report describes the first use of percutaneous peripheral nerve stimulation (PNS) for prolonged use beginning prior to TKA, continuing perioperatively in the hospital and following hospital discharge for >1 month.

Results/Case report

The study was approved by the FDA under an investigational device exemption (IDE), and investigational review board approval was obtained. The research study followed good clinical practice guidelines.

A 60-year-old male provided informed consent and was enrolled 11 days prior to primary TKA for chronic osteoarthritis of his right knee. Two fine-wire coiled percutaneous stimulating leads designed to resist infection (MicroLead, SPR Therapeutics, Cleveland, OH) were inserted to within 5-20 mm of the femoral and sciatic nerves using ultrasound guidance. Each lead was connected to a battery-powered external stimulator, and electrical stimulation was delivered through the leads. The subject used the therapy at home until just prior to TKA surgery. During this preoperative period, average pain over the past week decreased from 3/10 to 2/10 compared to before initiation of therapy, and opioid dosage decreased by 50% (75mg Tramadol every 8h to 37.5mg every 8h).

On the day of surgery, the stimulators were disconnected and the leads secured beneath occlusive dressings. During surgery a tourniquet was placed distal to the lead exit sites. Approximately 2 hours following surgery, the stimulators were reconnected to the leads, and stimulation confirmed that both leads remained functional. Stimulation was delivered for the duration of the in-hospital stay: pain was adequately controlled without continuous anesthetic nerve block, and the subject maintained sensory/motor function, enabling ambulation and participation in physical therapy while receiving stimulation. The subject was discharged home on postoperative day (POD) 2 and continued using stimulation. Pain was well-controlled through the first orthopedic follow up visit (POD 16): the subject walked without an assistive device on POD 3 and had already resumed driving (POD 6) and returned to work (POD 13). The therapy was discontinued and the leads removed on POD 40 (approximately 2 months following placement).

Discussion

This case is the first use of percutaneous PNS in a perioperative setting and is also the first take-home use of PNS for pre- and post-operative pain management. This case report demonstrates the feasibility of preoperative lead placement to reduce opioid consumption and potentially reduce opioid tolerance. The use of PNS shows great potential for 1) analgesia without motor block, 2), a reduction in preoperative opioid usage and 3) prolonged non-opioid analgesia following hospital discharge. This patient started driving and returned to work much sooner at 2 weeks than published typical normal[1,2] of 8 weeks. Future prospective studies are planned to evaluate these potential benefits along with the safety and effectiveness of this promising non-opioid therapy.

References

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2. Tilbury Rheum 2014:53;512

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
SPR Therapeutics (Cleveland, Ohio) provided funding and the peripheral nerve electrical leads and stimulators used in this investigation.
Brian Ilfeld: Dr. Ilfeld's institution has received funding for his research from SPR Therapeutics (for studies other than the current investigation), Baxter Healthcare, Smiths Medical, Summit Medical, Teleflex Medical, Myoscience, and Pacira Pharmaceuticals. In addition, Dr. Ilfeld has also acted as a consultant to Pacira Pharmaceuticals.
Stuart Grant: Dr. Grant's institution has received funding for his research from SPR Therapeutics (for studies other than the current investigation), Cara Therapeutics, and Durrect. Dr. Grant also acts as a consultant to BBraun Medical.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1543
Scientific abstract: Acute pain

A Pathway for Managing Rib Fractures

Sombith Maitra, Hajnalka Huszka, Peter Martin, Frederic Sage, Gordon Morton
East Surrey Hospital, Redhill, Surrey, UK.

Introduction

Rib fractures are a common injury, under-recognised for the burden of morbidity and mortality they cause. Patients often require critical care due to sequelae including pneumonia, atelectasis, respiratory failure and poor secretion clearance. Underlying injuries such as flail chest, contusions, and pneumo/haemothorax can compound the problem. Rib fracture patients are thought to have an overall mortality of up to 10%[1]. This increases with the number of fractures, ranging from 5.8% for 1, to 30.4% for greater than 8[1]. It is common for patients to require invasive ventilation. The mainstay of non-surgical treatment is analgesia, physiotherapy, early mobility and rehabilitation. However, there does not appear to be any agreed standard by which these patients are managed, which may contribute to poorer outcomes.

Chronic pain is also a common consequence. The severity of acute pain has been shown to be the only predictive variable[2].

We conducted a retrospective audit of management of rib fracture patients and then constructed a multi-departmental pathway for the treatment of those considered high risk. This was in collaboration with the Emergency Department (ED) team. This pathway has been presented in part at the European Congress on Emergency Medicine, Torino, Italy (2015).

Materials and methods (NA for case report)

Patients admitted between July 2014 and July 2015 were identified via the hospital coding department, and their notes analysed.

Following literature review we identified key features indicating high risk for morbidity or mortality. We incorporated this into a pathway to expedite recognition of these patients in the ED, facilitate early analgesia, and follow with regional anaesthesia (RA) and high dependency care.

Results/Case report

30 patients were identified. Average age was 64 (range 31-94). From the data available, at least 14 were ASA 3 preceding injury. An average of 3 ribs were broken (range 1-11). The average time in the ED prior to analgesia administration was 1.9 hours (range 0- 7.8 hours). 4 patients received no analgesia in the ED, whereas 12 received more than one dose, the last of which was on average 2.9 hours after the first. The time to diagnosis of rib fractures was 10.5 hours (mean), 3.2 hours (median), requiring a maximum of 5 days.

See table 1 for drugs prescribed in ED and on the subsequent ward.

The acute pain team was involved in only one case. Critical care was involved in 6 cases via trauma call and 8 through subsequent referral. Only 4 patients received regional anaesthesia (1 epidural, 2 serratus blocks, 1 paravertebral). 5 patients received high dependency care totaling 11 days. 3 patients were treated for pneumonia. Total hospital length of stay was 170 days (5.6 average, range 1-19).

See figure 1 for the pathway subsequently developed.

Discussion

Following our audit, we have developed a multi-disciplinary, focused strategy to provide advanced multi-modal analgesia to this complex group of patients. This includes the use of RA with novel strategies such as serratus plane block. Our institution is well placed to deliver prompt, effective RA through the recent development of our 'block room'.

We feel that this will lead to improved patient comfort and satisfaction, and is evidence based to reduce morbidity and mortality.

References

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Tables/images

Table 1

Analgesia in ED			
Paracetamol	NSAID	Weak Opioid	Strong Opioid
21	4	8	10
Analgesia on Ward (2 records unavailable)			
Paracetamol	NSAID	Weak Opioid	Strong Opioid
28	15	22	20

Table 1. Analgesia prescribed in the ED, and on the ward.

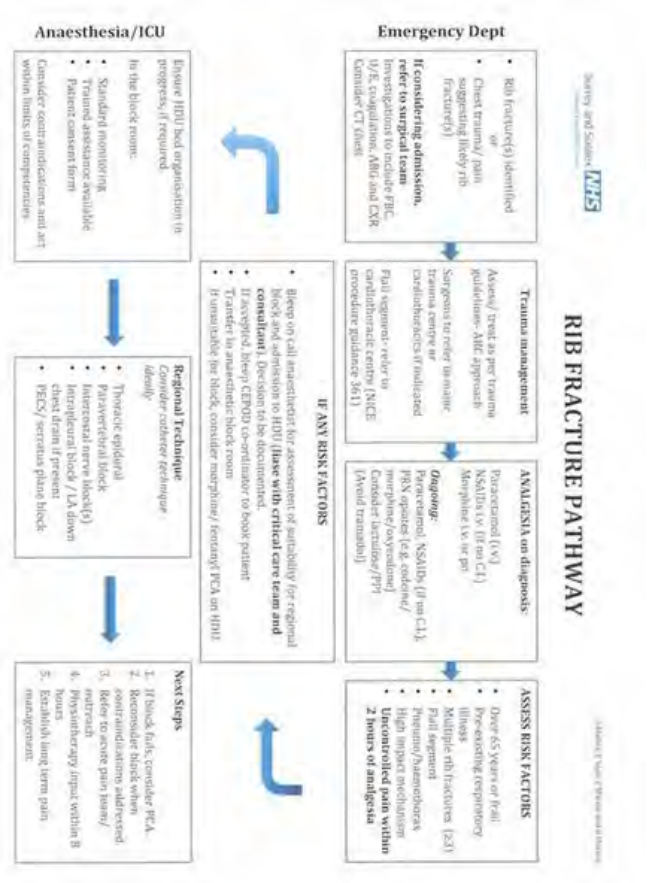

Figure 1. Rib Fracture Pathway

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1544
Scientific abstract: Acute pain

Safety and efficacy of perioperative intravenous ketamine: a retrospective study of patients undergoing amputation

Kellie Jaremko, Brian Dahlben, Kara Segna, Shannon Haley, Matthew Wiltshire, Tanziyah Muqeem, Eugene Viscusi
Sidney Kimmel Medical College of Thomas Jefferson University

Introduction

NMDA receptor antagonists such as ketamine have been purported to minimize central sensitization at the spinal cord level and may decrease ongoing neuropathic pain following acute neuronal injury. There is conflicting information in the literature regarding the efficacy of intravenous ketamine infusions to treat acute post-amputation pain and potentially ameliorate chronic phantom limb pain. Our hypothesis is that IV-ketamine within 30 days of amputation will reduce phantom pain, pain at discharge, decrease opioid usage, and improve outcomes without significant adverse effects.

Materials and methods (NA for case report)

All hospitalized patients who underwent limb amputation and received an Acute Pain Medicine Service consult and received ketamine from January 2009 through October 2015 are eligible for inclusion in this retrospective study (n=24). IRB approved data collection includes documentation of pain characterization and intensity over time, duration and dosage of ketamine, adjuvant analgesic usage, and side effect occurrences. The addition of individuals that underwent amputation without perioperative ketamine is in the process of IRB approval for comparative statistical analysis.

Results/Case report

Of the subjects exposed to ketamine, 54% were Caucasian, 58% were male and subjects were between 22 to 70 years old. Indications for amputation were predominantly infection (41.7%) and ischemia secondary to peripheral vascular disease (33.3%), followed by trauma (16.7%) and one case each of vasopressor induced ischemia and frostbite. There were nine cases each of below or above the knee amputations, 3 hip disarticulations, a transmetatarsal amputation, multiple finger or bilateral lower extremity and forearm amputations. Intraoperative ketamine was utilized in 58.3% with the rest of subjects being initiated on ketamine no longer than 8 days from their procedure. Length of treatment varied from 1-26 days with doses of ketamine infusion most frequently between 10-25mg/hr, ranging from 5-75mg/hr. Dose did not correlate with side effect presentation or severity although the rate of dose escalation and use of 10mg ketamine boluses was the inciting event for some side effects. Preliminary data on 13 subjects demonstrated that 54% displayed an absence of or mild self-limited side effects that were well tolerated, including one night of vivid dreams, blurry vision, or mild dizziness and disorientation. Moderate to severe psychoactive side effects occurred in four individuals including hallucinations, dissociative feelings, and confusion. Only one patient required immediate ketamine discontinuation while a decreased dose was tolerated and justified due to the reported pain reduction benefit. Of note there were no cardiovascular disturbances or hepatic-related lab abnormalities; nor were there any neurological deficits or loss of consciousness in any patient. Initial data review showed documented benefit of ketamine specifically decreasing phantom or neuropathic (burning, electric, tingling) pain in greater than 30% of patients. Further pain assessment rating analysis, opioid utilization, and comparison with non-ketamine treated patients is ongoing.

Discussion

Our preliminary findings support the safety and efficacy of ketamine for neuropathic or phantom pain following amputation. Further prospective studies are warranted.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1546
Scientific abstract: Acute pain

Preoperative Factors Related to Perioperative Low-Dose Ketamine Infusions

Stephen Goldberg, Eric Schwenk, Jaime Baratta, Richard Epstein, Eugene Viscusi
Sidney Kimmel Medical College, Thomas Jefferson University

Introduction

Opioids can cause significant adverse events. Evidence suggests that ketamine infusions improve perioperative analgesia over opioids alone, but usage is variable[2,3]. The purposes of this study were: 1) Identify patient factors associated with ketamine infusions during spine surgery; 2) Identify spine procedures where ketamine has been used most frequently. Spine surgery was studied because it is painful and commonly associated with ketamine use.

Materials and methods (NA for case report)

All patients admitted following elective spine surgery between January 2012 and March 2015 at Thomas Jefferson University Hospital, a regional spinal cord center, were studied. Demographic data, preoperative medications, and ketamine infusion data were retrieved from the AIMS and pharmacy information database. Data analyzed included date of surgery, age, gender, BMI, ASA physical status, scheduled surgery duration, and preoperative medications. Preoperative opioids were classified as “scheduled” or “as needed” basis. Planned procedures were queried from the OR scheduling system.

Data were extracted using SQL Server 2008 R[2]. Odds ratios were computed using the function oddsRatio in the R mosaic library, Pearson’s chi-square test, two-group Student t tests, and local polynomial regression fits using the functions chisq.test, t.test, and loess, respectively.

Results/Case report

A total of 4748 patients were analyzed from our electronic preoperative anesthesia system. 211 received intraoperative ketamine infusions. Those receiving ketamine were younger (difference = -4.4 years, 95% CI -2.2 to -6.0 years, P <10-6), higher ASA Physical Status (P = <10-6), and scheduled for longer estimated duration surgeries (difference = 72 minutes, 95% CI 60 to 84 minutes, P <10-6) There were no differences in BMI or gender.

The following were associated with greater likelihood of intraoperative ketamine infusion: scheduled opioids (OR 16.09, 95% CI 11.98 to 21.59), any opioids (OR 10.25, 95% CI 7.13 to 14.75), and anti-depressants (OR 2.69, 95% CI 2.02 to 3.57) (Table 1). Patients taking both scheduled opioids and anti-depressants were more likely to receive ketamine than those taking only scheduled opioids (OR 1.64, 95% CI 1.11 to 2.46; Table 1).

Among the 552 patients taking scheduled opioids preoperatively, those receiving ketamine infusions were younger (difference = 2.8 years, 95% CI -0.6 to -5.1 years, P =0.012), higher ASA Physical Status (P = 0.01), and scheduled for surgeries of longer estimated duration (difference = 49 minutes, 95% CI 32 to 67 minutes, P <10-6).

There were 20 distinct spine procedures identified (Table 2). Of these, 10 procedures had > 5% prevalence of intraoperative ketamine administration. The three most commonly performed were posterior thoracic/lumbar fusion (N = 148), anterior thoracic/lumbar fusion (N = 136), and anterior/posterior cervical fusion (N = 137).

Discussion

Patients taking scheduled opioids, had a higher likelihood of receiving ketamine intraoperatively. More complex spine surgeries, were frequently associated with intraoperative ketamine. These are not surprising findings, given previous studies that showed a benefit of ketamine in spine surgery[1,4]. This confirms that in clinical practice anesthesiologists viewed opioid-tolerant patients, especially those undergoing more complex and painful procedures, differently than those not taking opioids and undergoing less complex spine procedures.

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Tables/images

Table 1. Odds Ratios of receiving a ketamine infusion according to preoperative medication use

Preoperative Medication	Taking	Intraoperative Ketamine Infusion		Odds Ratio (95% CI)
		No	Yes	
Scheduled Opioid[1]	No	4325	82	16.09 (11.98 to 21.59)
	Yes	423	129	
Any Opioid[2]	No	3221	36	10.25 (7.13 to 14.75)
	Yes	1527	175	
Anti-Depressant	No	3765	124	2.69 (2.02 to 3.57)
	Yes	983	87	
Scheduled Opioid Alone	Yes	274	68	1.64 (1.11 to 2.46)
Scheduled Opioid + Anti-Depressant	Yes	149	61	

CI = confidence interval

[1] Included oxycodone extended-release, oxycodone (not taken PRN), hydrocodone (not taken PRN), morphine extended-release, oxymorphone extended-release, fentanyl patch, hydromorphone, morphine, methadone
[2] Included all "chronic" opioids, as well as the following: oxycodone PRN, hydrocodone PRN

Table 2. Ten Primary Spine Procedures with Highest Frequency of Ketamine Use

Procedure	Number of Cases	Intraoperative Ketamine Infusion	
		#	%
Image-guided posterior thoracic/lumbar decompression/fusion	46	8	17.4
Anterior/posterior thoracic/lumbar fusion	37	5	13.5
Anterior/posterior cervical fusion	137	15	10.9
Anterior thoracic/lumbar fusion	136	12	8.8
Posterior thoracic/lumbar fusion	148	10	6.8
Anterior/posterior lumbar fusion	202	8	4.0
Posterior cervical fusion	275	10	3.6
Anterior minimally invasive/posterior lumbar decompression and fusion	69	2	2.9

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1549
Medically Challenging Cases (report of up to 4 cases)

Peripheral Nerve Blockade as Perioperative Anesthetic and Pain Management of Patient with Severe Aortic Stenosis for Charcot Foot Reconstruction

Alex Dressler, Kristin Ondecko Ligda
University of Pittsburgh Medical Center

Introduction

Both normal and bicuspid aortic valves can increasingly calcify and stenose with age. The pooled prevalence of aortic stenosis is 12.4% with the prevalence of severe aortic stenosis being 3.4% in the United States and Europe with the percentage increasing yearly (1). Aortic stenosis (AS) is divided into the following stages: patients at risk of AS (stage A), progressive hemodynamic obstruction (stage B), severe asymptomatic AS (stage C), and symptomatic AS (stage D). The degree of AS is characterized by the transaortic maximum velocity or mean pressure gradient. These categories can be utilized if the patient has a normal transaortic volume flow. Subcategories under stage D exist for patients who have coexisting low flow as a result of low Left Ventricular Ejection Fraction (LVEF) (D2) and left ventricular dysfunction with normal LVEF (D3). Peak aortic valve velocity of >4 m/s or mean aortic valve gradient >40 mmHg indicates poor prognosis. (2)

Results/Case report

62-year-old female with a past medical history of aortic stenosis (previously deemed moderate by last evaluation in 2011), cerebrovascular accident without residual deficit, hypertension, hyperlipidemia, poorly controlled insulin-dependent diabetes and morbid obesity presented for Charcot foot reconstruction. Further cardiac testing was ordered to evaluate her current condition as she had been lost to follow up after previous evaluations. Lexiscan stress test showed mild reversible defect consistent with ischemia in the apical inferior segment and mid-inferior segment, LVEF 53%, and mild hypokinesis in the apical inferior segment and inferior wall. Transthoracic echo (TTE) showed moderate concentric left ventricular hypertrophy, mild systolic left ventricular systolic dysfunction, basal anterior segment, mid-lateral segment, and mid-posterior segment hypokinesis of left ventricle and showed mild enlargement of left atrium with associated mitral annular calcification and regurgitation. TTE also showed estimated LVEF of40-45%, severe aortic stenosis with an AV peak gradient of 93 mmHg and valve area estimated at 0.7 cm2 with an AV Peak velocity of 4.82 m/s. Patient did not desire valvular surgery at this time as she was asymptomatic from her severe AS. After discussion with surgeon, surgery was deemed necessary to prevent ulcer formation and infected wounds in her foot. Surgery would be modified for only essential procedure. Patient received with ultrasound-guided continuous sciatic catheter and saphenous nerve block injection. During the procedure, the patient tolerated the procedure well and received minimal intraoperative sedation. She was discharged from hospital on post-operative day 3.

Discussion

As the population ages and comorbidities increase, patients may not elect to have valvular repair despite presence of severe aortic stenosis. Patients may present for surgeries to minimize effects of future morbidity and preserve mobility. In our patient with Charcot foot, the pain, deformity, instability and risks for future wounds necessitated surgical reconstruction. Regional anesthesia techniques are used to minimize risks in patients with complicated comorbidities. Extensive discussion of risks, benefits, and alternatives should be discussed with the patient including the concern for aortic valve replacement prior to surgery. Our patient elected elected peripheral nerve blockade and surgery under regional anesthesia.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1551
Scientific abstract: Regional anesthesia

A Randomized Controlled Study Comparing Brachial Plexus Blockade Performed Using Device Assisted Needle-Guidance vs Standard Approach

Amaresh Vydynathan, Singh Nair, Nancy Shilian, Gregory Bryan, Naum Shaparin
Montefiore Medical Center

Introduction

The ultrasound guided, in-plane technique of needle insertion during peripheral nerve blockade poses the challenge of maintaining in-plane alignment of the needle tip. This challenge sometimes results in the utilization of multiple passes and needle re-insertions to maintain needle alignment, causing longer procedure times and increased patient discomfort. The new needle guidance device is designed to assist in-plane needle visualization by attaching to the ultrasound probe and maintaining needle alignment while utilizing the in-plane approach. The purpose of this study is to evaluate the efficacy of using the guidance device in improving procedure performance during upper extremity regional anesthetic blockade using the in-plane approach.

Materials and methods (NA for case report)

After IRB approval and obtaining informed consents, 70 patients scheduled to receive either interscalene or supraclavicular nerve blocks were randomly assigned into 2 groups, one using standard approach and the other utilizing the needle guidance device. An independent observer recorded the following data: total procedure time from probe contact with skin to needle withdrawal; total needle insertion time from needle insertion to withdrawal; number of planned and unplanned redirections; and number of re-insertions. Additionally, physician satisfaction, ease of technique, and needle visualization were assessed using a questionnaire survey.

Results/Case report

Baseline patient characteristics were similar in the two groups. In the supraclavicular group, the median time taken to complete block, unplanned needle re-directions and total procedure were all significantly different between the standard and the needle guidance group ($p < 0.001$. [table.1]). In the interscalene group, the needle insertion time and the unplanned needle re-direction time was significantly different between the standard and the needle guidance group, ($p < 0.001$), but there was no difference in the total procedure time (p-0.339[table.1]). The incidence of needle reinsertion did not differ significantly between the groups, however in the supraclavicular group reinsertion percentages were 27.8% and 5.3% in the no device and device group respectively (p-0.063). 100% of the physician's reported that they would use the needle guidance again and 90% reported that they would prefer it in all in-plane blocks.

Discussion

Performing regional blocks using the needle guidance device reduces total needle insertion time and unplanned needle re-directions in supraclavicular and interscalene block, but total procedure time is only reduced in the supraclavicular blocks. Moreover, all physicians were satisfied with the performance of the needle guidance system. Results of the study demonstrates that the use of needle guidance device while performing upper extremity regional block saves procedure time and improves physician's satisfaction.

References

Research support made available through an unrestricted grant provided by CIVCO Medical Solutions. The terms of this arrangement have been reviewed and approved by Albert Einstein College of Medicine, Montefiore Medical Center in accordance with its policy on objectivity in research.

Tables/images

Table .1 **Supraclavicular block**

	No needle device [18]	Needle device group[18]	
Needle insertion time (sec)	197 [140-278]	106 [92-162]	<0.01
Total procedure time (min)	4.5 [4-6]	3 [2-3]	<0.01
Unplanned directions	5.5 [3-9]	2 [1-5]	<0.01
Needle reinsertions (%)	28	5	0.06

Interscalene group

	No needle device [17]	Needle device group [17]	
Needle insertion time (sec)	126 [94-295]	86 [76-146]	<0.01
Total procedure time (min)	3 [2-6.5]	3 [2-4]	0.33
Unplanned directions	4 [2-8.5]	2[1-3]	<0.01
Needle reinsertions (%)	17	6	0.28

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1552
Medically Challenging Cases (report of up to 4 cases)

Usage of Ketamine Infusion for Acute Exacerbation of Chronic Neuropathic Pain

Kristin Bevil, Jocelyn Blake
University of Wisconsin

Introduction

Here a case report of intravenous ketamine infusion to treat an acute exacerbation of chronic neuropathic pain is presented.

Results/Case report

J.O. was a 72yo male admitted for an exacerbation of chronic abdominal pain. The pain was present for the past eight years; it began as a slowly progressive burning pain in his left abdomen and spread bilaterally. The pain was exacerbated by movement and light touch, and he was on disability due to functional impairment secondary to the pain. He denied any associated skin changes such as color changes, rashes, or sweating. J.O. had previously seen two pain specialists. His medication history included failed trials of TCAs, SNRIs, opioids, gabapentin, NSAIDs, and topical local anesthetics. He also had bilateral TAP blocks performed previously without improvement. He was currently only taking acetaminophen as he was frustrated with the other medications that failed to relieve his pain.
During J.O's hospitalization, the pain services were consulted to aid in pain management. His current symptoms included 10 days of 10/10 constant bilateral abdominal pain that he described as burning, aching, and throbbing, and it prevented him from wearing any clothing that touched his abdomen. He was started on a ketamine infusion of 10 mg/hour for a duration of 48 hours; duloxetine and gabapentin were re-initiated. During his treatment with the infusion, J.O. experienced complete resolution of his pain, and it remained well controlled until his discharge from the hospital 5 days later. However, his symptoms had returned by the time of his follow-up office visit 2 weeks after discharge.

Discussion

Ketamine was chosen in this setting for acute pain relief as well as to reverse the effects of the sensitization process and associated chronic neuropathic pain. Ketamine acts as a noncompetitive antagonist at the NMDA glutamate receptor, which plays an important role in chronic neuropathic pain syndromes. Repeated activation of the NMDA receptor in the afferent pain pathway most notably leads to central sensitization and opioid tolerance. A systematic review of ketamine infusion as therapy for chronic pain showed a ketamine infusion to be superior to placebo in 12 of 14 trials. Ketamine was administered as a brief infusion ranging from 10-60 minutes with dosages from 0.1 to 0.5 mg/kg. Additionally, in two studies of prolonged (approximately 10 days) sub-anesthetic infusions of ketamine in patients with Complex Regional Pain Syndrome, pain scores were significantly reduced as long as 3 months after the infusion. Some studies also indicated that the duration of analgesia after infusion is amplified with a second infusion. One study on mouse pain models demonstrated increased efficacy of ketamine in the chronic pain phase versus the acute pain phase, suggesting that the central mechanisms of pain, rather than peripheral mechanisms, are more specifically addressed by ketamine. Usage of intravenous ketamine for the management of chronic pain syndromes appears promising, but further study is indicated.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1554
Medically Challenging Cases (report of up to 4 cases)

A Unique Presentation of Harlequin Syndrome Following Thoracic Epidural Analgesia

Hubert Cios, John Shepler
University of Wisconsin Hospital and Clinics

Results/Case report

A 60yof presented for an open ventral hernia repair with a PMH significant for HTN, Asthma and depression. A preoperative thoracic epidural was placed at the T7-8 interspace. Post-operatively despite adequate dosing, no level could be obtained, and given the patient's discomfort we opted to replace it. Using a paramedian approach the epidural was successfully replaced at the same interspace. In sequence, the patient received a test dose of 45mg lidocaine 1.5%, 15mcg epi. After lying the patient supine an additional 2ml 2% lidocaine was given. 5 minutes later after the patient did not receive relief an additional 2ml 2% lidocaine was administered with 100mcg fentanyl (2ml). The patients pain scores began to drop. It was noticed several minutes later that the patient had developed unilateral right sided facial flushing that was quite dramatic with no flushing on the left side. The patient had a level to cold temperature to T2 bilaterally that extended to L4 on both sides. The patient's right sided facial temperature was measured by Exergen TAT-5000 Temporal Artery Thermometer © and found to be 35.6 degrees Celsius on the left and 36.8 degrees Celsius on the right on several repeat measurements.

The patient did not report nasal stuffiness, increased sweat production on the right side. They also did not have evident eyelid drooping or pupillary dilation. The patient required phenylephrine dosing x 4 with 100-200mcg to maintain MAP>60 over a 20 minute period prior to stabilization of pressures as well as 1L bolus of LR. She did not become bradycardic. Approximately 60 minutes after the unilateral facial flushing was noticed it resolved and the patient was discharged from the PACU with an epidural infusion at a decreased rate of 4ml/hr of 0.1% ropivacaine. The patient remained in the hospital for 2 days and the epidural was discontinued on POD2. The patient continued to receive good analgesia and suffered no adverse events throughout her hospitalization.

This case is of interest secondary to the dramatic cephalad and caudad spread of her dermatomal levels with isolated unilateral facial flushing, increased skin temperature with lack of other associated Horner-symptoms. It requires distinguishing between a high spinal, horner syndrome, allergic reactions and other potentially benign or life threatening causes of unilateral facial flushing. Harlequin syndrome is unique from Horner in that it does not manifest with ocular symptoms. We believe that the most likely cause was an uneven distribution of local anesthetic even though by rough clinical assessment the patient had a T2 level bilaterally. Case reports had previously been published with Harlequin syndrome related to regional anesthetic techniques including high thoracic paravertebral anesthesia, extrapleural bupivacaine infusion, obstetric lumbar infusions. We did not find many cases that were very well documented especially with the dramatic demarcation of the face without ocular symptoms which we were able to document. Certain genetic causes of Harlequin syndrome, which can be triggered by emotional stress also can exist or patients may have underlying genetical predispositions.

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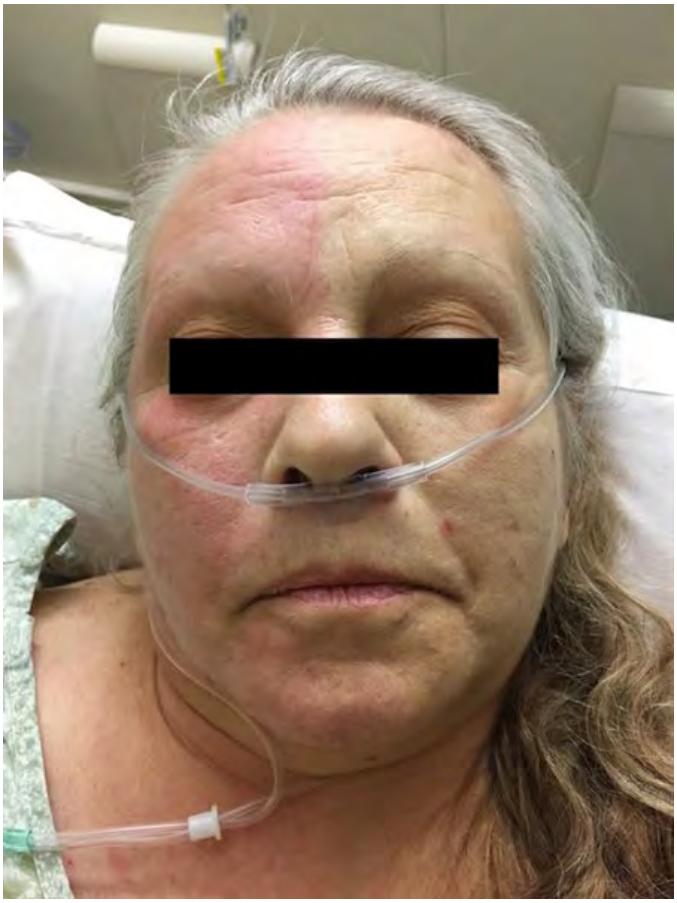
Tables/images



Picture taken by Hubert Cios, MD with permission granted by patient for use post-operatively and on the first post-operative day. Evident demarcation across the face with right sided facial flushing.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1556
Scientific abstract: Regional anesthesia

Pulse Wave Doppler Ultrasonography for detection of Nerve catheters

Srinivasa Raghavan Govindarajan, Theresa Fanelli, Rovnat Babazade, Loran Mounir Soliman, Wael Ali Sakr Esa, Kamal Maheshwari, Hesham Elsharkawy
Cleveland Clinic

Introduction

Use of ultrasound has increased the success rate of epidural and peripheral nerve blocks. However, secondary catheter failures are common and limit the ability to provide reliable continuous postoperative analgesia. Verification of proper position of the epidural and peripheral nerve catheter remains challenging. As catheter can't be readily imaged using ultrasound, a combination of different approaches are used to locate the tip of the catheter with varied success rates. We present a new novel method for verification of placement of epidural and peripheral nerve catheters using pulsed wave Doppler (PWD).

Materials and methods (NA for case report)

This abstract aims to report the new technique of using PWD for verification of catheter location. We plan a retrospective chart review of twenty patients where PWD was used to confirm the position of the catheter for any regional anesthetic procedure. No informed consent would be necessary as it would be a retrospective review of de-identified data of patients who were candidates for epidural or peripheral nerve catheter placement for postoperative pain management at Cleveland Clinic.

Results/Case report

Patients with confirmed catheter location experienced excellent pain control in the distribution of the blocked nerve. The distance from the skin surface to the area of PWD pattern did not affect the sensitivity of the detection. PWD was used both with saline and local anesthetic injection with no difference. Changes in PWD pattern was more obvious when small volume of air was injected after initial negative aspiration. We used M mode and found it to be useful in patients where PWD images were not conclusive for the position of the catheter and for deeper blocks such as lumbar plexus, quadratus lumborum and epidural catheters.

Discussion

PWD mode allows us to measure velocities at a single point, or within a small window of space. It requires the ultrasound probe to send out a pulsed signal to a certain depth and then listen for the reflected frequency shift from that particular depth. The computer then calculates the velocity of flow at the chosen point. PWD mode provides quantifiable information about the direction and velocity of blood through the specified vessel. We apply the same principle to the flow of local anesthetic or saline inside the nerve catheter, which can potentially be used to locate the nerve catheter. However, it can not distinguish between the tip and the shaft of the catheter.

This technique can be a useful and safe adjunct to the other array of modalities to verify proper positioning of catheters, especially in patients with difficult anatomy and in deeper blocks.

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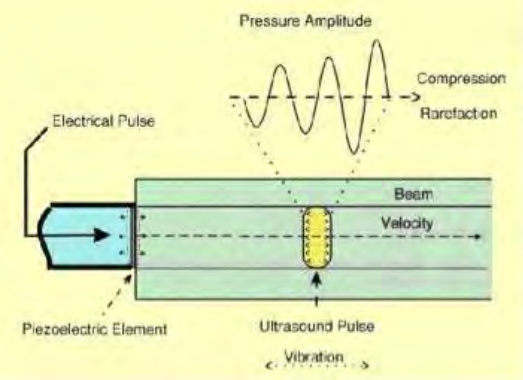
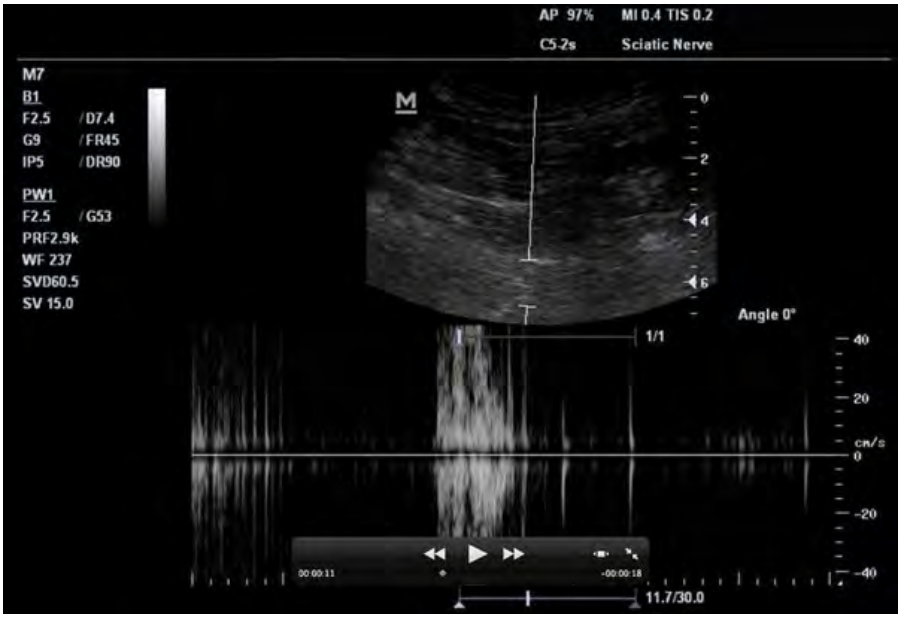
Tables/images



Principle of Pulse Wave Doppler



PWD for sciatic nerve catheter confirmation

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1557
Medically Challenging Cases (report of up to 4 cases)

Successful epidural anesthesia for vaginal delivery in a patient with von Hippel-Lindau disease

Tara Lenk, Kaveh Marzbani, Sanjeev Dalela
Henry Ford Hospital

Introduction

Von-Hippel Lindau disease is a rare autosomal dominant disease with variable expressivity that is characterized by hemangioblastomas of the central nervous system (especially cerebellum), retinal angiomas and pheochromocytomas. Our report describes successful epidural management for vaginal delivery in a parturient with VHL disease.

Results/Case report

A G2P1, 33 year old female at 34 weeks and 5 days with a medical history of von Hippel-Lindau disease was referred from an outside hospital with symptoms of neck stiffness and bilateral shoulder pain. A non-contrast MRI showed a new area of profound cervical spinal cord edema. She had a previous history of posterior resection of a cerebellar hemangioblastoma eight years ago. Neurosurgical evaluation did not reveal any new neurologic deficits or findings of elevated ICP with recommendation for early delivery followed by MRI with contrast with possible surgical intervention. The patient was evaluated by obstetrics who found polyhydramnios and breech status but she was stable from an obstetrical standpoint. Dexamethasone therapy was started for both fetal lung maturity and spinal cord edema.

Anesthesiology was consulted and requested an MRI to rule out any new lumbar hemangioblastomas below the level of L2 that may complicate neuraxial placement. Plan would be either spinal for cesarean section or epidural analgesia for labor if MRI showed no hemangioblastomas in the lumbar spine. Alternatively, if the patient had MRI findings of lumbar hemangioblastoms, alternatives such as intravenous opioids would be considered. General anesthesia would be used in case of cesarean section with lumbar hemangioblastomas or emergent status. Neurosurgery deemed her cervical spine to be stable and a consensus was made to use video-laryngoscopy for intubation. If her cervical spine became unstable, manual in-line stabilization with video-laryngoscopy or awake fiber-optic intubation would be used.

Upon repeat examination, the fetus was in cephalic position, and the mother requested trial of labor. An epidural catheter was placed using a 17 guage 3.5 inch Tuohy needle with 1 attempt at the L3-4 interspace. Spontaneous vaginal delivery of a healthy male newborn was completed 4 hours after epidural placement with minimal pain during the first and second stages of labor. There were no complications from epidural placement 24 hours following removal.

Discussion

Full knowledge of the patient's disease burden via MRI was especially helpful in this case. Armed with the information of no lumbar hemangioblastomas and no cerebellar hemangioblastomas causing mass effect and no signs or symptoms of increased ICP helped in having confidence in attempting epidural anesthesia for labor. A multidisciplinary approach was essential in this case, as neurosurgery was instrumental in developing the plan for the patient's airway. Additionally, we felt comfortable proceeding with epidural even with the possibility of an inadvertent dural puncture because the patient's ICP was not elevated.

In summary, we believe that induction of labor with epidural anesthesia is a viable option for patients with von Hippel-Lindau disease where lumbar hemangiomas are ruled out with appropriate imaging prior to placement, no signs or symptoms of increased ICP are noted and there is no other indication for cesarean section.

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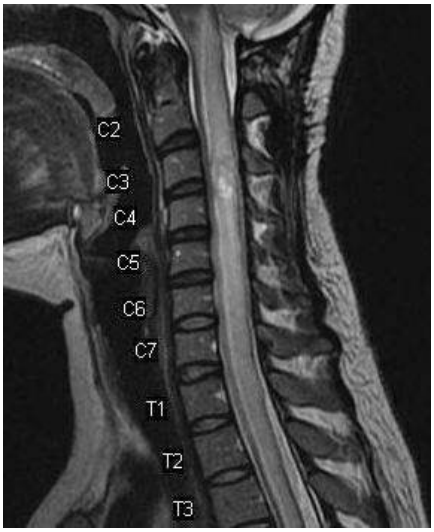

MRI with contrast of cervical spinal cord edema

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1558
Scientific abstract: Regional anesthesia

Going with the flow: Are we too quick? An observational study of injection speeds in the clinical practice of ultrasound guided regional anaesthesia

Thomas Bishop, Nima Deen, Simeon West
University College London Hospital

Introduction

Safe and successful regional anaesthesia requires the accurate placement of the needle tip in close proximity to nerves without breaching the epineurium. Animal studies have demonstrated injection pressures of greater than 75kPa correlate with intraneural needle placement. In clinical practice estimation of injection pressure, by touch (the 'syringe feel'), is unreliable (Claudio et al.[1]). Commercial in-line pressure monitors with cut-offs in the region of 75kPa are available. Bench-top studies have demonstrated that pressure characteristics of commonly used RA needles can exceed 75kPa at modest flow rates independent of patient tissue compliance (Patil et al.[2]). As a result it has been suggested that injection rates of less than 15ml.min^{-1} (0.25ml.s^{-1}) should be used to reduce the effect of factors upstream from the needle tip as a cause of high injection pressures (Patil et al.[2]).

Our aim was to assess the speed of injection in our clinical practice comparing this between blocks and with reference to the suggested rate of ≤15ml.min^{-1}.

Materials and methods (NA for case report)

'Covert' observation of a variety of blocks was undertaken by the anaesthetic nurse (ND) in our block room. The regional anaesthesia practitioner was unaware of this observation. The type of block, needle type and the total volume of local anaesthetic injected were recorded. The time taken to inject was observed and recorded using the stopwatch function on an iPhone 4S. The average injection speed was calculated from this data.

Results/Case report

A total of 36 regional anaesthetic procedures were observed; these were performed by 9 regional anaesthesia practitioners (7x consultants, 2x senior clinical fellows).

Barring the paravertebral blocks (Pajunk 16G SonoTouhy needles) all blocks were performed with 22G regional anaesthesia needles (B Braun StimuPlex 50mm, Pajunk SonoPlex 50mm or 80mm or Pajunk SonoTAP 80mm) In all cases the standard attached extension tubing was used for the injections.

Only 10 of the 36 blocks (28%) had injection speeds of less than the recommended 15ml.min^{-1}.

The injection speeds for the given blocks can be seen in table 1.

Discussion

Our results demonstrate that in our routine clinical practice, in the hands of experienced regional anaesthesia practitioners, injection speeds

regularly exceed the recommended rate of 15ml.min^{-1} (0.25ml.s^{-1}). As a result the pressure characteristics may exceed 75kPa independent of the tissue compliance encountered whilst undertaking a regional anaesthetic blocks. This further evidences the observation that 'syringe feel' is an unreliable predictor of needle tip location (intrafascicular vs. extrafascicular). Moreover, it suggests that needle tip manometry devices may obviate the influence of the flow-pressure characteristics of commonly used regional anaesthesia needles in predicting needle tip location.

These preliminary findings demonstrate that there is a need for further investigation of injection rates in regional anaesthesia and the impact they may have in the clinical setting.

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Tables/images

Block Type	Number Observed	Injection Speed ml.min^{-1} ± SD (Range)	Injection Speed ml.sec^{-1} ± SD (Range)
Supraclavicular	10	17.77±4.00 (13.75-24.07)	0.30±0.07 (0.23-0.40)
Interscalene	6	18.78±4.82 (13.52-26.62)	0.31±0.08 (0.23-0.44)
Axillary	2	18.18 (14.77-21.58)	0.30 (0.25-0.36)
Adductor Canal	6	22.08±4.98 (15.74-29.86)	0.37±0.08 (0.26-0.50)
Popliteal-Sciatic	1	36.42	0.61
Ankle	3	11.60±1.73 (9.65-12.95)	0.19±0.03 (0.16-0.22)
Facial Plane (PVB/TAP/PECS2)	8 (6/1/1)	27.60±9.30 (15.56-46.14)	0.46±0.15 (0.26-0.77)
Total	**36**	**20.87±7.61 (9.65-46.14)**	**0.35±0.13 (0.16-0.77)**

Table 1: Block types and injection speeds

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1559
Scientific abstract: Emerging technology

Oliceridine (TRV130), a novel μ receptor G protein Pathway Selective (μ-GPS) modulator, has a differentiated profile of G protein and ß-arrestin signaling versus select opioids

Will Gowen-MacDonald, Thomas Graczyk, Michael Lark, Conrad Cowan
Trevena, Inc.

Introduction

Opioids are widely employed for management of moderate to severe acute pain; however, opioid-related adverse events (ORAEs), including respiratory depression and gastrointestinal dysfunction, increase risk and may limit dosing required for analgesic efficacy. Conventional opioids bind to μ receptors and non-selectively activate two intracellular signaling pathways: the G protein pathway, associated with analgesia, and the β-arrestin pathway, associated with ORAEs and inhibition of G protein-mediated analgesia. Oliceridine (TRV130) is a novel μ receptor G protein Pathway Selective (μ-GPS) modulator that activates G protein while mitigating β-arrestin recruitment to the μ receptor. The objective of this study was to assess G protein activation and β-arrestin recruitment with oliceridine versus conventional opioids including morphine, oxycodone, hydromorphone, oxymorphone, fentanyl, and sufentanil.

Materials and methods (NA for case report)

Both G protein and β-arrestin responses were measured across a broad concentration range for oliceridine, morphine, oxycodone, hydromorphone, oxymorphone, fentanyl, and sufentanil using the same human embryonic kidney (HEK)-293 cell line expressing the human μ receptor. G protein-mediated responses were quantified by measuring reduction in forskolin-stimulated cAMP (HTRF, CisBio). β-arrestin recruitment was measured using enzyme fragment complementation per manufacturer's instruction (DiscoveRx). cAMP accumulation assays were run in parallel with β-arrestin recruitment, using the same cells, drug dilutions, and assay buffers. Data were normalized as a percentage of maximal assay responses to morphine.

Results/Case report

Oliceridine displays strong G protein signaling similar to that seen with other opioids including morphine, oxycodone, hydromorphone, oxymorphone, fentanyl, and sufentanil, in the cAMP assay (Figure 2). Oliceridine was more potent (EC_{50} = 8 nM) than morphine (50 nM) and similar to fentanyl (6 nM) in the cAMP assay. In the b-arrestin assay oliceridine produces little to no response as compared to morphine (Figure 1), fentanyl, and sufentanil.

Discussion

Oliceridine had similar G protein signaling, which is associated with analgesia, compared to morphine, oxycodone, hydromorphone, oxymorphone, fentanyl, and sufentanil. In contrast, oliceridine elicited almost no β-arrestin recruitment to the μ receptor, which is associated with ORAEs and inhibition of G protein-mediated analgesia, as compared to morphine, oxycodone, hydromorphone, oxymorphone, fentanyl, and sufentanil. In fact, both fentanyl and sufentanil recruited higher levels of b-arrestin than morphine. These results provide strong mechanistic support that oliceridine can activate G protein mediated-analgesia while mitigating β-arrestin-mediated ORAEs compared to conventional opioids. This novel mechanism of μ receptor activation may be responsible for the wider therapeutic window of oliceridine between analgesia and ORAEs in the management of moderate to severe pain.

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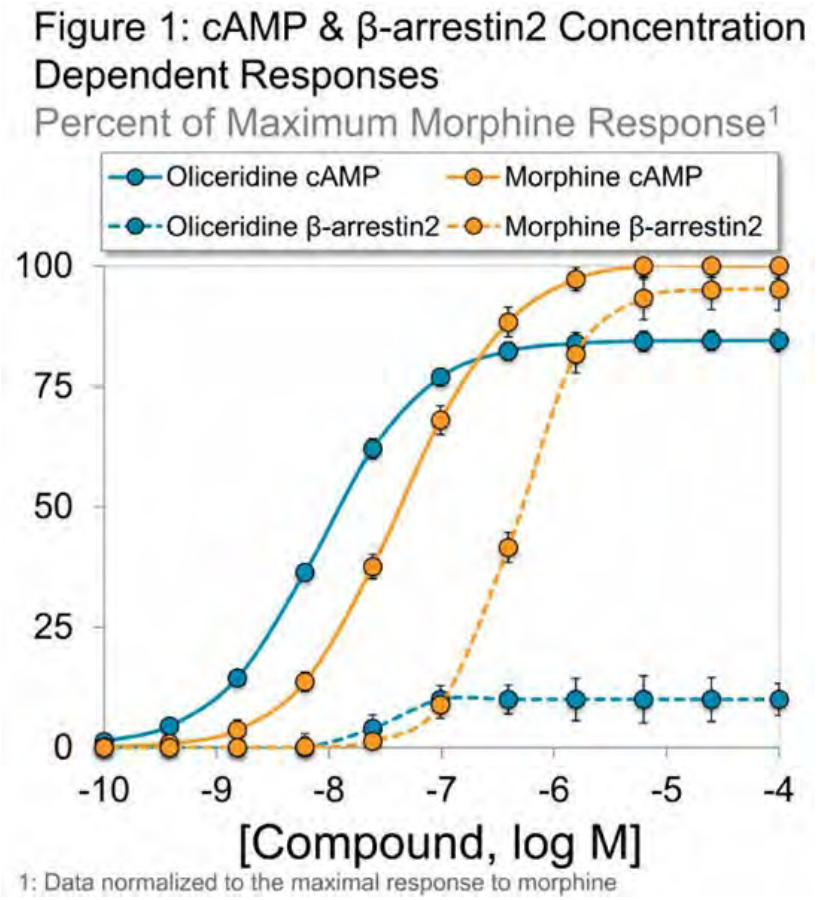

Figure 1: cAMP and ß-arrestin Concentration-Dependent Responses

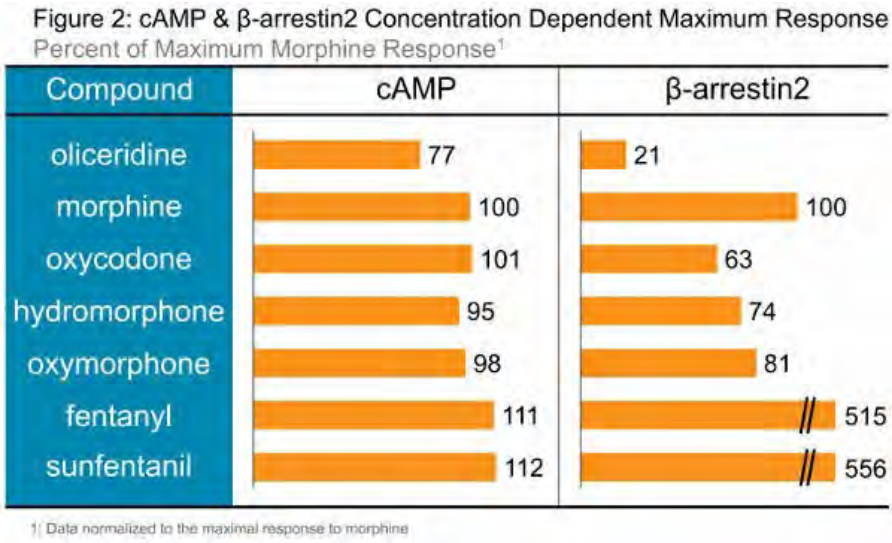

Figure 2: cAMP and ß-arrestin2 Concentration-Dependent Maximum Response

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
This study was supported by Trevena, Inc.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1560
Scientific abstract: Regional anesthesia

Lateral Compartment Block: A new approach for analgesia after total knee replacement

Daniel Kang, Naveen Shetty, Sarah Saber, Naum Shaparin, Amaresh Vydyanathan
Albert Einstein College of Medicine

Introduction

The adductor canal block (ACB) is a well-documented procedure for post-operative analgesia following total knee replacement (TKR). It was proposed as a viable option to eliminate motor blockade that complicated the previously popular femoral nerve block[1]. While ACB provides reproducible sensory blockade of femoral nerve branches supplying the knee, it does not provide analgesia in the distribution of the articular branches particularly in the lateral aspect of the knee. A recent cadaveric study[2] indicated the possibility of an ultrasound-guided nerve block to the lateral retinacular nerve (LRN) to alleviate chronic lateral knee pain. The LRN is the first branch off of the superolateral geniculate nerve (SLGN), which branches off the sciatic nerve to innervate the posterior and lateral aspects of the knee[2]. Our case-series study aims to demonstrate feasibility of the lateral compartment block (LCB) for pain control after TKR. In addition to feasibility, we aim to compare the effects on knee mobility, visual analogue pain scores, and adjuvant opioid use postoperatively to a recent study demonstrating efficacy of the ACB alone on the same measures[3].

Materials and methods (NA for case report)

The study was conducted at the Wakefield Campus of the Montefiore Medical Center. Institutional Review Board approval was obtained through the Albert Einstein College of Medicine. Ten patients undergoing TKR received the LCB in addition to the ACB. The LCB was done under ultrasound visualization with local anesthetic injected under the iliotibial band near the junction of the lateral condyle and shaft of the femur. Ropivacaine 0.5% 10 cc was used for the LCB and 20 cc for the ACB. Primary end points included extension and flexion measurements of the operated knee on POD 1 as well as the progression of visual analogue pain scores and adjuvant opioid requirements during POD 1 and 2. Measurements of efficacy were retrospectively obtained through chart review.

Results/Case report

This is an ongoing study; preliminary analysis shows that adequate strength and range of motion were achieved immediately after TKR. Median strength scores showed 4/5 on POD 1 and median degrees of extension to flexion were 0-90 for POD 1 and 0-95 for POD 2. Additionally, a previous study[3] of 111 TKR patients receiving solely ACB demonstrated a higher 24-hr opiate requirement than patients who received LCB in this study (median [25th, 75th percentile]): 41.5 [24.0, 61.3] (ACB) vs. 31.3 [25.2, 41.6] (ACB + LCB). Further analysis and results will be presented at the time of the conference.

Discussion

The lateral compartment block involving the LRN and SLGN may provide significant pain control and opioid use reduction in the postoperative setting of TKR. Ultrasound-guided injection of the LRN and SLGN may be a newly viable option for pain control without the risks of muscle weakness and falls associated with the traditional femoral and adductor block techniques. Furthermore, targeting the LRN and SLGN may provide a highly specific sensory blockade useful for lateral knee pain. Our study, however, is limited by a small sample size and its retrospective nature. The clinical utility of these findings will require further comparative investigation.

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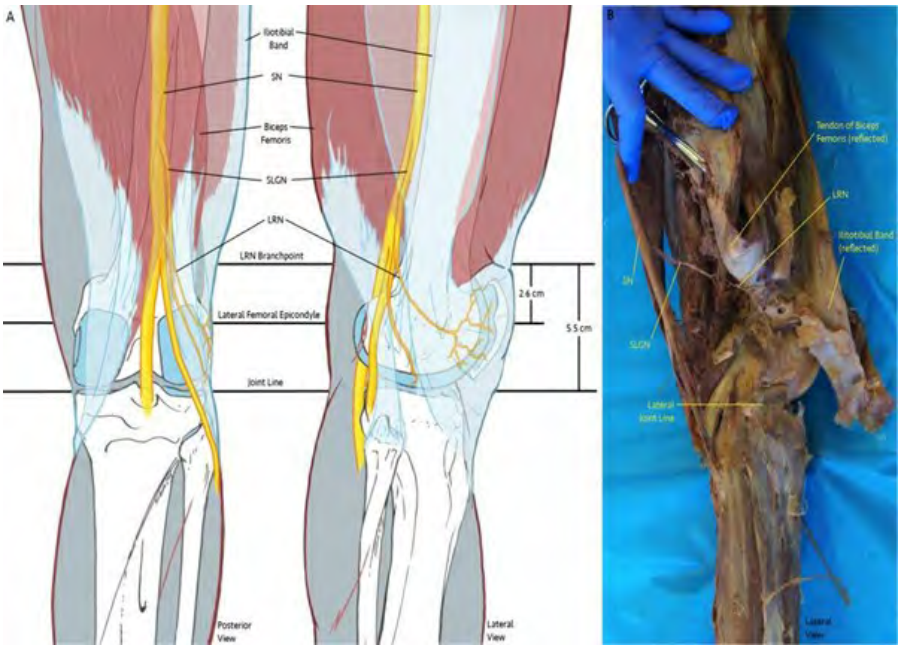
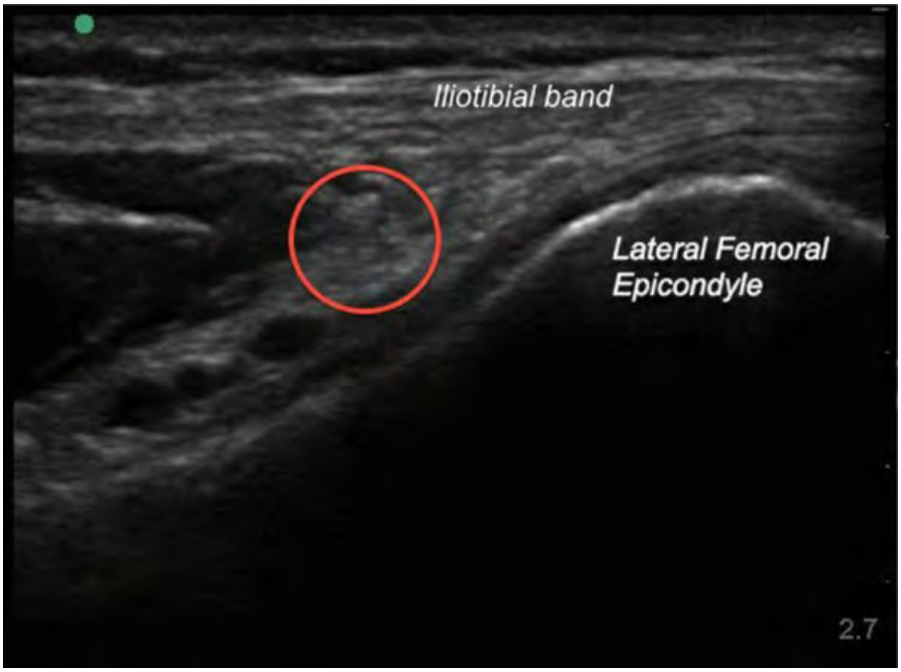


Cadaveric anatomy showing Lateral Retinacular Nerve and Superolateral Geniculate Nerve



Ultrasound guided technique of the Lateral Compartment Block

Table 1. Patient demographics and surgery data n=10

Sex (F)	Age	Surgical Time	Tourn Pressure
80%	70.5 (67, 74)	63 (60, 66)	350 (325, 350)

* Data are expressed as median (interquartile range)

Table 1: Patient demographics and surgery data

Table 2. Outcome variables n=10

Strength POD 1	4 (3, 4)	Opioid (24-hr)	31.3 (25.2, 41.6)
Strength POD 2	4 (3, 4)	APAP (24-hr)	IV: 500 (0, 1000) PO: 975 (975, 975)
Transfer	4 (4, 4.5)	NSAID (24 hr)	30 (18.8, 56.3)
AROM Ext POD 1	0 (0, 3.8)	VAS POD 1	4 (2, 7)
AROM Flex POD 1	90 (82.5, 94.5)	VAS POD 2	5 (2, 5)
AROM Ext POD 2	0 (0, 3.8)	Bed Mobility	5 (4, 5)
AROM Flex POD 2	95 (90, 98.8)		

* Data are expressed as median (interquartile range)

Table 2: Outcome variables

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1561
Scientific abstract: Education

Resident Accuracy of Musculoskeletal Palpation with Ultrasound Verification

Priyesh Mehta, Ethan Rand, James Wyss
Hospital for Special Surgery

Introduction

The physical examination is an essential part of the clinical encounter in every field of medicine. Specifically, proper training in musculoskeletal physical examination becomes increasingly important as musculoskeletal disorders are the single most common health-related cause of work disability (1). The teaching of physical examination to medical students has traditionally taken place at the bedside and in the classroom. However, studies have shown that these traditional methods have resulted in a decline in physical examination skills among medical students and residents (2). The use of ultrasound (US) as a method of teaching the physical examination has become the forefront of medical school curriculums. Much of the literature supports and validates the use of US in teaching medical students the abdominal and cardiac physical examination (3,4). Currently, there is limited evidence to support the use of US in evaluating and teaching the musculoskeletal physical examination. The purpose of this study is to determine the accuracy of musculoskeletal palpation of the medial joint line of the knee, medial patella tendon and posterior tibialis tendon verified by ultrasound in PM&R residents. In addition we identify areas of palpation errors and measure resident level of confidence in palpation skills.

Materials and methods (NA for case report)

The study was approved by the Hospital for Special Surgery Institutional Review Board. Cohort study from one PM&R residency program at an academic institution. Eighteen PM&R residents participated to palpate the medial knee joint line, medial patella tendon, and posterior tibialis tendon in a female and male model. Once the anatomic structure was localized, the residents were asked to tape a paperclip parallel to the anatomic structure overlying skin. The accuracy of paperclip placement over the anatomic structure was verified using US as well as distance from structure (Image 1, 2, 3). Residents were asked to evaluate their confidence on palpation using a 5-point Likert scale.

Results/Case report

Overall accuracy for medial knee joint line, medial patella tendon and posterior tibialis tendon was 11.5%, 36% and 28% respectively. The paperclip was placed superior to the medial joint line 24/32 (75%) of the time with the remainder placing inferior with a mean distance of 1.73 cm from the joint line. The paperclip was placed lateral to the medial patella tendon 12/23 (48%) with a mean distance of 0.65 cm. The paperclip was placed posterior to the posterior tibialis tendon 19/26 (73%) with a mean distance of 0.98cm. Based on the resident level of education, postgraduate level 4 performed better (31%) than postgraduate 3 (29%) and 2 (19%). Residents were least confident at palpating the posterior tibialis tendon.

Discussion

Residents in this study showed poor accuracy of medial knee joint line, medial patella tendon and posterior tibialis tendon palpation, using US as the standard for verification. Residents performed better with increased post-graduate level and were least confident with palpation of the posterior tibialis tendon. This study highlights the poor accuracy of musculoskeletal palpation skills and an area of much needed improvement in residency training. US may be a useful method of teaching the physical examination in medical education.

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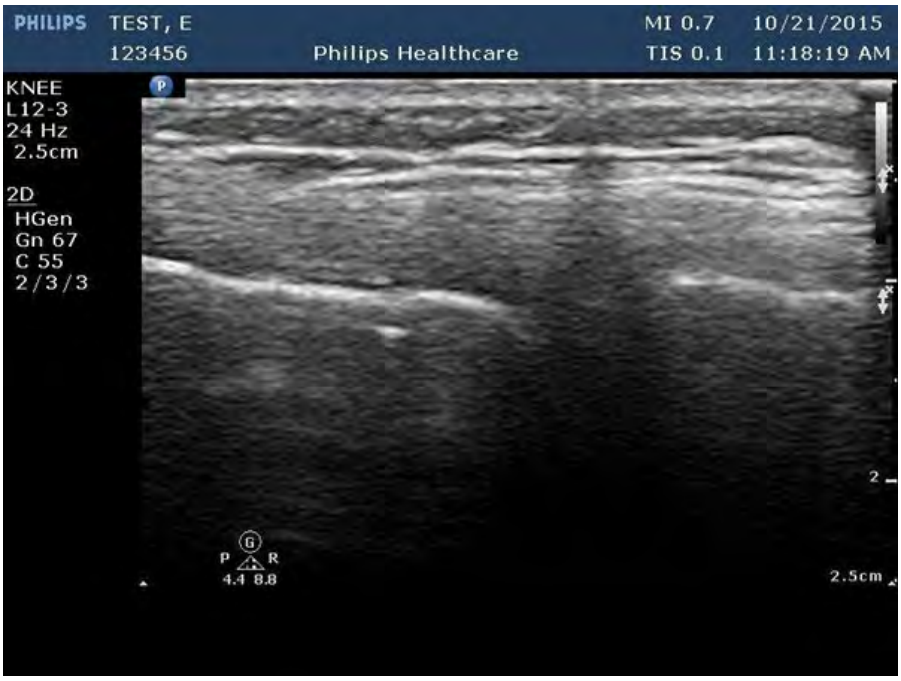
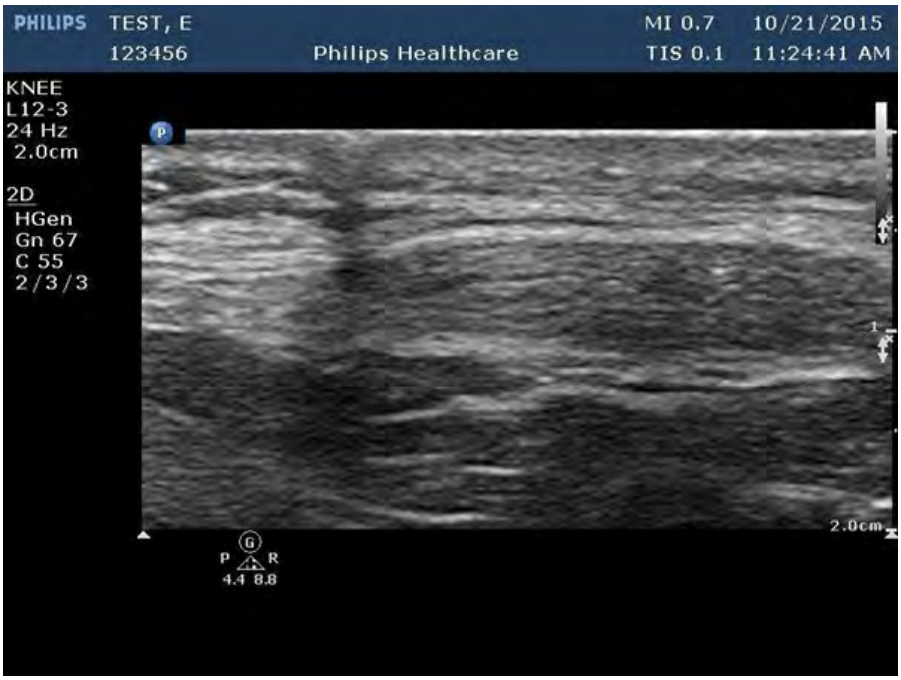
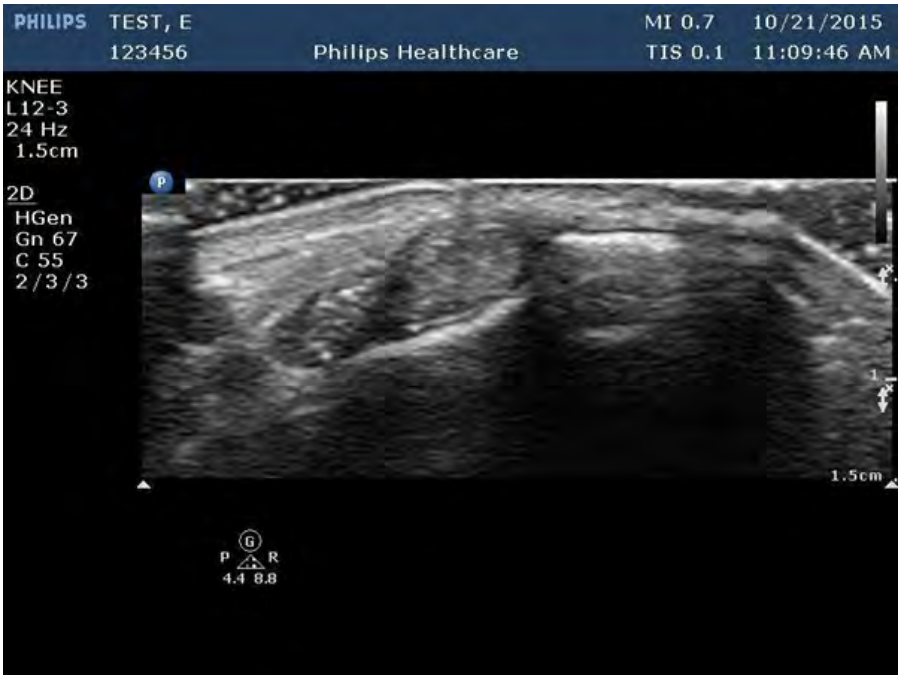


Ultrasound image of the needle correctly placed over the medial joint line of the knee. The reverberation artifact from the paperclip corresponds to correct needle placement over the joint line.



Ultrasound image of the needle correctly placed over the medial patella tendon. The reverberation artifact from the paperclip corresponds to correct needle placement over the medial patella tendon



Ultrasound image of the needle correctly placed over the posterior tibialis tendon. The reverberation artifact from the paperclip corresponds to correct needle placement over the posterior tibialis tendon.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1562
Medically Challenging Cases (report of up to 4 cases)

Complex Pain Management in Calciphylaxis

Robert Hill
University of Nebraska Medical Center

Introduction

Calciphylaxis, a disruption in calcium regulation, is associated with painful necrotic skin lesions, sepsis and vascular disease[1]. Often associated with renal failure, obesity, hyperparathyroidism and concomitant anticoagulant-use, the condition has mortality rates that approach 80%[2]. Death is largely attributed to organ failure brought about by small vessel disease. Ulcerations on the upper and lower extremities are an early and extremely painful sign[3]. Dressing changes are required every four to six hours and are a source of significant pain and anxiety for the patient[4]. In this report, we review the case of a thirty six year old patient with calciphylaxis. We address the nature of her pain and how we consulted with internal medicine, clinical pharmacists, burn team, acute and chronic pain management to cooperatively develop a narcotic-based pain regimen that would temper her discomfort during dressing changes yet not overly sedate to exacerbate her concomitant pulmonary and cardiac disease. Following successful treatment of her skin lesions with hyperbaric oxygen therapy[5], we developed a pain management plan for her extended care facility to transition her off of long-term narcotics and regain her quality of life. We discuss the rational for our treatment and how we are working to enhance future treatment options for patients in our institution.

Results/Case report

We discussed the options available to the patient. General anesthesia during dressing changes was an option, though not one desired by the patient or the primary team due to the frequency of procedure and disruption to the patient's daily schedule. Oral ketamine was proposed as a method of short-term pain relief for pain during dressing changes and transfer to the hyperbaric oxygen unit. The problem that we encountered, however, is that our institutional regulations mandate an increased level of care (ICU) for this medication to be utilized. Given the high-risk nature of her case, we agreed that intervention remained undesirable to the patient. Ultimately, we decided that the patient would likely benefit from a transition from high-dose oxycontin to methadone for long-term pain relief. Given the patient's history of cardiomyopathy, mitral valve dysfunction and low ejection fraction, cardiology was consulted and daily EKGs were ordered to detect significant QT prolongation[7]. We established the patient's QT baseline and initiated methadone at 5 mg every twelve hours. The following week, after noting that the QT remained stable, the methadone was increased to 5 mg every eight hours. The week after that, the methadone was again increased to 5 mg every six hours. During this period, she was tapered off of her oxycontin and oral dilaudid. The patient was maintained at 20 mg methadone q day during the bulk of her hospitalization. Over that three week period of time, her wounds began to respond to the hyperbaric oxygen treatments and diminished in size. After nine weeks of hospitalization, thirty treatments with hyperbaric oxygen and multiple dressing changes, the patient was discharged to an extended care facility. At the time of her discharge, we were already weaning her methadone dose from 4 mg every six hours to 2.5mg every six hours.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1564
Scientific abstract: Acute pain

The Risk of Respiratory Depression Following Intravenous Low-Dose Ketamine Sedation for Colonoscopy in Patients Receiving Long-Term Opioid Therapy (LTOT).

Harrison Burgess, Keith Fragoza, Afreen Siddiqui, Frederick Burgess
Providence VA Medical Centerr

Introduction

Patients treated with long-term opioid therapy are often difficult to sedate for endoscopic procedures, and frequently require the support of an anesthesia provider. Ketamine and propofol are routinely used at our institution, to minimize respiratory depression and provide better operating conditions, than standard fentanyl/midazolam sedation. However, in our population, ketamine/propofol sedation was noted to produce apneic episodes and slowed ventilation when administered to patients receiving methadone. To evaluate this observation, an IRB approved retrospective chart review was conducted on Veteran patients receiving anesthesia supported colonoscopies from 2008-2014.

Materials and methods (NA for case report)

Data on patient demographics, opioid medication history, PACU stay, respiratory rates(RR), and sedative medications were collected from the VA computerized patient record system to assess the impact of ketamine/propofol sedation on ventilation and discharge times. Overall, 148 medical records were reviewed, 108 provided sufficient data for evaluation. 45 Veterans were receiving LTOT, 39 of which received propofol/ketamine as part of their sedation. 46 patients were not receiving opioids and were sedated with propofol/ketamine

Results/Case report

Forty-five Veterans were receiving LTOT, including hydrocodone, oxycodone, hydromorphone, transdermal fentanyl, and/or methadone. Patients administered ketamine/propofol and receiving methadone (87mg/day+/- 74 mg) were found to have a statistically significant decline (p=0.007) in their RR of 5 breaths per minute. Patients without LTOT, or receiving LTOT other than methadone (morphine equivalent dose of 50mg/day +/-59), showed no change, or a slight increase in RR. Individuals on higher doses of methadone(>100mg) appeared to have the most dramatic impact, with episodes of apnea and RR. End tidal carbon dioxide monitoring was not consistently used on all patients and the values did not accurately reflect the true end tidal carbon dioxide value.

Discussion

Based on these findings, ketamine appears to produce evidence of respiratory depression in patients treated with long-term methadone, but this effect was not observed with other opioids. The greater morphine equivalent average dose of methadone (348-1044mg depending on the conversion factor used), and its' prolonged half-life , may account for the increased incidence of respiratory depression. Additional data are needed on higher dose conventional opioids to determine if this effect is unique to methadone, or simply an effect related to high-dose (>100mg/day) opioids. Patients receiving both methadone and ketamine did not experience a prolonged post-procedure recovery compared to the non-opioid treatment groups, suggesting that the drug interaction was relatively transient and did not impact readiness for discharge.

Tables/images

Respiratory Rate and Medication Variables

	Duration of Procedure (minutes)	N	Methadone (mg)	Morphine Equivalent Dose (mg)	Ketamine (mg)	Respiratory Rate Baseline	Respiratory Rate Change at Completion	Ketamine Dose (mcg/kg/min)	Total Propofol Dose (mcg/kg/min)	Recovery Time (min)
No Ketamine No Opioids	28 (12)	17	0	0	0	18 (3)	(-) 0.5 (5)	0	111 (49)	71 (25)
No Opioids	32 (14)	46	0	0	22 (12)	17 (3)	(-) 0.5 (6)	12 (11)	101 (65)	82 (22)
Methadone	29 (10)	12	87 (74)		45 (37)	17 (4)	(-) 4.8 (7)**	13 (8)	89 (52)	79 (22)
Opioids	29 (10)	27	0	50 (59)	37 (50)	17 (3)	0.4 (4)	13 (14)	93(40)	80 (29)
Opioids No Ketamine	25 (6)	6	0	57 (57)	0	18 (3)	1.5 (3)	0	97 (25)	75 (24)

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1565
Scientific abstract: Emerging technology

Oliceridine (TRV130), a novel μ receptor G protein Pathway Selective (μ-GPS) modulator, has enhanced titratability compared to morphine: analysis of PCA use in phase 2b

Harold Minkowitz, Franck Skobieranda, David Soergel, David Burt, Neil Singla
Memorial Hermann Memorial City Medical Center

Introduction

Conventional opioids are widely employed for the management of moderate to severe acute pain. These opioid ligands bind to μ receptors and non-selectively activate two intracellular signaling pathways: the G protein pathway, associated with analgesia, and the β-arrestin pathway, associated with opioid-related adverse events (ORAEs) and inhibition of G protein-mediated analgesia. Opioids such as morphine may take up to 30 minutes to produce meaningful analgesia. The slow onset of action of conventional opioids reduces their predictability and makes them difficult to optimally titrate. Potential consequences include excessive dosing and risk of delayed ORAEs. An analgesic with a rapid and predictable onset of pain relief with decreased ORAEs may be able to avoid these consequences. Oliceridine (TRV130) is a novel μ receptor G protein Pathway Selective (μ-GPS) modulator that activates G protein while mitigating β-arrestin recruitment to the μ receptor. In two randomized phase 2 studies, oliceridine demonstrated the potential to produce rapid and predictable analgesia, with a differentiated safety and tolerability profile compared to morphine. Here we present an analysis of the titratability of oliceridine versus morphine from a randomized, double-blind, adaptive patient-controlled analgesia (PCA) phase 2b study in patients with moderate to severe pain following abdominoplasty surgery.

Materials and methods (NA for case report)

Patients (N=200) were randomized to post-operative regimens of intravenous oliceridine (1.5mg loading dose, 0.1mg or 0.35mg demand PCA doses), placebo, or morphine (4mg loading dose, 1mg demand PCA doses), in a 1:1:1:2 ratio. All treatment arms included a 6-minute PCA lockout period. Rescue analgesics were available as necessary. The distribution of PCA doses across the 24-hour study was analyzed.

Results/Case report

20% and 22% of oliceridine 0.1 and 0.35mg PCA doses, respectively, occurred in the first 2 hours in contrast to 44% of morphine doses. Median time to 50% utilization of study drug occurred 80-90% faster in patients dosed with morphine PCA (30 to 45 minutes) vs either arm of oliceridine (5.0 hours). Adverse events (AEs) associated with oliceridine were similar in nature to those observed with conventional opioids; however, both oliceridine groups had a lower prevalence of hypoventilation, nausea, and vomiting than the morphine group (post hoc $p<0.05$ for both oliceridine regimens versus morphine). There were no serious AEs reported.

Discussion

In this clinical trial, oliceridine PCA demand doses were more evenly distributed over time than morphine demand PCA doses, likely due to oliceridine's rapid onset of pain relief. In contrast, patients receiving morphine self-administered substantial amounts of drug early in the trial and then experienced ORAEs more frequently than patients receiving oliceridine. These results suggest that oliceridine, a novel μ-GPS that activates G protein mediated-analgesia while mitigating β-arrestin-mediated ORAEs, may have improved titratability via a more rapid and predictable onset of analgesia.

Tables/images

Figure 1: Median Time to 50% Utilization of Oliceridine and Morphine

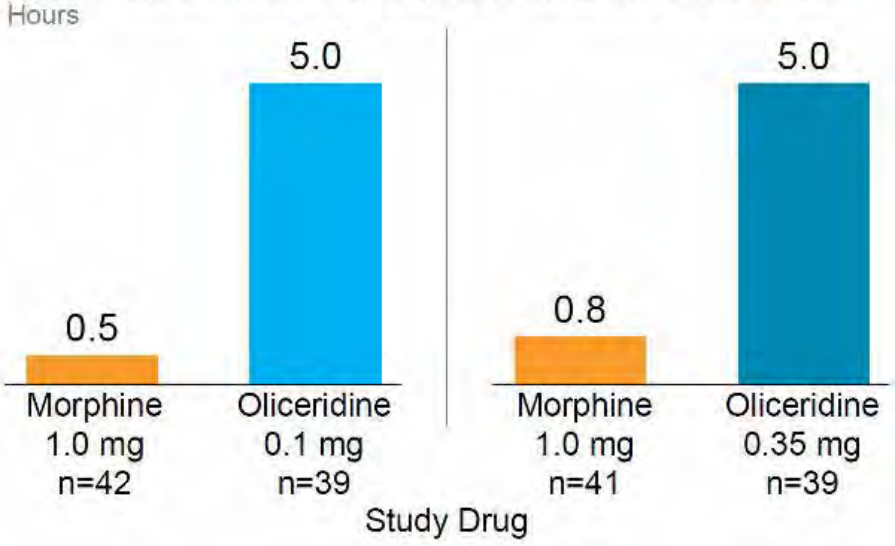

Figure 1: Median Time to 50% Utilization of Oliceridine and Morphine

Figure 2: Oliceridine and Morphine Self-administered Demand Doses in the First 2 Hours

	Total Doses (number)	Doses in 0-2hr (number)	Doses in 0-2hr (%)
Oliceridine 0.1 mg n=39	2312	470	20
Oliceridine 0.35 mg n=39	1582	347	22
Morphine 1.0 mg n=83	1980	871	44

Figure 2: Oliceridine and Morphine Self-Administered Demand Doses in the First 2 Hours

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
This study was supported by Trevena, Inc.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1567
Scientific abstract: Regional anesthesia

Ultrasound-Guided Continuous Superficial Radial Nerve Block for the Treatment of Complex Regional Pain Syndrome

Marc Yelle, Jonathan Jaffe, Daryl Henshaw
Wake Forest School of Medicine

Introduction

Complex regional pain syndrome (CRPS) is a devastating pain disorder that can occur either spontaneously or following traumatic injury. Although it can occur after major traumatic injuries such as bone fractures of crush injuries, it can also occur following normally innocuous procedures, such as a venipuncture[1,2]. CRPS involves pain that is disproportionate to the inciting event, hyperalgesia, temperature asymmetry, allodynia and autonomic signs and symptoms[3]. Fortunately, the majority of patients improve within the first year, however for a small subset of patients the effects can lead to long-standing, recalcitrant pain and a loss of function. These patients often exhaust both medical and surgical treatment options in hopes of finding relief for their symptoms, as no definitive treatment exists[4]. We present a case report of one such patient who noted significant improvement in her pain following the placement of an ultrasound-guided superficial radial nerve (SRN) catheter and the continuous administration of local anesthetic for multiple days.

Materials and methods (NA for case report)

NA

Results/Case report

A 46-year-old female with a history of CRPS type-II of the right arm and hand after an injury to the SRN during venous cannulation presented for evaluation at our institution. Previous treatments included surgical neuroma resection with allograph placement, stellate ganglion blocks, and intravenous ketamine infusions. Baseline pain scores (Numeric Rating Scale [NRS] 0-10) were 7/10 at rest and 10/10 with movement or when the hand or arm was touched.

Ultrasound guidance was utilized to identify the SRN at the level of the upper forearm and a 9-cm, 17-gauge Tuohy needle was placed from the lateral side of the arm and advanced until it abutted the SRN. A 19-gauge, non-stimulating, open-end peripheral nerve catheter was then threaded in close proximity to the SRN. (FIGURE 1)

Following an initial injection of local anesthetic (FIGURE 2) a continuous infusion of 0.4% Ropivacaine with 0.5 mcg/mL of clonidine was utilized for pain control along with a continuous infusion of intravenous ketamine. The patient remained hospitalized for 3 days and was then discharged home for 3 additional days of treatment with an ambulatory infusion of local anesthetic.

NRS pain scores during treatment ranged between 1-3/10 with rest and movement. As a result of her encouraging response to nerve blockade the patient is considering peripheral nerve stimulator implantation at the level of SRN.

Discussion

The utility of a continuous infusion of perineural local anesthetic to treat the pain and related symptoms of CRPS has been previously documented[5-7]. Additionally, ultrasound imaging of the SRN has been described[8]. However, this case report is unique because it represents the first description of an ultrasound-guided SRN catheter for any purpose, including the treatment of CRPS. The ability to visualize a sensory nerve with a known etiology of injury allowed for the targeted treatment of this patient's CRPS while avoiding the motor blockade that would have resulted from more proximal blockade of the brachial plexus. Additionally, it offered useful insight into the potential benefit of subsequent interventions aimed directly at the SRN and helped to guide future treatment decisions.

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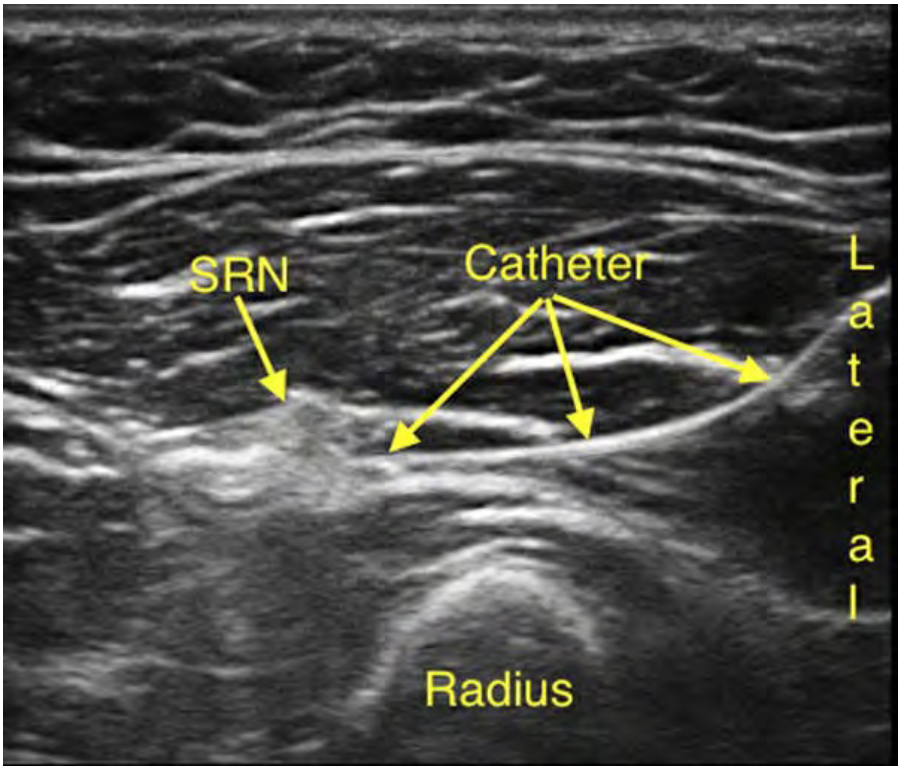
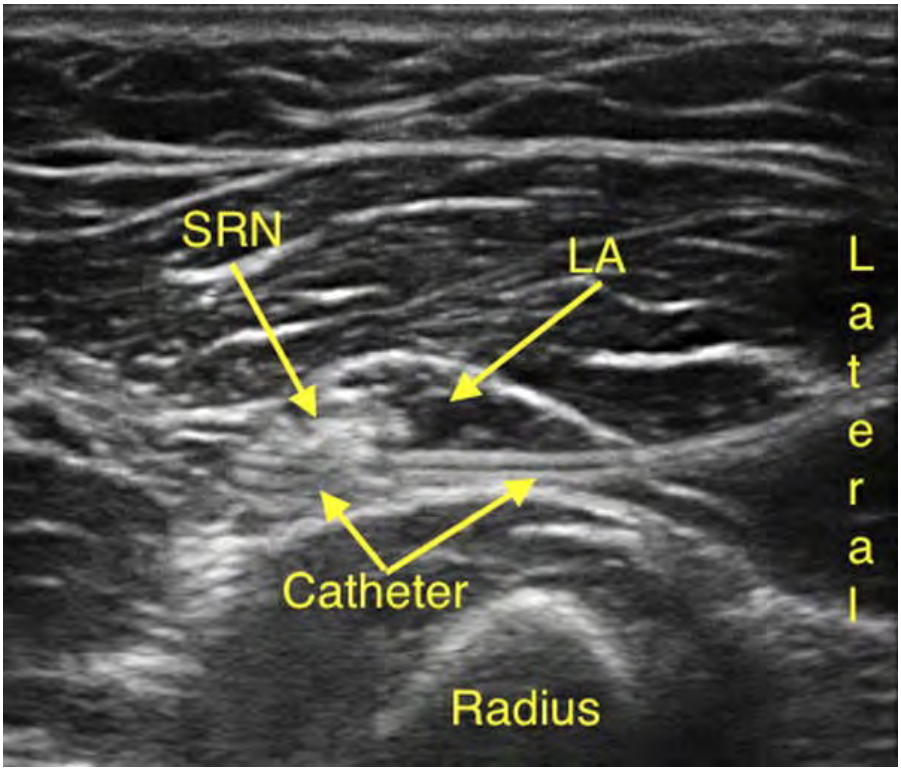
Tables/images





Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1568
Medically Challenging Cases (report of up to 4 cases)

Infraclavicular catheter placement for surgical anesthesia and postoperative analgesia in a patient with TAR syndrome (thrombocytopenia with absent radius) and known difficult airway

Anna Harter, Gunjan Kumar, Ryan Derby
Stanford University Hospitals

Introduction

Thrombocytopenia with absent radius (TAR) syndrome is a rare congenital disorder first described in 1969 characterized by severely reduced platelet counts and aplasia of bilateral radii which can be associated with heart defects (tetralogy of Fallot, atrial septal defects), kidney, and other skeletal abnormalities. Patients often present with life-threatening bleeding in the first year of life with platelet counts < 50 plts/nl and remain at risk for bleeding despite improving platelet counts throughout life. The prolonged bleeding risk and abnormal anatomy present challenges for the use of regional anesthesia techniques. We present the successful use of an infraclavicular perineural catheter as the primary anesthetic in a patient with TAR syndrome undergoing ORIF of her humerus.

Results/Case report

We present a 64 year-old, 50kg, 150cm tall patient with history of hypothyroidism and TAR syndrome who was scheduled for ORIF of her left humerus after a mechanical fall. At baseline, she walks with a cane and is left hand dominant, with a present humerus on her left side but complete absence of radius, ulna, and humerus on her right. Notably, patient reported a history of difficult intubation after a prior orthopedic operation. One week prior to admission, her platelet count was 136. After discussing the risks, benefits, and obtaining patient approval for use of her information, we performed an infraclavicular block with catheter placement. Standard ASA monitors were applied and the patient was positioned supine with her left arm abducted. An infraclavicular block was performed via an in-plane approach in sterile fashion. Using saline to hydro-dissect, a 17-guage Touhy was positioned deep to the axillary artery and a catheter was successfully threaded. Appropriate catheter placement was confirmed under ultrasound visualization with good spread surrounding all three cords. Twenty milliliters of 1.5% mepivacaine was bolused through the catheter prior to surgery. There were no acute complications in the block placement and adequate anesthesia was achieved prior to surgical incision. The patient required no additional opioids and only minimal continuous propofol sedation during surgery. A continuous infusion of 0.2% ropivacaine was administered through the catheter postoperatively. She received a 10 ml bolus of infusate on POD1 and her infusion was increased to a final rate of 8mL/hour before being removed on POD2. The patient reported excellent pain control throughout her hospital course. Interestingly, the distribution of the block postoperatively appeared to follow a more classic interscalene pattern with coverage of the shoulder and ulnar sparing.

Discussion

Little information is available in the published literature regarding regional anesthesia for patients with congenital upper extremity deformities. To our knowledge, this is the first case report of successful use of an infraclavicular block for the sole anesthetic in a patient with TAR syndrome. Our ultrasound scan showed normal brachial plexus sonoanatomy at the nerve root, trunk, and cord levels, suggesting that traditional approaches to nerve blocks can be safely and reliably used in this patient population when their platelet counts are appropriate.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1569
Scientific abstract: Acute pain

A single preoperative dose of AYX1, an EGR1 decoy, provides long-term reduction of postoperative pain after TKA in a randomized, double-blind, placebo-controlled, phase 2 trial.

Donald Manning, Kimberly Hebert, Scott Harris, Anita Das, Joseph Gimbel, Timothy Melson, Ian Gilron, Julien Mamet
Adynxx Inc.

Introduction

Inadequate pain relief and development of chronic pain still burdens patients after surgery. We designed the investigational drug AYX1, an EGR1 transcription factor decoy, to reduce acute pain and prevent the development of postoperative chronic pain and tested it in subjects undergoing total knee arthroplasty (TKA). A previous study (ADYX002) showed that the efficacy of AYX1 injection at 330mg/3mL was limited to injections made at or below the L4/5 lumbar interspace. The current study tested the hypothesis that higher dose/volumes of AYX1 would have broader CSF distribution and consequently enhanced efficacy, independent of spinal injection site, for patients undergoing TKA.

Materials and methods (NA for case report)

This phase 2, randomized, double-blind, placebo-controlled study at two centers enrolled medically stable (ASA 1-3) adults (40-80 years) undergoing unilateral TKA with spinal anesthesia and standard-of-care (SOC) opioid-based preoperative analgesia. Subjects were randomly assigned in a 2:1 ratio to receive an intrathecal administration of either AYX1 (660mg/6mL or 1100mg/10mL) or a volume-matched placebo at either L3/4 or L4/5 lumbar interspace prior to spinal anesthetic. Primary efficacy endpoints were least-square mean pain rating (11-pt NRS) while walking 5 meters (0-48 hours, inpatient period) and 15 meters (7-28 days, outpatient period) as analyzed by a mixed-effects model for repeated measures. Secondary endpoints included pain at rest and opioid utilization. Safety was assessed in all dosed subjects and efficacy was assessed in dosed subjects with at least one outcome assessment. Post-hoc analysis included responder rate (responder defined as NRS < 3) at each time point, as well as incidence of pain ≥ 3 at day 42 for both walking and pain at rest.

Results/Case report

From May 6, 2014 to May 4, 2015 after central IRB (Western IRB) approval, 120 subjects were enrolled, 116 were dosed and 114 completed the 42-day study. AYX1 660mg/6mL plus SOC significantly reduced pain with walking during the outpatient period compared to placebo plus SOC (LS mean 2.0 [SEM 0.2] vs. 2.9 [0.3]. p=0.026, figure 1); the 1100mg/10mL dose did not reach significance (2.4 [0.2] vs. 2.7 [0.4], p=0.423). AYX1 660mg/6mL also significantly reduced pain at rest during the outpatient period compared to control (1.5 [0.2] vs. 2.4 [0.3], p=0.033). Neither dose significantly reduced pain from 0-48 hours. Opioid utilization was similar across treatment groups. The incidence of pain > 3 at day 42 for both walking (5% vs. 32%) and at rest (3% vs. 21%) was markedly reduced in AYX1 660mg/6mL- treated subjects compared to placebo (figure 2). All AYX1- and all but two placebo-treated subjects reported adverse events. No AYX1-related serious adverse events occurred.

Discussion

A single preoperative intrathecal administration of AYX1 660mg/6mL added to a SOC postoperative analgesic regimen was well tolerated and significantly reduced both movement-evoked pain and pain at rest from day 7 through 28, independent of injection site, and the treatment effect persisted through the 42-day follow-up period. The reduced efficacy of the 1100mg/10mL dose was consistent with limited, reduced effects at elevated doses/volumes of AYX1 in preclinical pharmacology studies. The proportion of subjects with pain ≥ 3 at day 42 in the 660mg/6mL group strongly supports AYX1's ability to prevent postoperative chronic pain. NCT02081703 Funding -Adynxx Inc.

Tables/images

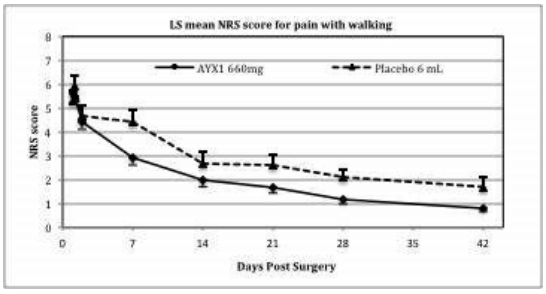

Figure 1

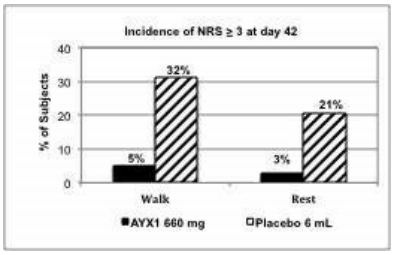

Figure 2

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
Employee and equity holder in Adynxx Inc.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1570
Medically Challenging Cases (report of up to 4 cases)

Regional Anesthesia: The Importance of the Education Component

Patrick Laughlin, Zachary Moak
Georgetown University Hospital

Introduction

Unplanned emergency room visits following surgery cost money to the healthcare system and counteract the economical benefits of ambulatory surgery. One of the biggest predictors of these visits is postoperative pain[1]. Several studies have shown that orthopedic procedures, particularly shoulder surgery, produce the highest levels of postoperative pain[1]. With the patient's approval, we present a case report in which the patient was discharged from the hospital following an ambulatory procedure, for which an interscalene block was performed, without a clear understanding of his own responsibility in managing his postoperative pain once his block wore off, which resulted in a return visit to the emergency room. There is limited information on this phenomenon and our hope is to examine existing and explore novel approaches to curb this issue.

Results/Case report

A 46 year-old male with a history of right shoulder pain was scheduled for an elective arthroscopic rotator cuff repair; there was no other significant past medical history. The patient received an ultrasounded guided right interscalene block with 30 mL of 0.5% Ropivacaine and Epinephrine 1:200,000 and was then induced with general anesthesia. The procedure was performed without any complications and the patient was discharged from the ambulatory surgery center, with a prescription for oxycodone/acetaminophen 5/325mg and instructions to take 2 tablets every 4 hours. Roughly 14 hours after his surgery, the patient presented to the emergency room with worsening shoulder pain. The patient reports his oral medication did not relieve his pain once it started, although he denies taking the medication as prescribed.

Discussion

Postoperative pain following ambulatory surgery is a well studied topic and studies have shown that 30-40% of patients report moderate to severe pain following ambulatory surgery[2]. Often medication noncompliance is the critical issue following ambulatory surgery. One study found only 44.8% of patients took their prescribed opioids following ambulatory surgery[2]. This issue has begun to push some surgeons to the option of refusing blocks altogether, so as to avoid the patient 'bounce back' to the Emergency Department in the night. Our case report is one of many that has taken place at our own institution, which has demonstrated the importance of patient education from all members of the multi-disciplinary team involved in patient care. Specific instructions for patients on what they can expect following regional anesthetic cessation, as well as how and when to take their oral medications is the responsibility of not only the prescribing surgeons, but is that of the regional anesthesiologists as well. It is also important that this education occurs at multiple time intervals, including before and after the procedure[3]. A study looking at the types of education used showed that preoperative biopsychosocial models tend to work best[4]. Several studies have examined the use of text message reminders as a means to increase medication compliance; a review of these studies has demonstrated an increase in compliance as high as 40% in various settings[4]. Further investigation is required on this topic, but the concept of patient education remains a crucial part of the success of regional anesthesia.

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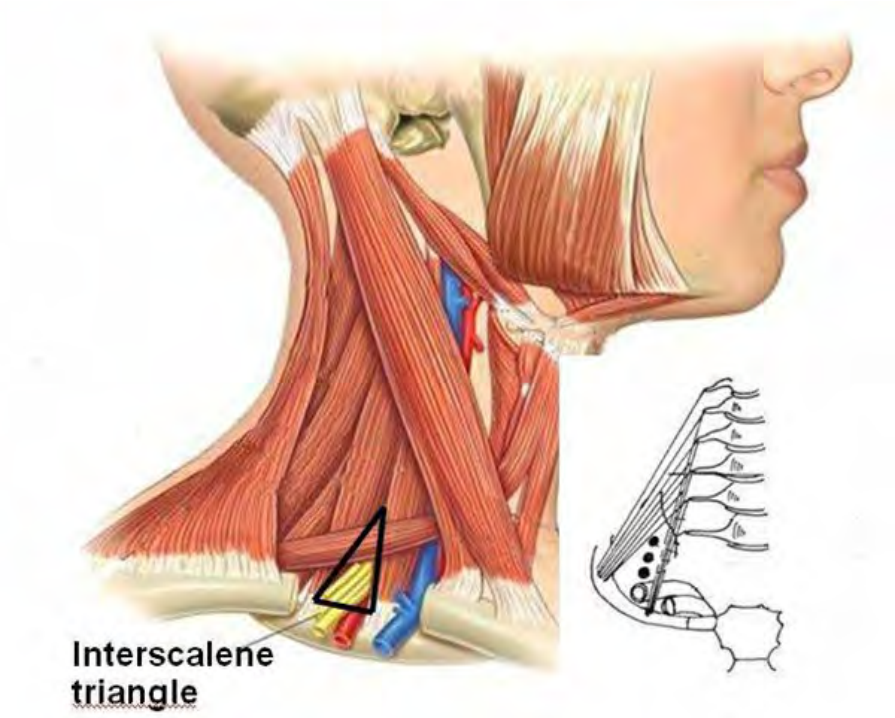

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1571
Scientific abstract: Emerging technology

A randomized, placebo- and active-controlled phase 2b study investigating oliceridine (TRV130), a novel μ receptor G protein Pathway Selective (μ-GPS) modulator

Neil Singla, Harold Minkowitz, David Soergel, David Burt, Franck Skobieranda
Lotus Clinical Research

Introduction

Opioids are widely employed for management of moderate to severe acute pain; however, opioid-related adverse events (ORAEs), including respiratory depression and gastrointestinal dysfunction, increase risk and may limit dosing required for analgesic efficacy. Conventional opioids bind to μ receptors and non-selectively activate two intracellular signaling pathways: the G protein pathway, associated with analgesia, and the β-arrestin pathway, associated with ORAEs and inhibition of G protein-mediated analgesia. Oliceridine (TRV130) is a novel μ receptor G protein Pathway Selective (μ-GPS) modulator that activates G protein while mitigating β-arrestin recruitment to the μ receptor. The objective of this randomized, double-blind, adaptive patient-controlled analgesia (PCA) phase 2b study was to investigate the efficacy, safety, and tolerability of oliceridine compared to placebo and morphine in patients with moderate to severe pain following abdominoplasty.

Materials and methods (NA for case report)

Patients (N=200) experiencing postoperative pain following abdominoplasty were randomized to regimens of intravenous oliceridine (two 0.75mg loading doses followed by either 0.1mg or 0.35mg self-administered demand PCA doses), placebo, or morphine (4mg loading dose followed by 1mg demand PCA doses), in a 1:1:1:2 ratio. All treatment arms included a 6-minute PCA lockout period. The primary endpoint was time-weighted average change in numeric pain rating scale over 24 hours (NPRS TWA 0-24). Rescue analgesics were available as necessary.

Results/Case report

Oliceridine 0.1mg and 0.35mg regimens reduced average pain scores (model based change from placebo in NPRS TWA 0-24) by 2.3 and 2.1 points, respectively ($p=0.001$ and $p=0.0005$ vs. placebo); these changes were similar to morphine, which reduced average pain scores by 2.1 points ($p<0.0001$ vs. placebo). Pain intensity differences at 5 minutes after the 1.5mg oliceridine loading dose was -1.8 and -2.2 for the 0.1mg and 0.35mg groups, respectively, compared to -0.8 for the morphine 1mg group (Figure 1). The proportion of patients requiring rescue analgesics over the 24-hour study was similar for both oliceridine groups (31% and 21%) and morphine (25%), all of which were significantly lower than placebo (64%; $P<0.0005$ for all active arms vs placebo). Median time to meaningful pain relief was 1.1 hours and 0.3 hours with oliceridine 0.1mg and oliceridine 0.35mg, respectively, compared with 1.1 hours with morphine. Adverse events (AEs) associated with oliceridine were similar in nature to those observed with conventional opioids. However, both oliceridine dose groups had a significantly lower prevalence of hypoventilation, nausea, and vomiting than the morphine group (post hoc $p<0.05$ for both oliceridine regimens vs. morphine). There were no serious AEs reported in the study.

Discussion

In patients with postoperative pain following abdominoplasty surgery, oliceridine achieved a magnitude of pain relief comparable to morphine over 24 hours. Patients receiving oliceridine 0.35mg also tended to experience a more rapid onset of meaningful pain relief compared to patients receiving morphine. Both dose groups of oliceridine had a lower prevalence of ORAEs than the morphine group and a lower prevalence of hypoventilation, nausea and vomiting. These results suggest that oliceridine, a novel μ-GPS that activates G protein mediated-analgesia while mitigating β-arrestin-mediated ORAEs, may widen the therapeutic window between effective, rapid analgesia and typical ORAEs.

Tables/images

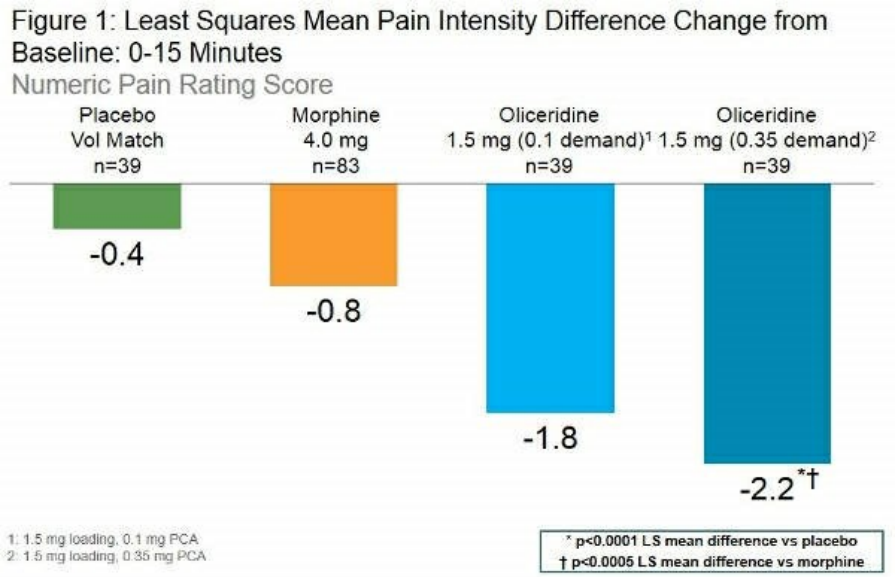

Figure 1: Least Squares Mean Pain Intensity Difference Change from Baseline: 0-15 Minutes

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
This study was supported by Trevena, Inc.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1573
Scientific abstract: Emerging technology

Rapid onset of pain relief with oliceridine (TRV130), a novel μ receptor G protein Pathway Selective (μ-GPS) modulator, vs. morphine: a phase 2a/b study analysis

Eugene Viscusi, Lynn Webster, David Soergel, David Burt, Franck Skobieranda
Thomas Jefferson University

Introduction

Conventional opioids are widely employed for the management of moderate to severe acute pain. These opioid ligands bind to μ receptors and non-selectively activate two intracellular signaling pathways: the G protein pathway, associated with analgesia, and the β-arrestin pathway, associated with opioid-related adverse events (ORAEs) and inhibition of G protein-mediated analgesia. Opioids such as morphine may take up to 30 minutes to produce meaningful analgesia. The slow onset of action of conventional opioids reduces their predictability and makes them difficult to optimally titrate. Potential consequences include excessive dosing and risk of delayed ORAEs. An analgesic with a rapid and predictable onset of pain relief with decreased ORAEs may be able to avoid these consequences. Oliceridine (TRV130) is a novel μ receptor G protein Pathway Selective (μ-GPS) modulator that activates G protein while mitigating β-arrestin recruitment to the μ receptor. In two randomized phase 2 studies, oliceridine demonstrated the potential to produce rapid and predictable analgesia, with a differentiated safety and tolerability profile compared to morphine. Here we present an analysis of the time to onset of pain relief from a randomized, double-blind, adaptive phase 2a/b study in patients experiencing postoperative pain following bunionectomy.

Materials and methods (NA for case report)

Patients in the second phase of this adaptive study (N=195) were randomized to receive double-dummy oliceridine 0.5mg, 1mg, 2mg or 3mg every 3 hours (q3h); placebo; or morphine 4mg q4h intravenously in an 8:8:4:5 ratio. Categorical pain relief was assessed at baseline, 5, 10, 15, 30, and 45 minutes, and at various other time points between 1 and 48 hours using a 5-point scale (“none,” “a little,” “some,” “a lot” and “complete”). Rescue analgesics were available as necessary.

Results/Case report

At 5 minutes post dose, the proportions of patients with “a lot” or “complete” pain relief were 0% and 13% with placebo and morphine, respectively, versus 20%, 29%, 58%, and 94% with oliceridine 0.5mg, 1mg, 2mg or 3mg, respectively (Figure 1). At 15 minutes, the proportions of patients with “a lot” or “complete” pain relief were 0% and 26% with placebo and morphine, respectively, versus 20%, 45%, 78%, and 90% with oliceridine 0.5mg, 1mg, 2mg or 3mg, respectively (Figure 2). Adverse events (AEs) associated with oliceridine were similar in nature to those observed with conventional opioids. There were no serious AEs reported.

Discussion

In this analysis of a phase 2a/b study of patients with postoperative pain following bunionectomy, a significantly greater proportion of patients receiving oliceridine reported “a lot” to “complete” pain relief at 5 and 15 minutes following administration versus patients on morphine. When delivered as-needed, oliceridine’s rapid onset of pain relief may allow for convenient and predictable titration and thereby may address the unmet need for an analgesic that can rapidly and effectively manage moderate to severe acute pain while possibly reducing ORAEs.

Tables/images

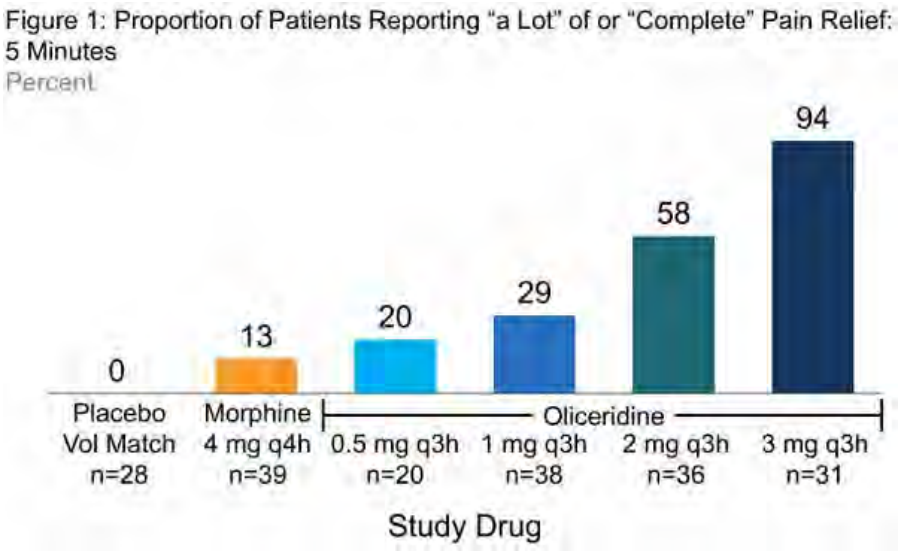

Figure 1: Proportion of Patients Reporting "A Lot" of or "Complete" Pain Relief at 5 Minutes

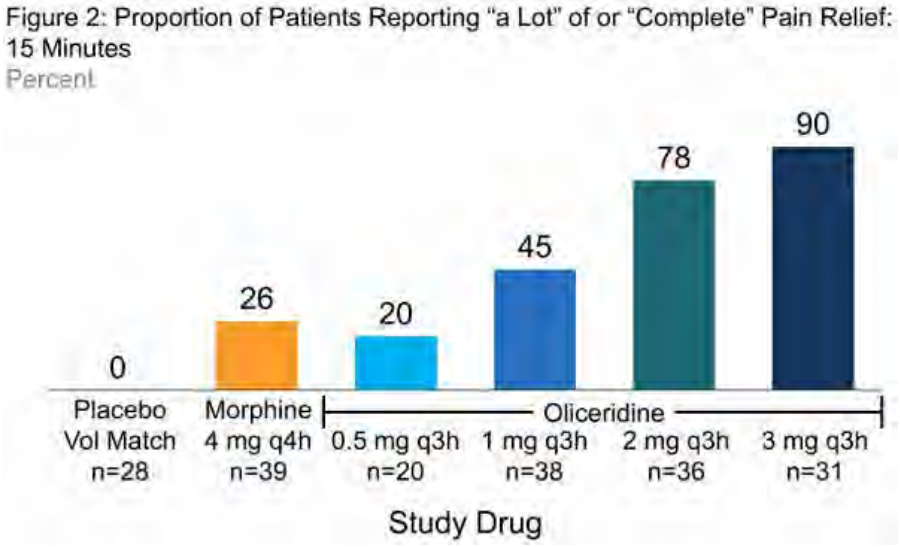

Figure 2: Proportion of Patients Reporting "A Lot" of or "Complete" Pain Relief at 15 Minutes

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
This study was supported by Trevena, Inc.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
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Abstract: 1574
Scientific abstract: Acute pain

Are sleep apnea patients at increased risk for opioid induced respiratory depression after surgery compared to controls? – A pilot study

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Hospital for Special Surgery

Introduction

Obstructive sleep apnea (OSA) has been associated with higher perioperative complication rates.[1] It has been hypothesized that many major complications in this patient population are related to increased sensitivity to opioids, which has led to recommendations that OSA patients be routinely observed in a monitored setting[2]. However, the current literature does neither provide sufficient evidence supporting this hypothesis nor the resulting practice, which is associated with an increased burden on healthcare resources. In this context, few studies have investigated the comparative impact of opioid use on respiratory depression, in those suffering from OSA versus those that are not. The objective of this proof of concept study was to identify the incidence, severity, and duration of decrease in minute volume (MV) occurring in response to opioid administration postoperatively in OSA patients and compare this effect to controls. We hypothesized that respiratory depression, as measured by a reduction in MV from baseline, would occur to a larger extent in OSA patients.

Materials and methods (NA for case report)

Following institutional IRB approval, 14 patients with OSA and 15 patients without OSA undergoing elective lumbar spine fusion surgery were enrolled. All patients underwent general anesthesia (GA) and received standardized opioid doses via intravenous patient-controlled analgesia (PCA) postoperatively. Respiratory data, including MV, tidal volume (TV), and respiratory rate (RR), were continuously measured using an impedance-based respiratory volume monitor (RVM, ExSpiron, Respiratory Motion, Inc., Waltham, MA) intraoperatively and up to 4 hours postoperatively in the post-anesthesia care unit (PACU).

Results/Case report

Following preliminary analysis, the value of absolute MV change following postoperative administration of opioids from the preoperative baseline MV value was higher by trend in OSA patients (4.86 ± 2.46 liters/min in OSA vs 3.11 ± 2.41 liters/min in controls, respectively), but no statistical difference was achieved (P=0.156). This related to a mean percentage change in MV of 52.93 ± 21.40% in OSA vs. 47.65 ± 32.24% in control patients, respectively. This trend in OSA patients was observed while OSA patients used on average less opioids/hour (8.04 ± 3.83 vs 12.68 ± 5.09 as measured in oral morphine equivalents, respectively). Interestingly, 71% of OSA patients spent more than 1/3 of the time breathing less than 40% of their predicted MV while this proportion was 36% for controls. No major respiratory complications were observed in this cohort.

Discussion

In this proof of concept study comparing OSA vs non-OSA patients, we observed a trend towards a more pronounced reduction in MV when exposed to standard opioid dosing using a PCA in the postoperative period among those suffering from the disease. Further, OSA patients consumed less opioids and were more likely to spend significant amounts of time hypoventilating compared to their non-OSA counterparts.
While analysis is ongoing, this data may indeed suggest that patients suffering from OSA are more prone to respiratory depression by standard postoperative opioid administration. If substantiated, this finding supports the implementation of strategies to reduce the use of opioids and if not possible increase surveillance to avoid respiratory complications in this patient population.

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Tables/images

Tables:

Table 1: Outcomes

Outcome	OSA	Control	P-Value
Absolute MV Change liters/min	4.86 (±2.46)	3.11 (±2.41)	0.156
% MV Change	52.9 (±21.4)	47.7 (±32.2)	
Average Opioids/hour	8.04 (±3.83)	12.68 (±5.09)	0.056
% patients LMV at discharge*	71.4 (±48.8)	36.4 (±50.5)	
PACU LOS (hours)	4.07 (±0.42)	3.75 (±0.73)	0.326

* percent of patients that spent more than 30% of the tome breathing below 40% of predicted MV

Outcomes

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
Stavros G. Memtsoudis, MD PhD FCCP is a non-paid consultant for B.Braun and is funded by the Anna Maria and Stephen Kellen Career Development Award.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1576
Medically Challenging Cases (report of up to 4 cases)

Wrong-Sided Nerve Block - A Close Encounter

Suraj Yalamuri, Jeffrey Gadsden
Duke University Medical Centr

Introduction

Wrong-site procedures are preventable medical errors and should be a “never event”.[1] The Universal Protocol was developed in 2003 for preventing wrong site, wrong procedure, and wrong person surgery.[2] Despite this, wrong-sided peripheral nerve blocks continue to be reported, as well as various verification protocols intended to prevent these events. [3] Our institution recently modified the existing Pre-Anesthetic Block Time Out protocol. We present a case highlighting how this amendment prevented a near miss from becoming a wrong-sided block.

Results/Case report

Patient approval was obtained for submission. A 59 y/o female was scheduled to undergo a *right* total knee arthroplasty. The anesthetic plan consisted of a spinal followed by posterior capsule block and an adductor canal catheter for postoperative analgesia. Prior to the block procedures, the attending surgeon marked his initials on the medial aspect of the *right* knee. The revised verification protocol mandated that the individual performing the nerve block (in this case the anesthesiology resident) then mark the sites where the blocks were to be performed with his/her initials and the word “BLOCK”. This was done for each separately planned block (i.e. on the *right* lateral knee and *right* lateral thigh). Following administration of an uneventful spinal anesthetic in the preoperative block area, the patient was positioned in a *left* lateral decubitus position. A verbal block time out was performed and the anesthetic block mark was confirmed on the *right* knee prior to performing an uneventful posterior capsule block. The patient was then positioned supine for the adductor canal catheter. While preparing to clean the skin on the *right* thigh, the anesthesiology resident noticed the surgical marking on the medial aspect of the *left* knee (Figure 1), prompting confusion about laterality and concerns that we were blocking the incorrect side. However, a re-verification of the *anesthetic* markings confirmed that the *right* side was correct. On further examination, the surgical marking was noted to be on the medial aspect of *both* knees (with the marking on the *left* being a mirror image of the *right*), due to ink transfer when the patient’s knees were together. After consent re-verification the adductor canal catheter placed on the *right* side without incident.

Discussion

Despite widespread adoption of the Universal Protocol, wrong-sided peripheral nerve blocks still occur[2]. This underscores the importance of implementing a protocol that has multiple layers of redundancy. In our institution’s revised protocol, an anesthesiologist’s marking of the block site(s) provides secondary verification. Importantly, many blocks require varying patient positioning that may hinder surgical marking visibility, and this “block” marking provides a reliable visual cue to the block physician regardless of gowns, blankets or positioning. In this case, this additional marking helped avoid a near-miss in placing a wrong sided peripheral nerve catheter due to an unusual transfer of the surgical mark and gave us the ability to verify that the single shot block was performed on the correct extremity. While future revisions might be necessary, we anticipate that this modified protocol will further aid in preventing wrong-sided nerve blocks.

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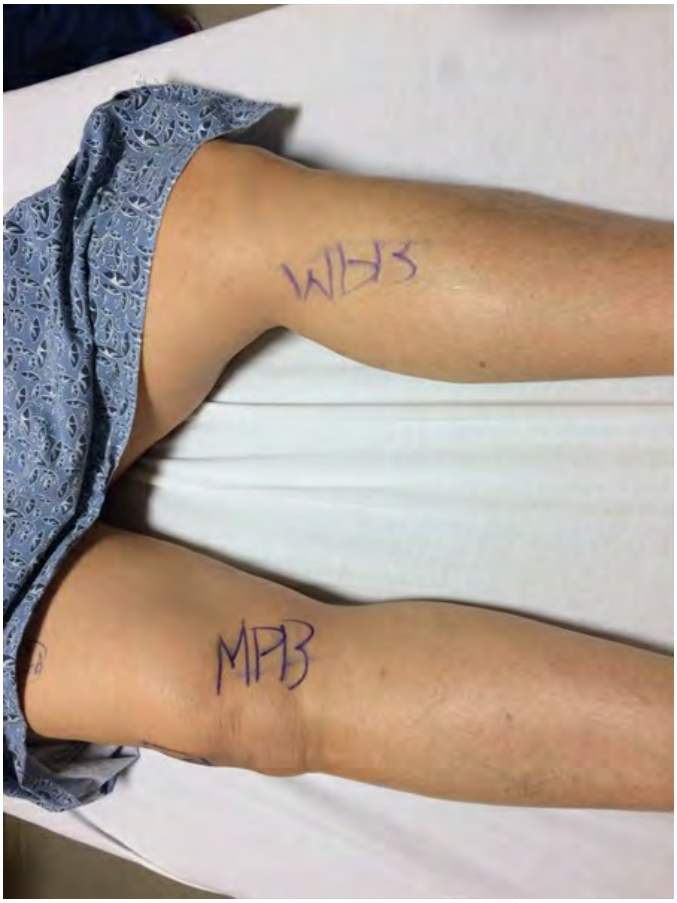
Tables/images



Mirror image of the surgical marking is visible on the wrong (left) extremity. Anesthesia markings are visible on the lateral aspect (thigh and knee) of the correct (right) extremity in addition to surgical marking on the medial aspect of the knee.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1577
Scientific abstract: Regional anesthesia

Perioperative outcomes of suprainguinal fascia iliaca blockade for arthroscopic hip procedures in young adults

Walid Alrayashi, Joseph Cravero, Karen Boretsky
Boston Children's Hospital

Introduction

Hip arthroscopies are becoming routine procedures in young adults to treat various hip pathologies such as femoroacetabular impingement, osteochondritis, and labral tears. One study reported a rise in cases performed by almost 600% between 2006 and 2010 [2, 3]. This surgery is known to cause a significant amount of pain, averaging 7/10 on the numeric rating scale in the immediate post operative period[1]. One method that anesthesiologists have explored to mitigate this is to perform an ultrasound-guided suprainguinal fascia iliaca block (SFIB) [6]. This includes blockade of the two nerves primarily involved in the operative area: the lateral femoral cutaneous nerve (LFCN) and the femoral nerve (FN)[4]. We present the first data on the use of this block for analgesia after hip arthroscopy [5] and provide comparative data to patients who had other forms of pain management.

Materials and methods (NA for case report)

This study was performed as part of a quality improvement project within the Department of Anesthesiology, Perioperative, and Pain Medicine at Boston Children's Hospital. Using an IRB-approved integrated outcomes database, patients were retrospectively identified by the appropriate billing codes for those receiving arthroscopic hip surgery between 2012-2015. Inclusion criteria included all age groups and ASA classes 1-3. Patients who received other concurrent procedures or those with incomplete data sets were excluded. Data was collected for patients managed with SFIB as well as other pain management strategies. The primary outcomes measured were the total opioid consumption and pain scores in the PACU. Secondary outcomes included PACU length stay, opioid side effects such as nausea, vomiting, ileus, and hypoxia. Block-related complications such as toxicity, neuropathy, hematoma formation, and bowel perforation were also assessed.

Results/Case report

There were a total of 756 patients identified with 268 receiving a SFIB, 446 with no block, and 42 obtaining an alternative nerve block. Data on demographics, block outcomes, and side effects are presented in Tables 1 - 4. There were no cases of bowel perforation, peripheral neuropathy, or hematomas detected in any of the cohorts.

Discussion

We present the first data on the use of SFIB for analgesia after hip surgery. Our review indicates that pain control with this block is adequate and side effects are minimal. This preliminary data appeared similar to patients receiving other forms of analgesia but given the uncontrolled nature of this comparison we believe future randomized and controlled studies are required before the role of this block in the management of post-hip arthroscopy pain is clear.

References

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Tables/images

Basic Demographics				
	ASA class (# of patients)			Mean age in years (SD)
	I	II	III	
SFIB BLOCK	136	129	3	21.4 (SD 5.6)
NO BLOCK	288	156	2	21.6 (SD 5.5)
OTHER BLOCK	20	19	3	21.7 (SD 6.2)
Total number of patients	756			

Table 1: Age and ASA class of patient population

Mean Pain Scores		
	Mean Pain score	Standard Deviation
SFIB BLOCK	3.92	2.20
NO BLOCK	3.88	2.10
OTHER BLOCK	4.27	1.51

Table 2: Mean PACU pain scores using Numeric Rating Scale (NRS)

Total Opioid Consumption		
	Morphine equiv. (mg)	Standard Deviation
SFIB BLOCK	16.4	9.5
NO BLOCK	15.2	8.1
OTHER BLOCK	18.3	11.3

Table 3: Total opioid consumption in morphine equivalents

Emesis and Desaturation In PACU		
	% with emesis (#/total)	% with Desaturation (#/total)
SFIB BLOCK	0.9% (2/216)	2.8% (6/212)
NO BLOCK	5% (15/293)	2.7% (8/300)
OTHER BLOCK	4.5% (1/22)	2.6% (1/42)

Table 4: Patients with emesis and desaturation events

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1580
Medically Challenging Cases (report of up to 4 cases)

Postoperative Pain Management in a Patient on Extraordinary High Dose Opioid Therapy

Maria F Ramirez, Yi Zhang
Massachusetts General Hospital

Introduction

Opioids remain the cornerstone in managing moderate to severe acute post-operative pain[1] . The prevalence of over-prescription of opioids in the US has caused unintended consequences including the challenge to effectively manage postoperative pain in patients taking large to extra-large doses of opioids[2]. Literature on how to optimally manage post operative pain and taper opioid medications in patients receiving more than 1000 mg oral morphine equivalent opioid dose is scarce.

Results/Case report

62 year old female with history of COPD, lung cancer and chronic neck and back pain s/p MVA with a 10-year history of opioid therapy presented for mediastinoscopy, video assisted thoracoscopy (VATS) and lobectomy. Home medication included: Fentanyl transmucosal lozenge 1200mcg every 4 hours, Fentanyl oral solution 10,000 mcg/ml every 4 hour PRN pain (6 ml/day), a regimen equivalent to approximately 7000 mg oral morphine. She underwent general anesthesia uneventfully. Postoperative pain control was in adequate despite using 50 mg of IV hydromorphone in 12 hours via PCA. On Post-operative day 1 a mid-thoracic epidural was placed for 0.1% Bupivacaine infusion supplemented with intermittent 2% lidocaine boluses with good affect. She was started on a Fentanyl PCA, IV Tylenol and Toradol. Home dose oral Fentanyl solution was not restarted as this unusual formula is unavailable at our institute, patient also desired not to resume extra-high concentration Fentanyl oral solution. On day 2 we added Oxycontin 60 mg TID. We continued epidural infusion and Fentanyl PCA throughout day 3. Her daily use of IV Fentanyl was between 3200 to 4200 mcg. On day 4 the epidural was discontinued. She was successfully transitioned to an oral regimen consisting of Oxycontin 60 mg TID and Fentanyl transmucosal lozenge 400-1200 mcg every 4 hour PRN pain, a total daily dose equivalent to approximately 1300 mg of oral morphine. We have monitored her plasma Fentanyl level daily for 3 days to provide guidance to the tapering process. Since the cessation of extra high dose of oral Fentanyl, her Fentanyl plasma concentration on three consecutive post-operative days before her discharge were 19.64 ng.ml, 12.24 ng/ml and 8.69 ng.ml respectively, representing a 30-40% of daily decrease in plasma drug concentration. She did not experience any withdrawal symptoms. At phone follow up 3 weeks from discharge, she remained on this regimen with good pain relief and no withdrawal symptoms.

Discussion

A multi-modal approach using a combination of opioid and non-opioid medications, as well proper reginal anesthesia/analgesia techniques are essential to the success management of postoperative pain in opioid tolerant patients[3] .

It is unknown whether there is a ceiling phenomenon in the analgesic effect of opioid agents. In this patient, no change in baseline pain was reported with a total dose reduction from 7000 mg oral morphine equivalent per day to 1300 mg per day, indicating that extraordinary high dose of opioid medications may not necessarily have further benefit in analgesia compared to more reasonable doses.

If a rapid taper is desired, a daily reduction of 30-40% total dose can be tolerated without provoking a withdrawal reaction.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1581
Scientific abstract: Acute pain

Transversus Abdominis Plane Blockade as a Component of a Multimodal Analgesia Plan following Radical Cystectomy.

Jacqueline Morano, Richard Matulewicz, Yasin Bhanji, Mehul Patel, Shilajit Kundu, Joshua Meeks, Anton Nader
Northwestern University

Introduction

Enhanced recovery protocols (ERP) for radical cystectomy (RC) focus great attention on GI recovery as ileus is associated with increased risk of complications, greater length of stay, and higher costs. Opioids have been a traditional component of postop pain control despite their known association with postop ileus. Multimodal pain management protocols have been implemented to reduce the use of narcotics post operatively or prevent their side effects. We investigated the use of continuous transversus abdominis plane (TAP) blockade with local anesthetic as part of a novel post-RC pain regiment and ERP.

Materials and methods (NA for case report)

Following IRB approval, a retrospective chart review identified cystectomy patients who had TAP catheters as part of their postoperative multimodal analgesia management nested within an ERP over a 12-month period (11/2014-10/2015). The postoperative outcomes extracted were total opioid consumption, maximum pain score and time to flatus. Secondary metrics included postoperative use of ketorolac or IV acetaminophen, length of stay, general diet, and postoperative complications. Data presented as n (percent). An initial bolus ranging from 50mg to 100mg of 0.5% ropivacaine with epinephrine 1:300K was administered, depending on weight, on each side followed by a continuous infusion of 0.1% ropivacaine at 5 mL/hr on each side.

Results/Case report

30 patients (20M/10 F) were identified. Bladder CA was the most common surgical indication with open radical cystectomy becoming the technique most frequently used. The median infusion of TAP catheters was 3 days. One patient experienced tachycardia causing removal of her TAP catheter prematurely. In addition to TAP catheter infusion, ketorolac was used in 56.7% of patients whereas IV acetaminophen was used in 73.3%. Total opioid consumption was 32mg (range 0-442mg). Median time to flatus, first bowel movement, and initiation of a general diet were 3, 4, and 5 days respectively. Seven patients (23.3%) required rescue NGT tube placement. The median length of stay was 7 days (range 4-24). Compared to a historical cohort of 100 RC patients, patients without TAP blockade as part of their multimodal pain regimen stayed a median of 10 days (7-21.5) compared to 7 days (4-21) who did receive TAP catheters (P=0.036). See images Table 1 and 2

Discussion

TAP catheter analgesia as part of a multimodal postop pain plan is a safe and effective means of pain control in RC patients. As part of an enhanced recovery protocol, subjects receiving bilateral TAP catheters were associated excellent GI recovery and experienced a shorter hospital stay.

References

Pietzak, Eugene J., Wei-Ting Hwang, S. Bruce Malkowicz, and Thomas J. Guzzo. "Factors Influencing the Length of Stay after Radical Cystectomy; Implications for Cancer Care and Perioperative Management." *Journal of the American College of Surgeons* 217.3 (2013).

Tables/images

Table 1

Age	71 ±12.7
Gender (n, %)	
Male	20 (67)
Female	10 (33)
Surgical Indication (n, %)	
Bladder CA	26 (87)
Prostate CA	3 (10)
Neuroendocrine tumor	1 (3)
Surgical technique (n, %)	
Robot-assisted radical cystectomy	20 (67)
Open radical cystectomy	1 (33)
Surgical Diversion (n, %)	
Ileal conduit	24 (80)
Neobladder	5 (17)
Indiana pouch	1 (3)
Maximum pain score*	4.6±1.6
Opioid consumption (mg, range)	32 (0-442)
Patients that required Ketorolac (n, %)	17 (57)
Dose (mg, range)	15 (0-225)
Patients that required Acetaminophen IV n,%	22 (73)
Dose (mg, range)	1000(0-4000)
GI Recovery (n, %)	
Time to flatus (d)	3 (2-5)
Time to bowel movement (d)	4 (2-13)
Time to general diet (d)	5 (3-15)
Rescue NGT	7 (23)
Length of stay (d)	7 (4-24)
Greater than 7 days	11 (37)
Bilateral TAP catheters	
Infusion duration (d)	3 (2-4d)

Data presented as n (%) or median (range). *=VRSP = verbal rating score for pain (0 to 10 scale where 0 is no pain and 10 is the worst pain imaginable).

Table 2

Demographics (n = 30)		
	Age (SD)	71
	% Male	20 (67)
Surgical Indication	**Bladder CA**	26 (87)
	Prostate CA	3 (10)
	NE Tumor	1 (3)
Approach	**ORC**	20 (67)
	RARC	1 (33)
Diversion	**Ileal Conduit**	24 (80)
	Neobladder	5 (17)
	Indiana Pouch	1 (3)
ç		
Average Max Pain score	**(range 0-10)**	4.6
TAP Catheters	**% (#) Patients**	100% (30)
	Duration (median)	3 days
	TAP Complications	3.3% (1, tachycardia)
Narcotic Use (mg morphine equivalents)	**Median total dose**	32 mg
	Range dose	0-442 mg
Ketorolac Used (mg)	**% (#) Patients**	56.7% (17)
	Median total dose	15 mg
	Range dose	0-255 mg
IV acetaminophen used	**% (#) Patients**	73.3% (22)
	Dose given (x1 max)	1000 mg
GI Recovery		
Time to flatus (d)	Median (range)	3 (2-5)
Time to bowel movement (d)	Median (range)	4 (2–13)
Time to general diet (d)	Median (range)	5 (3-15)
Rescue NGT use	n (%)	7 (23)
Length of Stay (d)	Median (range)	7 (4-24)
	>7days (n, %)	11 (37)

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1585
Scientific abstract: Regional anesthesia

Comparison of Serratus plane block with Thoracic Epidural for Post-operative analgesia in Thoracic wall Surgeries - A Retrospective Analysis

Sivasenthil Arumugam, Peter Kanelos, Wesley Knauft, John Thayer, Sanjay Sinha
Woodland Anesthesiology Assoc.

Introduction

Acute post-operative pain is a major concern for patients having thoracic and chest wall surgeries. Common modalities of pain relief in this group of patients include thoracic epidural, paravertebral and intercostal blocks. Serratus anterior block is a relatively new technique for chest wall analgesia. In this retrospective analysis, we compare serratus anterior block with thoracic epidural for post-op analgesia after chest wall surgeries.

Materials and methods (NA for case report)

After obtaining institutional IRB exemption, we performed a chart review on patients (From June 2014 to December 2014) who received Serratus plane block or Thoracic epidural for post-op analgesia after chest wall surgeries. We compared 25 patients in each group. Pain scores, narcotic requirements and interventions for any cardio-pulmonary issues in PACU and POD#1 were assessed.

Results/Case report

The mean pain scores in PACU were 2.32 and 1.48 for Serratus block and Thoracic epidural respectively. The opiate use (intravenous or oral route) in PACU for the Serratus block group was 8.27mg and for the Thoracic epidural group was 1.52 mg Morphine equivalents.

The POD#1 pain scores for the Serratus block and Thoracic epidural groups were 1.4 and 0.72. The opiate consumption during the same period was 35.72 and 3.62 for the Serratus block and Thoracic epidural groups.

Serratus plane blocks provided good analgesia but required more supplemental narcotics than the Epidural group. Interventions for cardio-pulmonary instability was more frequent in the Epidural group than the Serratus group.

Discussion

Serratus plane block was described as an extension of the PEC I and II blocks in patients undergoing breast surgery. This relatively new technique has not been evaluated for thoracotomy incisions. Our study evaluates the Serratus block and compares it with the thoracic epidural, which is still considered the gold standard for thoracic wall analgesia.

Thoracic epidural provided better pain control than the Serratus block in terms of narcotic requirement and pain scores both in the PACU and first post-op day. Hypotension was more frequent in the Epidural group, as expected due to the associated sympathetic blockade.

Serratus blocks can be particularly advantageous in patients that may not tolerate the significant sympathetic block associated with thoracic epidurals or for those patients in whom a neuraxial technique is contraindicated due to anticoagulation or coagulopathy. It can also be safely performed under general anesthesia.

The serratus block seems to be a viable option for analgesia in this group of patients. As this is a retrospective study with a limited number of patients, a larger prospective study is recommended to substantiate these findings.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1586
Scientific abstract: Case series (5 or more patients)

Real time ultrasound guided lumbar plexus block (psoas compartment block) for total hip arthroplasty: A case series.

Hari K P Kalagara, Sree Kolli, Hesham Elsharkawy, Loran Mounir Soliman
Cleveland Clinic

Introduction

Traditionally lumbar plexus block (LPB) or psoas compartment block (PCB) is performed for postoperative analgesia for total hip arthoplasty (THA). Most often LPB is done with different landmark techniques [1,2]. With the evolution of ultrasound guided regional anethesia, commonly it is utilized for pre procedural block scanning for confirmation of anatomical landmarks and surface marking. We further extended the use of the ultrasound guided LPB to be done in real time for THA [3].

Materials and methods (NA for case report)

The patients scheduled for revision or primary total hip replacement with history of chronic pain are selected and consented for LPB. A curvilinear low frequency ultrasound probe is placed with patient in prone position over the lower lumbar spine in paramedian (PS) sagittal approach. The L4, L3 and L2 lumbar transverse processes are identified with the ultrasound, image optimized with intertransverse process views to obtain the trident sign [3]. Acoustic window is identified between L2 and L3 transverse process and psoas major muscle recognised. PS approach with inplane technique used for needle advancement and quadriceps twitch is used for confirmation of correct location of lumbar plexus. Local anesthetic injected and continuous peripheral nerve catheter (CPNC) placed to provide postoperative analgesia. Postoperative analgesia is provided by CPNC with ropivacaine 0.1% at 8 ml/hr with 5 ml bolus every 60 minutes as needed with patient controlled peripheral nerve catheter analgesia. They are followed by the acute pain management service; IV patient controlled analgesia (PCA) with dilaudid for breakthrough pain is enabled, CPNC is discontinued once the pain is adequately controlled.

Results/Case report

All the 10 patients had general anesthesia for the total hip replacement in the operating room (OR). The CPNC analgesia was started on admission to post anesthesia care unit (PACU) after initial assessment and continued post operatively for 2-4 days for pain relief. Intravenous usage of opioids in the OR and PACU was noticed to be low. There were no reported block related complications in these patients. 3 out of 10 patients had bilateral lower limb weakness in PACU, which may be attributed to the epidural spread of the initial local anesthetic bolus. Average postoperative pain scores were 2-3; IV dilaudid usage was minimal in these patients and most CPNC were discontinued on day 2. Standard ASRA guidelines regarding anticoagulation for deep blocks were followed to place and remove these lumbar plexus catheters.

Discussion

LPB block provides more effective analgesia compared to femoral, fascia iliaca or 3 in 1 block. Most of these blocks are performed using anatomical landmark techniques and are associated with major complications with the procedure [1,2]. Usage of real time ultrasound guidance enables to perform LPB more safely with very few complications [4]. The success rate and postoperative analgesia benefits with the PCB will help the patients to have enhanced recovery after THA. Further randomized studies are needed to confirm the analgesic benefits and safety profile of real time ultrasound guided LPB. Real time US guided LPB block can be performed by different approaches and needs advanced skills by regional anesthesiologist's to safely perform this block.

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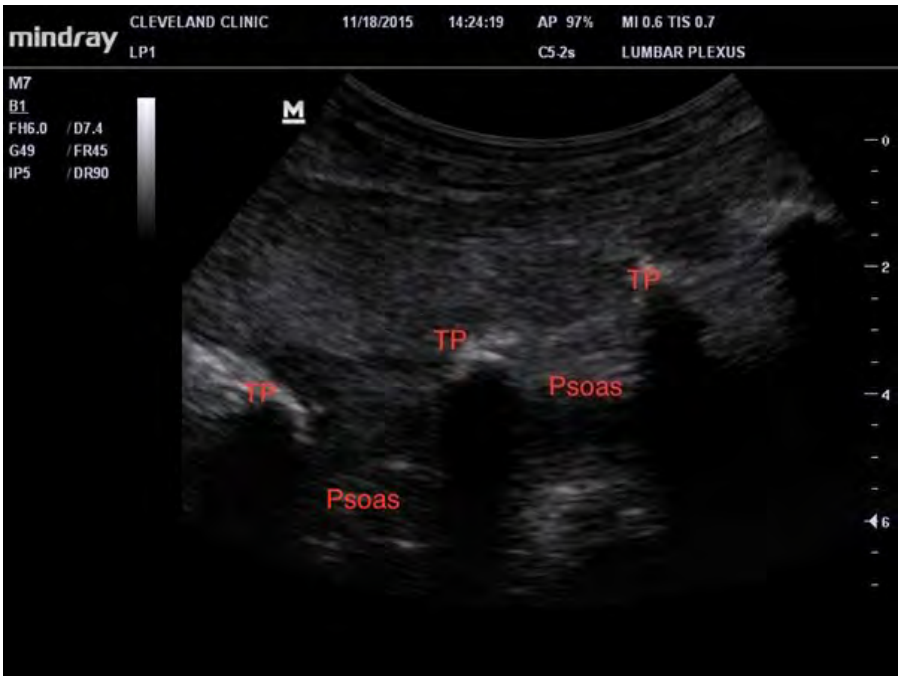
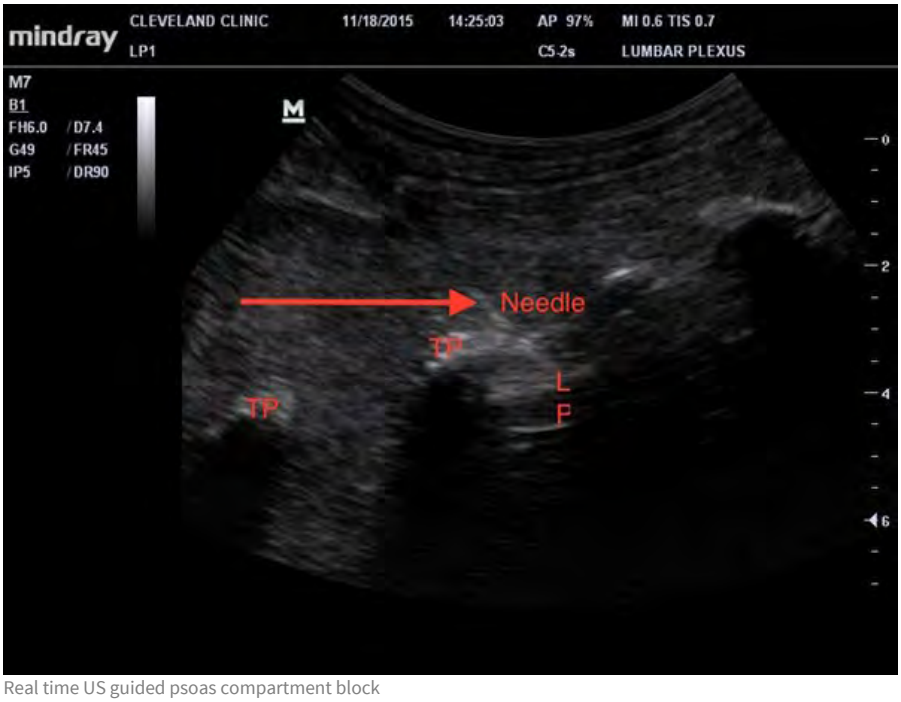
Tables/images



US guided lumbar plexus block



Real time US guided psoas compartment block

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1588
Medically Challenging Cases (report of up to 4 cases)

Post-surgical ischemic leg pain- evaluation and treatment

Lauren McLaughlin, Jeffrey Gonzales, Adrian Hendrickse, Melanie Donnelly
University of Colorado

Introduction

Acute limb ischemia affects an estimated 14 out of 100,000 people in the general population. The patients at greatest risk for acute ischemia are those with underlying peripheral artery disease, but limb ischemia can also be the consequence of embolism, injury, dissection, or severe vasoconstriction, even in the absence of pre-existing occlusive disease. Patients with critical limb ischemia often suffer severe pain. A continuous peripheral nerve block can provide effective analgesia for patients whose pain could not be relieved by other analgesic therapies.

Results/Case report

We present on a 67 year-old female with a history significant for CAD status post multiple stents and 5V CABG who underwent an EVAR for TAAA. She complained of 10/10 pain in her RLE on POD1. On exam, her RLE was mottled and slightly swollen with palpable distal pulses. After discussion with the surgical team, it was determined she was experiencing ischemic microembolic symptoms. She was deemed not a good candidate for a femoral nerve catheter given her body habitus and large pannus. Popliteal and adductor canal nerve catheters were placed running 0.1% ropivacaine at 10cc/hr. Given the high risk for compartment syndrome, q12hr compartment pressures were monitored. The patient experienced immediate pain relief with minimal effects on sensation/motor function. The catheters were discontinued after 4 days.

Discussion

Critical limb ischemia is associated with substantial mortality and morbidity, including severe refractory pain. While opioid analgesics remain an important part of pain management, consideration should be given to interventional therapies including continuous nerve blocks. Continuous nerve blocks have been shown to be an effective and safe option for patients experiencing acute ischemic limb pain. The analgesia provided by a continuous nerve block may delay the diagnosis of other potentially harmful conditions such as compartment syndrome in which pain is usually one of the major presenting symptoms. Patients with acute limb ischemia should be carefully monitored.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1589
Scientific abstract: Regional anesthesia

Femoral nerve block vs Adductor canal block- difference in duration of PACU stay in ambulatory setting

Preeti Narayan, Heather Samady
Emory University

Introduction

Short post anesthesia care unit (PACU) recovery times are associated with increased patient convenience and satisfaction in addition to being cost effective for the institution.[1] Femoral nerve blocks (FNB) and Adductor canal blocks (ACB) are routinely performed on patients undergoing knee surgeries. Studies have shown that ACB provides a clinically relevant and statistically significant increase in quadriceps muscle strength.[2] Therefore, ACB is often preferred over FNB for knee surgeries particularly in ambulatory population. We compared the two blocks to see if there is a difference in PACU stay duration at our orthopedic ambulatory center.

Materials and methods (NA for case report)

A review of 40 patients (20 patients in each group) undergoing anterior cruciate ligament reconstruction (ACL reconstruction) was performed. We looked at the duration of PACU stay for patients who were operated on by two surgeons over the duration of 6 weeks (mid November to end December 2015). The patients were randomized for a separate IRB approved active prospective study comparing pain scores in patients receiving FNB vs. ACB for ACL reconstruction. Both groups received 20 ml of 0.5% Ropivacaine. All patients received general anesthesia. Neither received any supplemental blocks (such as lateral femoral cutaneous nerve block or sciatic block). We did not look at incidence of PONV, pain scores or pain medications given in PACU.

Results/Case report

20 patients received FNB and 20 patients received ACB. The average duration of PACU stay for patients receiving FNB was 150 minutes vs. 115.1 minutes for patients receiving ACB (95% CI 119.29 to 145.81). The difference in duration was found to be significant (p value= 0.0082). The preliminary data suggests that in patients undergoing ACL reconstruction, ACB is associated with shorter PACU stay in comparison to FNB.

Discussion

If performed at the proper level, motor weakness of the quadriceps muscle, *i.e.*, vastus medialis muscle, might be reduced or even be non-existent with ACB.It is however not yet clear if ACB has equal anesthetic potency when compared to a FNB.[3] A recent retrospective study found that children and adolescents undergoing ACL reconstruction had persistent strength deficits and a delay in return to sports at 6 months in patients who were managed with a femoral nerve block compared to those who did not.[4] However, other existing prospective [5] and other recent studies [6] did not confirm the results described by the authors. Larger randomized controlled clinical trials are needed in this field potentially comparing FNB and ACB.

The current medical climate creates financial and productivity pressures on hospitals, physicians, and staff. The duration of PACU stay is particularly significant in ambulatory setting.

The preliminary data suggest statistically significant difference in the duration of PACU stay, in favor of ACB.As we continue with the primary study,

we shall have more power and more significance to our findings.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1590
Medically Challenging Cases (report of up to 4 cases)

My patient hurts in the recovery room after successful peripheral nerve blocks, a case of Martin Gruber anastomosis?

Steven Bourland, Glenn Merritt, Richard Ing, Chris Ciarallo
Children's Hospital of Colorado

Introduction

Regional anesthesia benefits the perioperative surgical home by increasing patient satisfaction and preventing unplanned admission from inadequate analgesia. Anatomic variations of median & ulnar nerves commonly exist and should be considered when attempting to achieve preemptive analgesia. Nerve blocks may be incomplete in the setting of these variations and thorough understanding might assist diagnosis when considering a differential. The most common of these variations, the Martin Gruber anastomosis, represents a median to ulnar nerve communication (proximal to distal, respectively) which has been described as primarily a motor communication however sensory innervation can be found in the literature; one study showed an incidence of 22.9% upon dissection in cadaver lab (Rodriguez [2]). A Marinacci anastomosis describes an ulnar to median nerve communication (proximal to distal, respectively) that has been shown to have sensory innervation. A study by Hopf et al. (1) found that nerve action potentials evoked by stimulus to the ulnar middle finger and radial ring finger could be detected in the median nerve at the wrist and ulnar nerve at the elbow.

Results/Case report

This case describes a seventeen year old female presenting for incisional biopsy of the left second metacarpal for an aneurysmal bone cyst. After general anesthesia was induced we performed ultrasound-guided perineural injections of the left median and radial nerves each receiving 7mL of 0.25% bupivacaine. A 2cm longitudinal incision was made on the radial border of the left second metacarpal head, the defect was visualized and removed from the metacarpal shaft and the wound was subsequently closed. The patient was extubated then taken to the post anesthesia care unit to be monitored until ready for discharge home. She described a 7/10 “sharp aching” pain in her left 4th and 5th digit not relieved with acetaminophen 648mg and oxycodone 3.2mg. We then performed an ultrasound guided left ulnar nerve block with 6mL of 0.25% bupivacaine which reduced the pain to 3/10 described as “numbing.”

Discussion

It is important to understand common anatomic variations in order to provide optimal neural blockade. A benefit of peripheral versus plexus block is the sparing of motor blockade however missed coverage is possible with anatomic variability. This patient benefited from a rescue ulnar nerve block that we believe was secondary to a sensory anastomosis between her left median and ulnar nerve. Knowledge of anatomic variations may lead to better outcomes by reducing the likelihood of dismissing unusual pain complaints to secondary hyperalgesia or referred pain. Regional anesthesia has an imperative role in perioperative analgesia and understanding common variations of the nervous system will help assist anesthesiologist’s impact on patient care.

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*Patient approval was granted prior to submission

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1591
Scientific abstract: Acute pain

Modification of Paramedian Approach to Epidural Insertion

Shelly Ferrell, Nicholas Willius, Charles Baysinger
University of Kentucky

Introduction

Thoracic and lumbar epidural placement provides an excellent analgesic option for patients undergoing abdominal and thoracic surgeries. With thoracic epidural insertions, the midline approach can be rather difficult depending on the height and opening of the space1. Based on review of patient CT imaging data at our institution, it has been noted that osseous variance occasionally yields irregular spinous process structure, obstructing a conventional midline approach. The adaptation described is designed to provide safer and more accurate midline placement compared to the conventional paramedian approach.

Conventional paramedian approaches describe identification of the spinous process, then a needle insertion 2 cm lateral to the landmark. The needle is then advanced until lamina is contacted. With contact, the needle is “walked off” the lamina in a superior-medial direction. With passage past the osseous structure, the “loss of resistance” (LOR) technique is employed to identify the epidural space2. There are some concerning anatomic considerations regarding this approach. First, the lamina could be missed resulting in a needle pass into the thorax or abdomen3. Additionally, the final position of the needle may be further away from midline, depending on depth of laminar contact4. Therefore, the angle adjustment and needle depth allow for a wide variance of insertion points based on observations from one sided catheter experience and use of high fidelity training mannequins. This variance of approach seems to have more inconsistent results that can make catheter management more challenging1,3.

Results/Case report

When midline insertion is not easily obtained, the approach described below has been utilized successfully. The Touhy is placed 0.5 cm lateral to the attempted midline insertion. The Touhy is directed anteriorly to contact the superficial surface of the spinous process. The Touhy is then directed lateral to the osseous contact until free advancement is identified. Using a continuous LOR technique to saline, the needle is advanced until a difference in back pressure is appreciated. If a loss is noted, the Touhy position likely has entered the epidural space and the catheter is inserted conventionally. If osseous contact is made, it is likely laminar contact lateral to midline. The needle is then “walked off” in a cephalo-medial direction with continuous pressure LOR to saline. Compared with conventional insertion, this approach offers a less lateral insertion point, and there is typically less directional modification necessary.

Discussion

The above adaptation was developed to increase reproducibility of an existing approach that has historically varied results in the hands of different operators. By using the spinous process as a tactile landmark, midline is recognized throughout the procedure. As the majority of contact passage of the needle is around osseous structures, conventional resistance to saline is sustained as ligament to osseous contact is present in the directed needle path. Additionally, the contact point is on cephalad segments of the lamina, which results in reduced needle manipulation and discomfort of the patient. This description serves as a modification to aid the proceduralist in reproducible access to the epidural space when conventional midline approaches do not.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1593
Medically Challenging Cases (report of up to 4 cases)

Supraorbital Nerve Block with Liposomal Bupivacaine for Severe, Refractory Postherpetic Ophthalmic Neuralgia

RITA SHANKAR SHAH, ANTHONY SIFONIOS
RUTGERS UNIVERSITY- NEW JERSEY MEDICAL SCHOOL

Introduction

Post-herpetic neuralgia (PHN) is a chronic pain disorder that often presents as intractable, dermatomal pain that persists after resolution of a Herpes Zoster rash. Thoracic nerves and the ophthalmic branch of the trigeminal nerve are most commonly affected. Several pharmacological and psychological therapies attempt to address such neuropathic pain. Refractory post-herpetic neuralgia has been addressed with epidurals, intercostal nerve blocks, and stellate ganglion blocks; however, supraorbital nerve blocks may represent another, simple yet effective modality in treating patients who present with severe, refractory ophthalmic postherpetic neuralgia.

Results/Case report

70 year old Filipino male with past medical history significant for coronary artery disease, hypertension, diabetes mellitus, and recurrent left pleural effusion presented to the hospital due to shortness of breath. One month prior to admission, he suffered from herpes zoster on his right side Trigeminal V1 nerve distribution. Patient thereafter developed subacute postherpetic neuralgia and was started on acyclovir and tramadol without much relief. Once admitted to the hospital due to his worsening respiratory status, patient described his pain to be 10/10, sharp, pressure-like, constant high frequency in the same , right eye and associated with rhinorrhea. Patient found no relief in severity or frequency of attacks after several pharmacologic treatments were attempted,which included tramadol, morphine, oxycodone, amitriptyline, gabapentin, and methadone. After failure with the aforementioned medications, a right supraorbital nerve block with 5mL 0.25% bupivacaine and 1 ml (40mg) kenelog was performed. Patient reported a continuous 5 hour pain-free period. The next day, the same procedure was performed with 5mL bupivacaine liposome injectable suspension (23.3mg/mL). After the second procedure, patient reported 6 hours of no pain, after which the attacks were significantly less frequent and less severe compared to his initial symptoms.

Discussion

While several treatment therapies exist for post-herpetic ophthalmic neuralgia, its severe, refractory form may benefit from supraorbital nerve blocks as an adjunctive treatment modality. Prior to taking more aggressive interventional measures, such as spinal cord stimulation, intrathecal steroid injections, or neuroablation, it may be prudent to study pain outcomes in this population with such neuraxial blockade.

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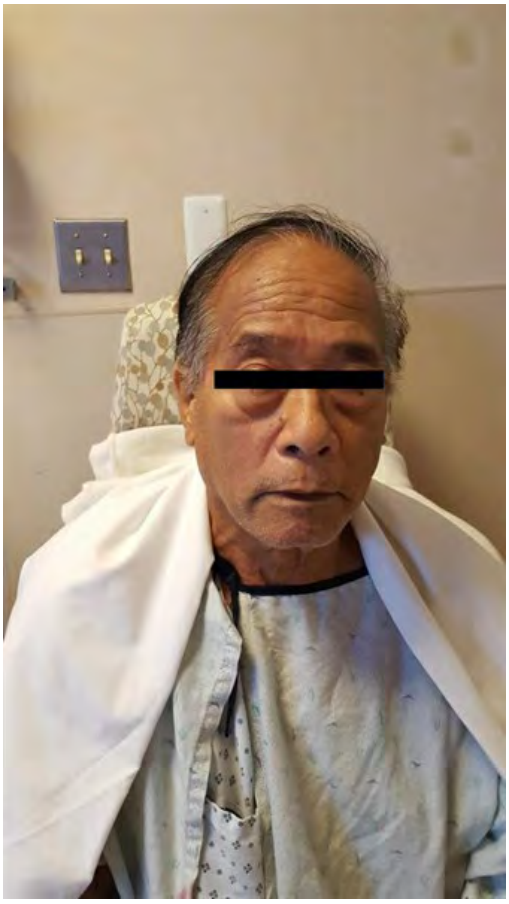
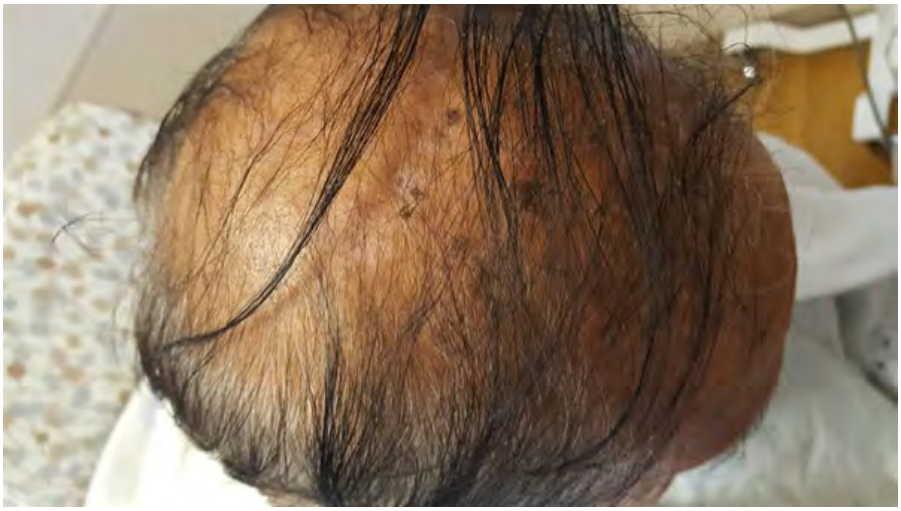
Tables/images



Patient s/p right side supraorbital nerve block.



Scarring after Herpes Zoster Rash in our patient.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1594
Scientific abstract: Acute pain

Safe Neuraxial Anesthesia In A Patient With Neurofibromatosis Type I

Amit Kaushal, Rita Shankar, Jean Daniel Eloy, Anthony Sifonios
Rutgers- NJMS

Introduction

Neurofibromatosis type 1(NF 1) is one of the most common autosomal dominant disorders which occurs in 1:2500 to 1:3300 live births.[1] Common practice of perioperative assessment includes a thorough history and physical as well as intracranial and spinal imaging prior to neuraxial anesthesia. However, safe neuraxial anesthesia may be considered without imaging.

Results/Case report

A 32-year-old African American male with neurofibromatosis type 1 (NF 1) presented with small bowel obstruction and was found to have a recurrent large abdominal high-grade malignant nerve sheath tumor. Patient was scheduled abdominal wall mass resection and reconstruction. On day of procedure, surgeon requested epidural placement for post-operative pain control. Patient was seen and examined in the holding area where a history and physical was obtained, including a detailed neurological assessment. Patient had numerous cutaneous neurofibromas across his back, but no neurological deficits. Further imaging such as magnetic resonance imaging (MRI) was unable to be obtained. The decision to attempt epidural anesthesia was made after consideration of negative neurologic and physical exam. Patient was placed in the sitting position. Using a midline approach, successful placement of thoracic epidural at T10 was done on the first attempt, avoiding all cutaneous neurofibromas. Patient was then placed supine for general anesthesia. Upon completion of surgery, the epidural was started in the recovery area. Post operatively, the patient had no complaints of pain and had a sensory block up to T4. Epidural was removed on postoperative day 3 without complications.

Discussion

Most neuraxial guidelines for NF 1 arise from a few obstetrical case reports. Pregnancy is often associated with rapid increase in the number and size of neurofibromas.[2] Non-parturient patients do not undergo the rapid progression as compared to parturient patients.

Some suggest up to 40% of patients with NF 1 have some underlying spinal tumor even without any neurological symptoms.[3] This is derived from one article where 12 out of 30 patients have asymptomatic spinal lesions.[3] The majority of these tumors arise laterally from the intervertebral foramen.[3] The same article notes that among 1400 patients studied with NF 1, symptomatic spinal tumors account for only 1.6% of the subjects.[3]

There is one documented case of epidural placement in a patient with NF 1, which was complicated by dural puncture and epidural hematoma formation.[4] The author suggests they may have punctured an epidural vein, which is a common risk for any epidural placement. Post procedural MRI showed no firbromata at the location of the puncture, which makes the cause due to a neurofibroma unlikely.[4]

Another case report documents unintentional placement of a spinal needle through a neurofibroma with no adverse consequences.[5]

Perioperative assessment for neuraxial anesthesia in patients with NF1 should continue to be based on a thorough history and physical exam, including a detailed neurological exam and imaging, if possible. However, the unavailability of imaging does not necessarily have to inhibit the safe use of neuraxial anesthesia in a non-pregnant patient if there are no physiological or neurological deficits, as seen in our case report.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1596
Scientific abstract: Acute pain

Defense and Veterans Pain Rating Scale Intensity Scores versus Numerical Pain Rating Scores In Patients Undergoing Total Knee Arthroplasty.

Mike Kent, Brady Reese
Walter Reed National Military Medical Center

Introduction

The Defense and Veterans Pain Rating Scale (DVPRS) was developed as a clinical bedside tool to measure the multidimensional nature of pain and has shown acceptable psychometric capabilities in initial studies (Fig. 1). [1] The DVPRS consists of a pain intensity scale and four supplemental questions exploring the impact of pain on sleep, activity, stress, and mood. Despite efforts to push the DVPRS into the perioperative period within the DoD/VA, the numerical pain rating scale (NRS) is still predominantly the sole tool for perioperative pain measurement used by nurses.[2] While the DVPRS has been validated against the NRS, such investigations were conducted with research staff and not clinical nursing staff. Thus, the aim of this retrospective study was to explore possible discrepancies that may exist between nurse obtained NRS scores and physician obtained DVPRS pain intensity scores.

Materials and methods (NA for case report)

Following IRB approval, a retrospective chart review was performed (n=48) on patients undergoing total knee arthroplasty who had documented nurse obtained numerical pain rating scores and physician obtained DVPRS scores in the morning of postoperative day one. Descriptive statistics was used for demographic data. Pearson R product moment correlation coefficient was performed to capture the magnitude of the bivariate relationship for the postulated research questions. α was set at .05, and using Cohens' taxonomy, small correlation = 1., medium = .3, and large =.5.

Results/Case report

Average patient age was 60 (+/- 8.8) years and all patients received general anesthesia and a femoral perineural catheter for postoperative analgesia. The mean physician obtained DVPRS intensity score on postoperative day one was 2.4 (+/- 2.1) and mean nurse obtained NRS scores was 3.4 (+/-2.2). There was a relatively strong and positive relationship between physician obtained DVPRS intensity scores and nurse obtained NRS scores: $r = .574$, $p < .001$ ($r^2 = .329$).

Discussion

Nurse obtained NRS scores displayed a strong correlation with physician obtained DVPRS intensity scores on postoperative day one following total knee arthroplasty. Previous, investigations have suggested possible discrepancies between nurse acquired pain scores and pains scores obtained from other sources (patients, provider, etc).[3] The DVPRS intensity scores offers significantly more information in the form of functional anchors and a face/color scheme compared to the tradition NRS. In addition to the four supplemental questions, such a pain assessment offers a deeper individualized assessment of each patient's pain experience.[4] In the backdrop of previous validation studies, our results suggest that the DVPRS can replace the NRS in daily perioperative assessments in patients undergoing total knee arthroplasty.[5]

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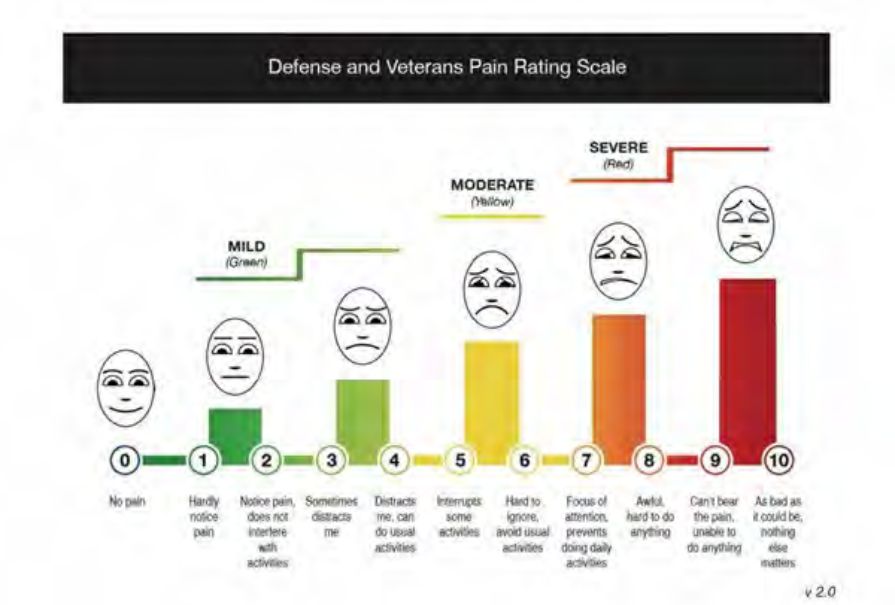
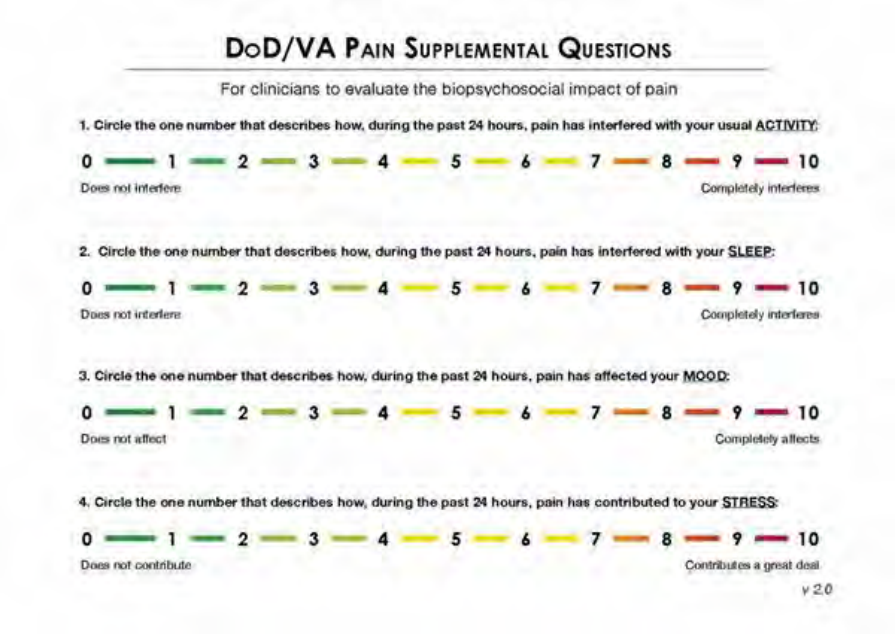
Tables/images



DVPRS Pain Intensity Scale



DVPRS Supplemental Questions

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1598
Scientific abstract: Acute pain

Postoperative Physician Obtained Defense and Veterans Pain Intensity Scores vs Nurse Obtained NRS Scores In a Mixed Surgical Cohort

Kristine Lyons, Michael Kent
Walter Reed National Military Medical Center

Introduction

The Defense and Veterans Pain Rating Scale (DVPRS) was developed in 2010 as an endeavor to provide a consistent bedside tool to measure the multidimensional nature of pain. The DVPRS includes a pain intensity scale and four supplemental questions regarding the impact of pain on sleep, activity, stress, and mood. A preliminary validation study has demonstrated acceptable psychometric application to a military population.[1] Despite efforts to utilize DVPRS during the perioperative period within the DoD/VA as originally intended, the numerical pain rating scale (NRS) is still predominantly the sole tool for perioperative pain measurement used by nurses.[2] The aim of this retrospective chart review was to further investigate the construct validity of DVPRS versus NRS.

Materials and methods (NA for case report)

Following IRB review, a retrospective chart review was performed (n=30) on patients undergoing a mixed set of surgeries (orthopedic, thoracic, urology, and general surgery) who had documented nurse obtained numerical pain rating scores and physician obtained DVPRS scores on postoperative days one and two. Descriptive statistics was used for demographic data. Pearson R product moment correlation coefficient was performed to capture the magnitude of the bivariate relationship for the postulated research questions. α was set at 0.05, and using Cohens' taxonomy, small correlation = 0.1, medium = 0.3, and large =0.5.

Results/Case report

On postoperative day one, there was a medium and positive relationship between physician obtained DVPRS intensity scores and nurse obtained NRS scores: $r = 0.410$, $p = 0.024$ (r2 = 0.168). Similarly, on postoperative day two, there was a relatively large and positive relationship between physician obtained DVPRS intensity scores and nurse obtained NRS scores: $r = 0.502$, $p = 0.005$ ($r^2 = 0.252$).

Discussion

Results demonstrate a medium to large correlation between nurse obtained NRS scores and physician obtained DVPRS intensity scores on both postoperative days one and two respectively. Although previous investigations have suggested possible discrepancies between nurse acquired pain scores and pains scores obtained from other sources (patients, provider, etc),[3] our findings instead favor appropriate construct validity between the two scales in a mixed surgical cohort. Therefore, together with previous validation studies, our results suggest that the DVPRS is a suitable alternative to NRS in daily perioperative assessments.[4] Given this continued foundation of acceptable construct validation, further investigation of the additional four DVPRS supplemental questions in terms of convergent versus discriminate validity is possible, as such a pain assessment offers a deeper individualized assessment of each patient's pain experience.[5]

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2. Cooper SA, Desjardins PJ, Turk DC, et al. Research design considerations for single-dose analgesic clinical trials in acute pain: IMMPACT recommendations. *Pain*. December 2015:1.
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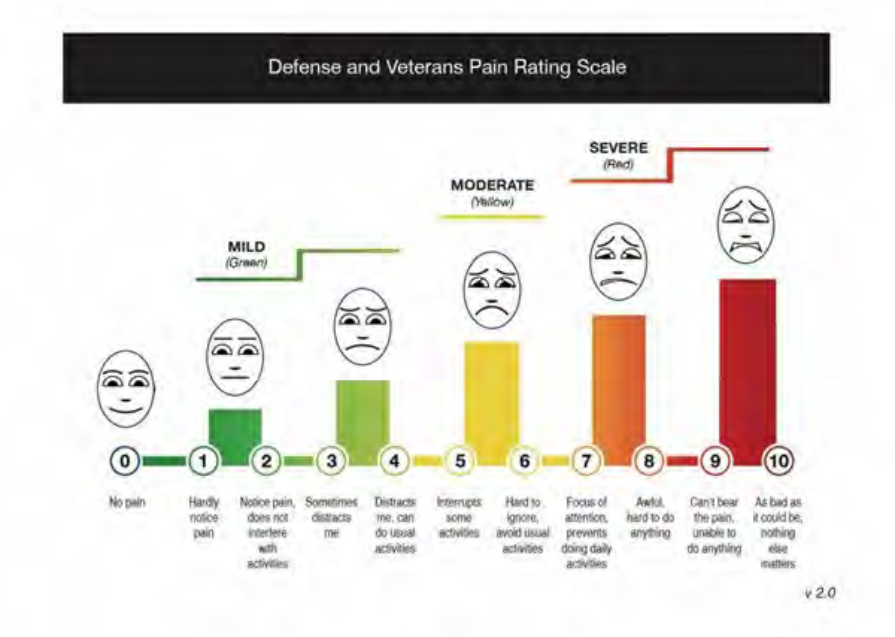
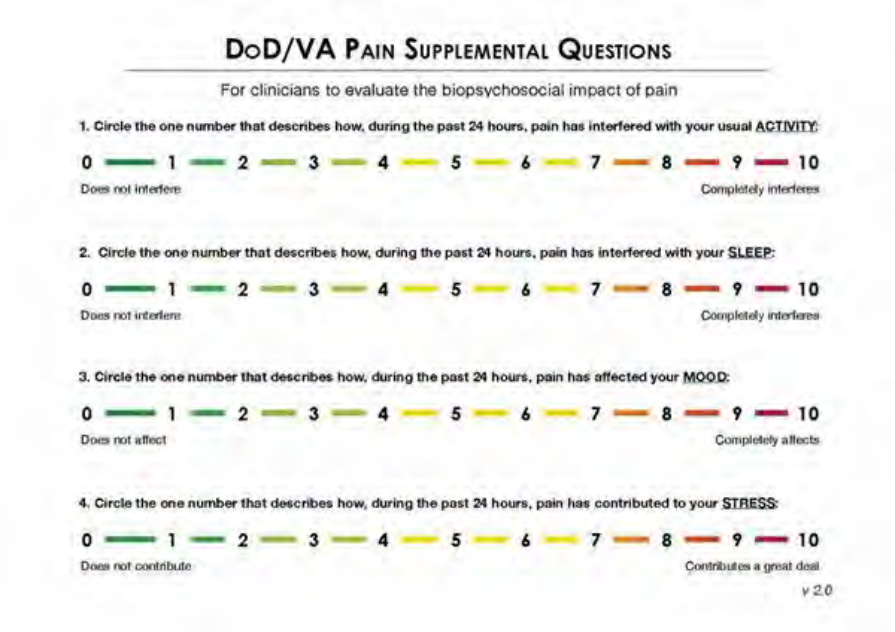


DVPRS Pain Intensity Scale



DVPRS Supplemental Questions

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1599
Scientific abstract: Case series (5 or more patients)

Compression Nerve Injuries Associated with the Beach Chair Positioning for Shoulder Surgery, a Report of Cases.

Frederick W. Burgess, Keith Fragoza, Afreen Siddiqui
Providence VA Medical Center

Introduction

Beach chair positioning for patients undergoing arthroscopic shoulder surgery has become very common approach, employing a variety of low profile head and back supports to provide unobstructed surgical access and exposure. Our facility recently purchased a T-Max beach chair positioner to replace an older system, and has resulted in a series of positioning injuries. Several of the injuries were not initially recognized as compression injuries, and were attributed to other causes, such as regional anesthetic block complications or possible CNS events. However, a pattern began to emerge that led to the recognition of probable compression injuries related to the shoulder positioning system.

Results/Case report

Over a 20 month period, six patients were identified with positioning complications out of 32 shoulder surgeries. Two patients reported numbness and paresthesias involving the periauricular region (greater auricular nerve distribution). Two additional patients complained of pain, numbness, and swelling over the posterior occipital region, in the distribution of the greater occipital nerve. Their symptoms abated without active treatment over a 6 week period. Three patients described symptoms in the post-anesthesia care unit, the fourth reported his symptoms during a follow-up visit. Two additional positioning injuries were identified in two different patients, one involving rib pain over the region supported by the lateral thoracic positioning support, and the other involving the lateral femoral cutaneous nerve on the operative side. All patients were carefully positioned by the surgical team, including the surgeons, nursing, and anesthesia members. Several potential causes for these injuries have been tentatively identified, including tightening the foam face support too tightly, compressing the relatively superficial greater occipital and auricular nerves against the firm U-shaped headrest, and patient movement during surgical manipulation of the extremity causing misalignment. Compared to our general population undergoing shoulder surgery, no differences in risk factors, such as obesity, tobacco use, or diabetes were noted. Surgical times were longer than the average in the injured patients.

Discussion

Injuries to the greater auricular and occipital nerves have previously been reported with other types of headrests employed for shoulder surgery, such as the horseshoe gel padded headrest.[1,2] To avoid future injuries, the addition of supplemental gel padding is recommended to be placed over the posterior head and thoracic supports. Clear plastic drapes may help to improve early recognition of patients moving out of position, and allow for rapid correction. Injuries involving the lateral femoral cutaneous nerve have been reported in obese patients positioned in the beach chair position. Obesity is not be a modifiable risk factor in the short-term; therefore, it may be important to counsel at risk patients of the potential risk prior to surgery.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1600
Medically Challenging Cases (report of up to 4 cases)

Use of Peripheral Nerve Block Catheters to Manage Refractory CRPS and Prevent Phantom Limb Pain

Richard Zhu, Rajat Sekhar
Yale University School of Medicine

Introduction

Complex regional pain syndrome (CRPS) can be challenging to treat. For refractory CRPS, amputation of the affected limb is considered a last resort. The decision to amputate is also accompanied by a risk of postamputation pain and phantom pain. This case report (with patient approval) describes the successful use of peripheral nerve block catheters in a patient with Type 2 CRPS secondary to a repaired tibia and fibula fracture, refractory to medical management and multiple revisions, who finally opted for a therapeutic below-knee amputation. Preoperative gluteal-sciatic and femoral nerve block catheters were placed and used for postoperative analgesia, with subsequent postoperative clinic visits notable for no significant postamputation pain or phantom pain. The utility of peripheral nerve blocks in treating CRPS and postamputation pain is discussed in the context of this case where both conditions were successfully managed with this therapy.

Results/Case report

FD is a 36 year old male presenting for elective amputation for Type 2 CRPS refractory to 1 year of medical and surgical management. Initially, he suffered a comminuted fracture of the tibia and fibula from a hunting accident, which was repaired with ORIF. He had persistent debilitating lower extremity burning and sharp pain and neuropathy demonstrated on EMG that did not improve with 2 surgical revisions; medications including gabapentin, pregabalin, amitriptyline, and duloxetine; inpatient ketamine infusions; or lumbar sympathetic blocks.

Femoral and gluteal sciatic nerve block catheters were placed and started 6 hours prior to surgery in the holding area. Intraoperatively he received perineural ropivacaine infusion as well as methadone and low-dose ketamine. Postoperatively, pain was controlled and catheters were removed on the day of discharge, postoperative day 3. At 2-week and 1-month follow-up visits, FD had moderate incisional pain, but much improved from his preoperative CRPS. He did not report any phantom pain or phantom sensation.

Discussion

Peripheral nerve blocks have been used for both the treatment of CRPS and postamputation phantom pain, with studies examining their use in each condition. This case encompasses both conditions and illustrates the ability of peripheral nerve catheters to prevent phantom pain in an extremity that has already been affected by prior CRPS, as well as their ability to help provide analgesia in that extremity during the profound stimulation of amputation.

CRPS and postamputation pain are distinct, but they share similarities in their central and peripheral mechanisms, which are highlighted in this particular case by the efficacy of peripheral nerve block catheters. In CRPS, sympathetically maintained reflex arcs are thought to cause pain, with imaging studies also demonstrating somatosensory reorganization on a central level (1). In phantom pain, sensitization from somatosensory changes in the cortical area following limb deafferentation contributes to nociception, but there are also peripheral contributions at the stump caused by axonal damage that lead to increased sympathetic activity and catecholamine levels (2, 3). As well as highlighting similarities in mechanism, this case also demonstrates the long-term benefits of peripheral nerve blocks in this challenging patient group.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1601
Scientific abstract: Acute pain

Correlation Between the Patient Reported Outcomes Measurement Information System (PROMIS) Tool and the Defense and Veterans Pain Rating Scale (DVPRS) Score

Michael Stockin, Michael Kent
Walter Reed National Military Medical Center

Introduction

The numerical pain intensity rating scale (NRS, 0-10) is used to quantify pain severity in the perioperative setting. However, this scale does not capture biopsychosocial pain measures. Thus the DoD/VA developed the Defense and Veterans Pain Rating Scale (DVPRS), which captures pain intensity and its effects on sleep, activity, stress and mood.[1,5] (Figure 1)

The National Institutes of Health (NIH) developed the Patient-Reported Outcomes Measurement Information System (PROMIS) to consolidate and standardize measures of physical, mental, and social health.[2] PROMIS has more expansive domains than the DVPRS and has undergone extensive validation.[3,4,6] PROMIS utilizes a standardized metric, the T score with a mean of 50 and standard deviation of 10. Unlike DVPRS, PROMIS utilizes item response theory and computer adaptive testing (CAT).[3]

To date, there has been no comparison between DVPRS and PROMIS items in a perioperative setting. Our goal was to explore any correlations between these two systems in patients prior to surgery.

Materials and methods (NA for case report)

The DVPRS and a selection of PROMIS measures (Anger, Anxiety, Pain Behavior, Pain Interference and Physical Function) are administered daily to patients at Walter Reed National Military Medical Center prior to surgery. Following IRB review, a retrospective chart review was conducted of 23 patient encounters with DVPRS and PROMIS assessments conducted preoperatively and on postoperative day one.

First, we investigated whether or not preoperative DVPRS items correlated with preoperative PROMIS items. Second, we determined whether or not preoperative PROMIS banks correlated with postoperative DVPRS items. Pearson R product moment correlation coefficient was performed to capture the magnitude of the bivariate relationship for the postulated research questions. The small sample size α was set at .05, using Cohens' taxonomy with a small correlation = 1., medium = .3, and large =.5.

Results/Case report

Preoperative DVPRS & Preoperative PROMIS Banks

Positive and significant correlations were found between Pre-DVPRS Sleep Impact/Pre-PROMIS Sleep Disturbance (Medium/Large, r=.452, p=.01), Pre-DVPRS Pain Intensity (Now)/PROMIS Pain Behavior (Large, r=.469, p=.024), Pre-DVPRS Pain Intensity (last 24 hours)/PROMIS Pain Interference (Large, r=.572, p=.02), and Pre-DVPRS Pain Intensity (last 24 hours)/PROMIS Pain Behavior (Large, r=.572, p=.004).

Preoperative PROMIS Banks & Post Operative Day One DVPRS

Positive and significant correlations were found between Pre-PROMIS Pain Interference/Post DVPRS Pain Intensity (last 24 hours) (Medium/Large, r=.498, p=.015) and Pre-PROMIS Pain Behavior/ DVPRS Pain Intensity (last 24 hours)(Medium/Large, r=.498, p=.266).

Discussion

Improving perioperative pain assessment requires inclusion of comprehensive biopsychosocial measures. The DVPRS is a step forward in improving

daily multidimensional bedside pain measurements. NIH's PROMIS measures (indexed over the last seven days) utilize adaptive testing to provide a precise, work flow friendly tool. While our sample size was small, positive correlations in pain-related sleep disturbance and pain impact (pain behavior, interference, etc) warrant further study in combining these two systems (daily perioperative measures with weekly postoperative assessments) to provide a comprehensive history of perioperative pain.

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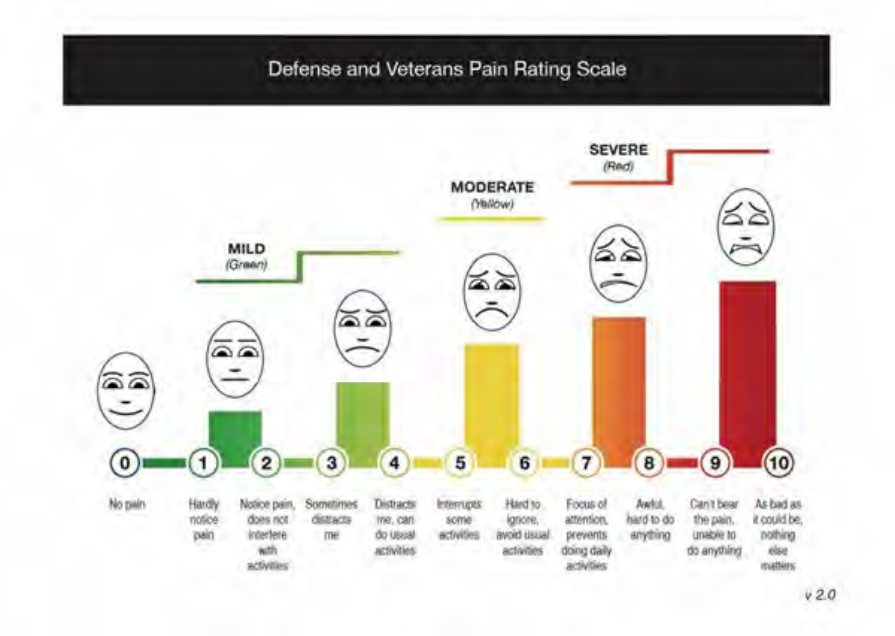
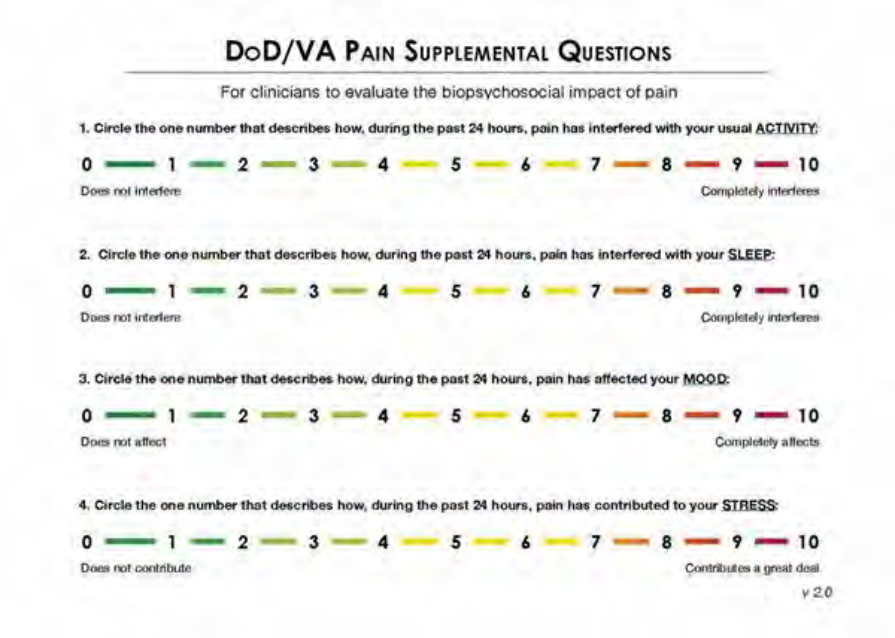
Tables/images



DVPRS Pain Intensity Scale



DoD/VA Pain Supplemental Questions

For clinicians to evaluate the biopsychosocial impact of pain

1. Circle the one number that describes how, during the past 24 hours, pain has interfered with your usual ACTIVITY:

0 — 1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9 — 10

Does not interfere — Completely interferes

2. Circle the one number that describes how, during the past 24 hours, pain has interfered with your SLEEP:

0 — 1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9 — 10

Does not interfere — Completely interferes

3. Circle the one number that describes how, during the past 24 hours, pain has affected your MOOD:

0 — 1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9 — 10

Does not affect — Completely affects

4. Circle the one number that describes how, during the past 24 hours, pain has contributed to your STRESS:

0 — 1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9 — 10

Does not contribute — Contributes a great deal

v 2.0

DVPRS Supplemental Questions

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1602
Scientific abstract: Emerging technology

Diaphragm thickness and its relationship to lung sliding using the ABC approach to Diaphragmatic Evaluation: a feasibility study in patients undergoing ultrasound-guided brachial plexus blocks.

Susan Halliday, Sara Horne, Ban Tsui
University of Alberta Hospital

Introduction

Paralysis of the ipsilateral hemidiaphragm due to blockade of the phrenic nerve during local anesthesia of the brachial plexus is common. Several methods to evaluate diaphragm function have been described using percentage changes in thickness of the diaphragm muscle[1-3]. Assessment of the left hemidiaphragm has been shown to be more challenging than the right. This is most likely due to the spleen providing a lesser acoustic window than the liver. We therefore performed a feasibility study to determine if the novel systematic *ABC* approach to *D*iaphragmatic *E*valuation[4] can be used to easily obtain the percentage change of diaphragm thickness (T) and whether there is any correlation between the distance travelled during lung sliding (D) with the percentage change of diaphragm thickness (T) in patients undergoing ultrasound-guided supraclavicular blocks for forearm and hand surgery.

Materials and methods (NA for case report)

With ethical approval obtained, patients were consented and recruited to the study. Firstly, baseline measurements were taken for the left and right hemidiaphragms. With the patient supine, a high frequency linear probe (3-12MHz) was placed in the anterior axillary line just below the level of the nipple. The level to which the pleura descended to on quiet, normal breathing was marked on the skin. The US probe was then moved caudally along the anterior axillary line and the patient asked to take a maximal breath in and hold. The point to which the pleura descended to on deep inspiration was then marked. At this second mark, the thickness of the diaphragm was measured during normal, quiet respiration and on maximal inspiration. The distance (D) between the two points marked on the skin was measured. The ultrasound-guided supraclavicular block was subsequently performed. Ten minutes following completion of the nerve block the aforementioned measurements were repeated. The incidence of success in visualizing the diaphragm muscle and lung sliding was noted. Multiple regressions were performed between the diaphragm thickness changes (T) and the lung sliding distance travelled (D).

Results/Case report

Ten patients (average BMI = 27.1) were recruited to the study. The incidence of success in visualizing the diaphragm muscle and lung sliding, enabling measurements to be taken for both sides, was 100%. Multiple regressions (Figure 1) were performed between the diaphragm thickness changes (T) and lung sliding (D) with R^2value of 0.057 during deep inspiration for both sides.

Discussion

This study demonstrated that the newly described approach provides easy visualization of lung sliding and the diaphragm muscle, allowing measurements to assess function of the diaphragm to be obtained readily. However, there is no apparent linear relationship between diaphragm thickness changes and the lung sliding distance travelled. This may be partly due to the fact that large variation exists between the lung sliding distance and changes in diaphragm thickness, as both are dependent on patient effort. The implication of this observation is that lung sliding distance cannot reliably predict diaphragm thickness changes and vice versa.

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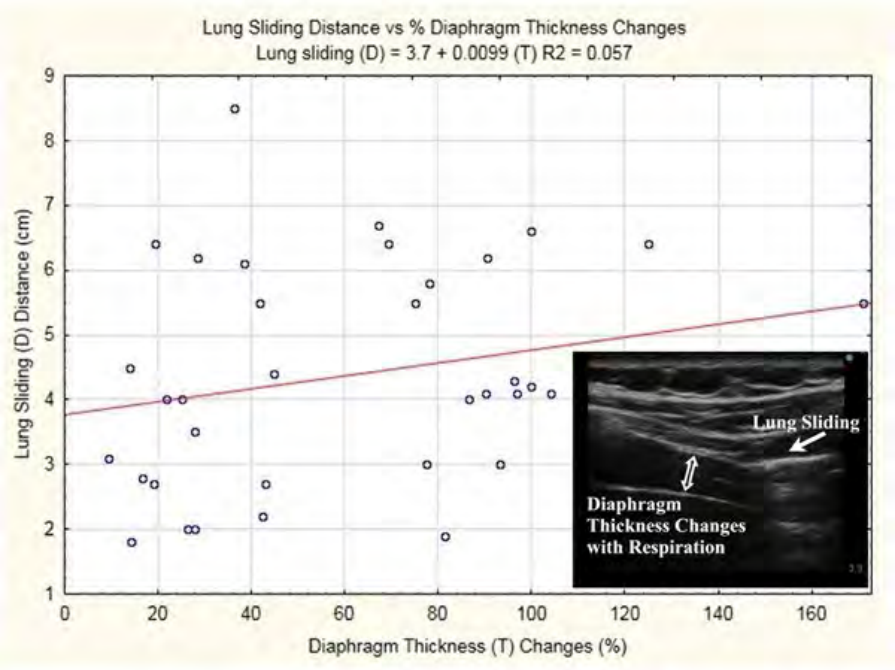

Figure 1

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1603
Medically Challenging Cases (report of up to 4 cases)

Regional anesthetic management in a patient with Charcot-Marie-Tooth disease: A case report.

Anita Mathew, Sally Gowen Stander
University of North Carolina at Chapel Hill

Introduction

Charcot-Marie-Tooth disease is a degenerative disease of the peripheral nervous system that affects nearly 1 in 2500 people in the United States. Usually inherited in an autosomal dominant fashion, Charcot-Marie-Tooth disease can present with slowly progressive weakness, muscular wasting, and sensory impairment primarily involving the distal lower extremities [1]. It has long been known that patients with neuropathy, as is seen in Charcot-Marie-Tooth disease, are at increased risk for anesthesia-related peripheral nerve injury [2]. Consequently, regional anesthetic techniques have been considered controversial in those patient populations [2]. We present an interesting case of a patient with Charcot-Marie-Tooth disease who underwent a challenging but successful anesthetic interscalene block prior to a total shoulder arthroplasty.

Results/Case report

A 61-year-old female with a history of Charcot-Marie-Tooth disease presented with severe pain and decreased motion in her left shoulder and was scheduled for a left total shoulder arthroplasty. Her symptoms were primarily in the upper extremities and included decreased bilateral hand sensation to pain, temperature, and vibration. She also had significant bilateral thenar muscle atrophy and absent deep tendon reflexes in the bilateral upper extremities. Diagnostic MRI of her cervicothoracolumbar spine revealed diffuse enlargement of the roots, plexus and nerves in all spinal segments. Postoperative pain control was a significant concern for the patient, but upon chart review it was found that she had underwent multiple successful interscalene blocks for prior shoulder surgeries without any complications. A left interscalene block was placed for intraoperative and postoperative pain control. Under ultrasound guidance, 25ml of 0.5% bupivicaine with epinephrine was administered carefully around the plexus. During the procedure, it was noted that the brachial plexus was enlarged, with the C6 nerve root estimated to be as large as 5 mm. The nerve block was uneventful, and the patient did not experience any complications such as worsening neuropathy from the procedure.

Discussion

There is little information in the literature regarding regional anesthetic techniques in patients with Charcot-Marie-Tooth disease. This case demonstrates a successful interscalene block in a patient with atypical brachial plexus anatomy due to her underlying disease. Peripheral nerve blocks should be done cautiously in patients with previous underlying neuropathy, but this case report shows that they ultimately can still be an effective option for intraoperative and postoperative pain control.

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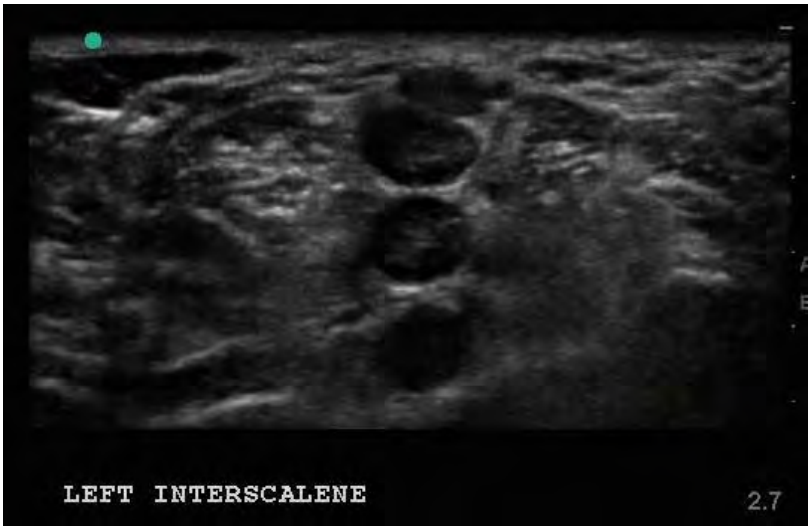
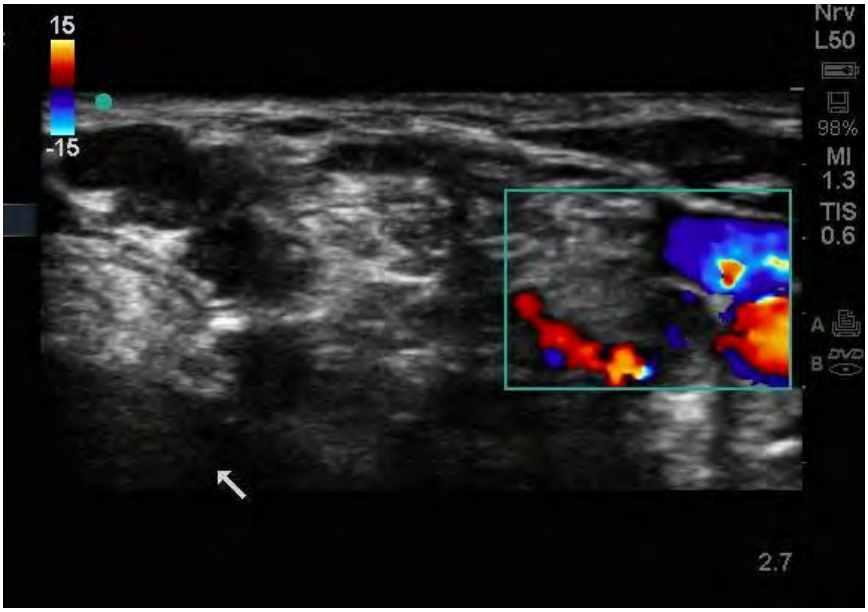


Ultrasound visualization of left interscalene block with C5-T1 nerve roots of brachial plexus.



Ultrasound visualization of left interscalene block using color doppler.

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1604
Medically Challenging Cases (report of up to 4 cases)

Continuous Supra iliac Quadratus Lumborum (upper iliopsoas compartment) Block for Post-operative Analgesia in Patients Undergoing Total Hip Arthroplasty

Youssef Saweris, Hesham Elsharkawy, Kamal Maheshwari, Theresa Fanelli, Wael Ali, Loran Mounir Soliman
Cleveland Clinic Foundation

Introduction

Optimal analgesia after total hip arthroplasty (THA) is important for improving patient outcomes [1] . Opioids are associated with various side effects especially in elder population. Neuraxial and lumbar plexus blocks are not widely used for THA, because clinicians and patients perceive regional anesthesia procedures to be associated with a high risk for complications.[2] Furthermore; hemodynamic alternations with neuroaxial analgesia are undesirable. A continuous Supra iliac quadratus lumborum (QL) block can be a valuable option in patients undergoing THR especially if Neuroaxial or lumbar plexus block are not a feasible option.

Results/Case report

We present a novel technique, a continuous supra iliac quadratus lumborum (QL) block, for pain control after THA in two patients. Case 1: an 85 year old male with complex medical history including dementia, anxiety and lumbar and cervical laminectomies scheduled for revision THR. Case 2: a 63 year old female with a history of fibromyalgia, reflex sympathetic dystrophy and multiple lumbar fusion and instrumentation surgeries from L1-L4 presented for left TKR. On ultrasound scanning, her lumbar region showed unclear anatomy, eliminating the option for the safe placement of a lumbar plexus block. Both cases were on oral opioids before surgery.

In both cases, the patient was placed in the lateral position. Ultrasound scanning started at the flank, 4-5 cm lateral to the lumbar spinous process at the L5 level. The transverse process (TP) of fifth lumbar vertebrae, erector spinae muscle, psoas major muscle, and the QL can be identified as Shamrock's sign as described by Sauter et al [3] . At L5, with the TP in view, a 17 G Tuohy needle was advanced in-plane from lateral to medial through latissmus dorsi muscle and QL to deposit the local anesthetic (LA) at the space between the fascial layers of the QL above its attachment to the iliac crest and psoas major muscles close to the L5 TP (Figure 1). We injected a total of 10 cc of the Ropivacaine 0.5% and a catheter was then advanced 4 cm past the tip of the needle.

In both cases, the patients had excellent pain control with their peripheral nerve catheter in addition to patient's oral home regimen and minimal breakthrough oral and IV medications. First patient had dermatomal sensory block from T10-L3 while in the second patient was from T11-L4. In addition, the first patient received prophylactic anticoagulation with enoxaparin 40 mg SQ daily and aspirin 325 mg PO BID, both started on the first postoperative day and not held for PNC removal.

Discussion

Our cases illustrate that a Supra iliac QL continuous PNC may be an effective component of the analgesic regimen after THA

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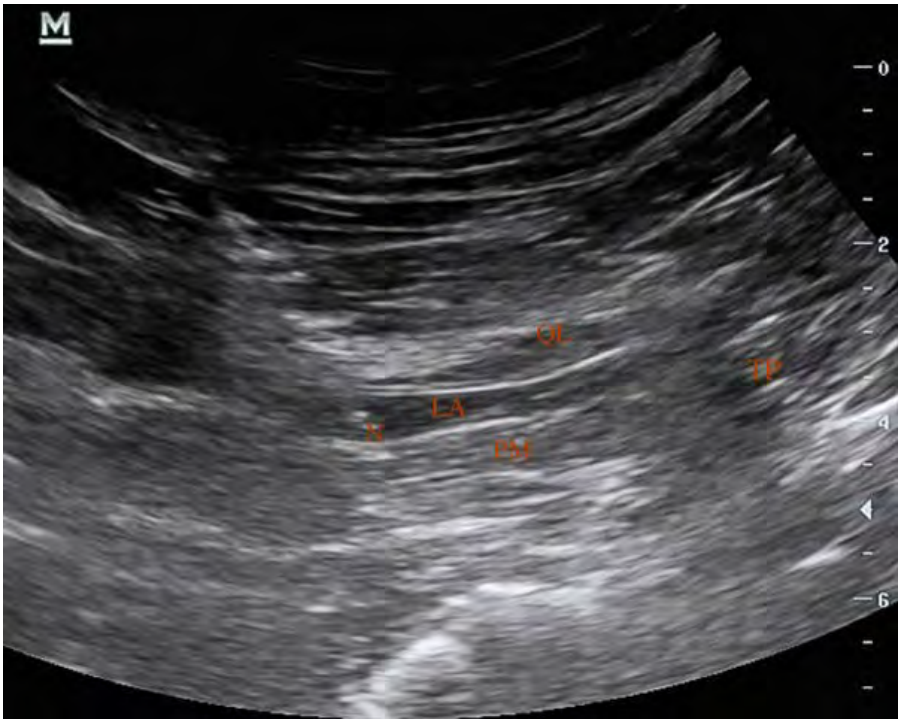

Figure 1: Ultrasound image of QL Block with needle and LA in view N = needle, LA = local anesthetic, PM = psoas muscle, QL = quadratus lumborum, TP = transverse process

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1605
Medically Challenging Cases (report of up to 4 cases)

Spinal cord infarct after failed epidural placement and intraperitoneal bleed

Bradley Lee, Solmaz Manuel
University of California, San Francisco

Introduction

The incidence of subclinical epidural hematoma is unknown given the lack of routine imaging[1]. Consequently, the implications of hematoma on the risk of spinal cord ischemia are also unclear. We present the case of a patient who underwent attempted epidural placement for ventral hernia repair and subsequently suffered intraperitoneal bleed and spinal cord infarct. Imaging demonstrated presence of epidural hematoma without cord compression which may have contributed to the infarct. Consent was obtained from the patient to present details of the case.

Results/Case report

A 55-year-old woman presented for repair of a large ventral hernia. She had a history of breast cancer and underwent mastectomy with breast reconstruction using transverse rectus abdominis myocutaneous (TRAM) flap. She subsequently underwent eight ventral hernia repairs and suffered from chronic pain requiring fentanyl 50 mcg/hr patch and hydromorphone 4 mg 2-3 times per day. The patient also had repeated deep venous thromboses and pulmonary emboli requiring anticoagulation; though these were considered provoked incidents, she was eventually placed on lifelong anticoagulation with enoxaparin.

Preoperative plan was discussed with the surgeon and involved holding enoxaparin prior to surgery with epidural catheter placement for postoperative pain control. On the day of surgery, enoxaparin had been held for 48 hours and labs confirmed the absence of coagulopathy. In the operating room (OR), epidural placement was attempted multiple times at levels T7-9 however was unsuccessful and therefore aborted. General anesthesia was induced and surgery proceeded uneventfully with estimated blood loss of 50 ml. In recovery, patient developed increasing tachycardia and became acutely hypotensive with mean arterial pressure of 40 requiring resuscitation with intravenous fluids and vasopressors. Labs revealed a hemoglobin of 4.7 g/dL and, after further resuscitation, patient was taken back to the OR where laparotomy revealed 1.5 liters of unclotted blood in the abdomen.

Postoperatively, patient was found to be paraplegic and STAT MRI demonstrated epidural hematoma without cord compression (Figure 1) and central cord signal abnormality extending from the conus to T8 suggestive of arterial ischemia (Figure 2). Neurology and neurosurgery evaluated the patient and determined the etiology of myelopathy was likely due to cord infarct from acute blood loss and hypotension in the setting of epidural hematoma. She was treated with steroids and blood pressure support for cord infarct; however, she had persistent T8 myelopathy and was eventually discharged to rehabilitation facility.

Discussion

The incidence of epidural hematoma is approximately 1 in 150,000 epidural anesthetics[1] with coagulopathy considered to be the most significant risk factor[2]. This may be underestimated, though, because it represents clinically significant hematomas and does not take into account the increasing use of anticoagulants. In our case, we confirmed appropriate interruption of enoxaparin and appropriate lab values; however, the epidural hematoma and intraperitoneal bleed seem to suggest presence of coagulopathy that was undetected. Unfortunately, there is no effective treatment for spinal cord infarct and prognosis is poor[3]. A better understanding of the potential relationship between epidural hematoma and spinal cord ischemia may help us identify and modify risk factors in the future.

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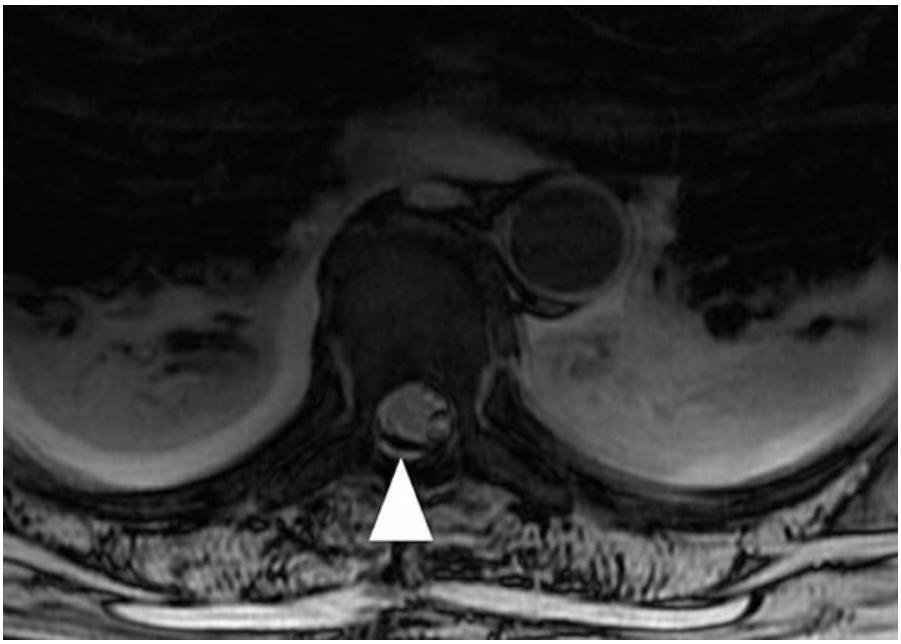
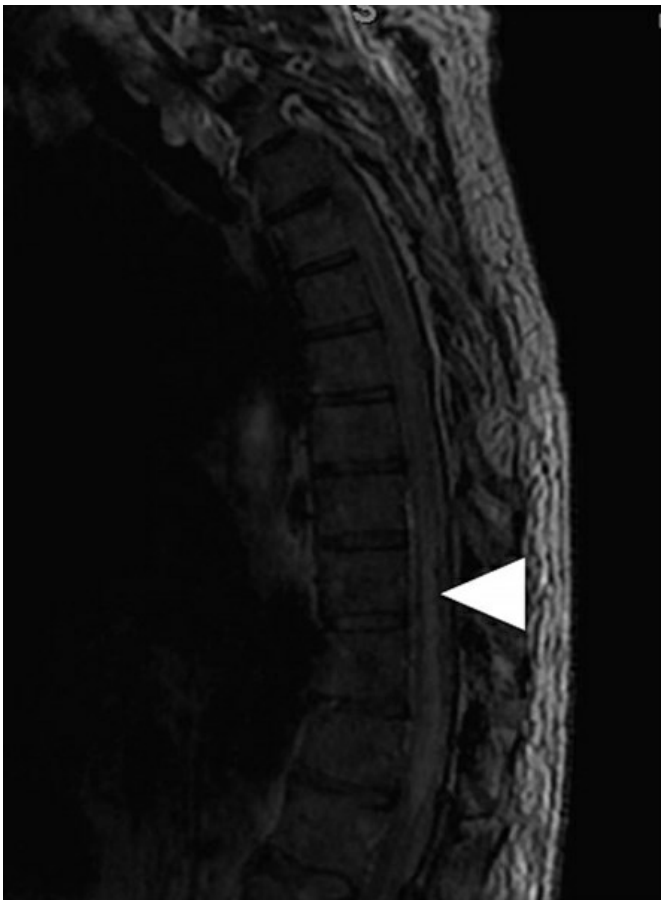


MRI demonstrating epidural hematoma (arrow) without spinal cord compression.



Central cord signal abnormality (arrow) from T8 to conus suggestive of arterial ischemia.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
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Abstract: 1608
Medically Challenging Cases (report of up to 4 cases)

Infraclavicular Nerve Block in a Patient with Amyotrophic Lateral Sclerosis

Jason Johns, Jonay Hill, Meredith Kan, Jean-Louis Horn
Stanford University Medical Center

Introduction

Amyotrophic lateral sclerosis (ALS) is a relentlessly progressive neuromuscular disease associated with the degeneration of both upper and lower motor neurons. It eventually leads to muscle weakness, atrophy, and death within 3-5 years, most commonly from respiratory failure. [1] The appropriate anesthetic management of these patients can pose various challenges as both general and regional anesthesia have their associated risks.[2] With the patient's permission, we present the use of an infraclavicular nerve block as a primary anesthetic in a patient undergoing wrist surgery.

Results/Case report

A 64 year-old, 74kg, 165cm female with progressive ALS was scheduled for lunotriquetral arthrodesis after a traumatic fall. Preoperative examination revealed an ALSSS score of 32. She had fully intact upper extremity sensation and strength, mildly impaired speech and swallowing, and was requiring a walker for ambulatory support. After discussing the risks and benefits the decision was made to place an infraclavicular peripheral nerve catheter to provide both greater distance from the phrenic nerve and assure surgical anesthesia throughout the entire procedure, should the initial dose need re-bolusing. The patient was placed in the supine position, standard monitors applied, and under ultrasound guidance, via an in-plane approach, a 17g Touhy needle was positioned at the level of the posterior cord of the brachial plexus near the subclavian artery. Following this, 25cc of plain 1.5% mepivacaine was injected through the needle with adequate spread near all 3 cords. Partial onset of both sensory and motor blockade was noted within 10 minutes and at the time of surgical incision, approximately 38 minutes later, adequate surgical conditions were noted. Anesthesia was maintained with 30mcg/kg/min of propofol and a total of 100mcg of fentanyl, which was given for spastic discomfort of the lower extremities. Total time from initial local anesthetic injection to arrival in the post anesthesia recovery area was 180 minutes. Approximately 30 minutes later the patient noted partial return of sensory and motor function with complete return to baseline after 90 minutes. The infraclavicular catheter was left in place but per the patient request was not utilized and eventually removed on POD 1. No complications occurred during the performance of the block and no new neurologic deficits were noted during the patient’s hospital course or at her 1 month follow-up appointment.

Discussion

Relatively little information is available with regards to ALS and peripheral nerve blocks. To our knowledge, no literature describes an infraclavicular nerve block in the setting of ALS. Regional anesthesia, according to some texts, may be relatively contraindicated secondary to concern for traumatic nerve injury from the needle or catheter, nerve ischemia, disease exacerbation, and possible neurotoxic effects from local anesthetics.[2,3] However, regional anesthesia also poses several advantages including maintenance of airway reflexes and improved hemodynamics as well as avoidance of general anesthesia, neuromuscular blockers, and subsequent respiratory muscle weakness or failure. In conclusion, this report adds to the small but growing body of literature that suggests peripheral nerve blocks may offer a viable alternative to general anesthesia for patients with ALS.

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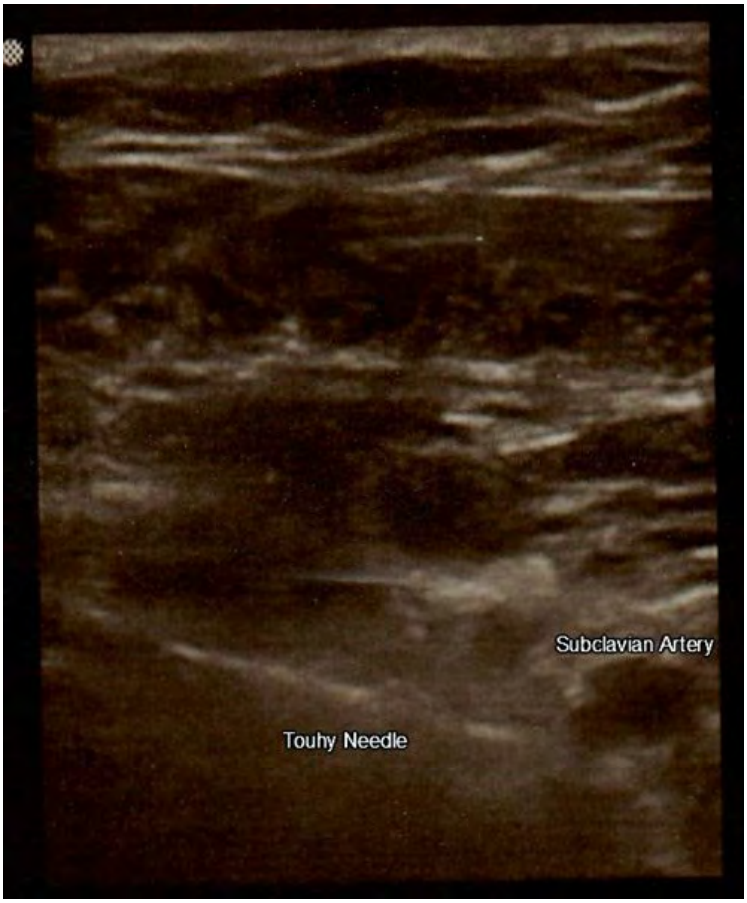

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1609
Scientific abstract: Regional anesthesia

Ultrasound-guided Adductor Canal Blocks have improved pain control and ambulation following Total Knee Arthroplasty in our centre

Emma Murphy, Rahul Bhattacharyya, Susan Halliday, Brian Rooney, Graeme Hilditch

Introduction

Effective pain control with minimal side-effects is essential for early mobilisation following total knee arthroplasty (TKA). Femoral nerve blocks (FNB) are seen as the gold standard for providing analgesia following knee arthroplasty[1] but they reduce quadriceps strength impeding post-operative mobilisation[2]. Peri-articular local anaesthetic infiltration (LAI) has been shown to provide equivalent analgesia to FNBs[3]. The adductor canal block (ACB) also provides analgesia similar to the FNB but preserves muscle strength, improving ambulation[4,5]. In our centre, where we used a multimodal analgesic regimen consisting of regular acetoaminophen and non-steroidal anti-inflammatory drugs (NSAIDs) with OxyContin BD and Oxynorm as required, in combination with peri-articular LAI, we were however experiencing difficulties mobilising patients due to pain. To improve the quality of analgesia, we introduced ACBs to the analgesia protocol. To ensure patients were benefitting from ACBs we carried out a quality assurance audit.

Materials and methods (NA for case report)

From the operating theatre database, we identified 20 patients who underwent TKA with spinal anaesthesia only and 20 who had spinal anaesthesia plus an ultrasound-guided ACB. All patients had OxyContin 10mg BD, receiving the first dose pre-operatively or in the post-operative recovery room, acetoaminophen 1g QID and ibuprofen 400mg TID, unless contraindicated. Plain 0.5% bupivacaine (3.0 to 3.25 ml) was used for all spinal anaesthetics. ACBs were undertaken using a single shot injection of 20 ml 0.375% levobupivacaine infiltrated medial to the femoral artery. Intra-operatively paracetamol 1g and diclofenac 75mg were given and peri-articular LAI was performed (a reduced dosage of local anaesthetic was infiltrated in patients with a ACB).

Primary outcome measures were post-operative morphine usage and pain scores. Secondary outcomes included ability to straight leg raise (SLR) and mobilise to walk at the first post-operative physiotherapy (PT) assessment, and discharge day.

Results/Case report

The mean morphine consumption at 12h was 4 mg in block group and 11 mg in the no block group (p = 0.009). The total morphine consumption at 24 h was 8mg and 19mg (p= 0.0988) Pain scores were significantly reduced in the block group compared with the no block group at 6h (1 v 3; p=0.022), 12h (1 v 3; p=0.004), 18h (0 v 3; p=0.002) and 24h (1 v 2; p= 0.054). At the first PT assessment, in the block group 18 patients were able to SLR and 19 were mobilised, whereas in the no block group 15 were able to SLR and 18 were mobilised. The mean length of stay in the block group was 2.7 days compared to 3.9 days in the no block group (p=0.01).

Discussion

This audit demonstrates that in our centre the adductor canal block reduces opioid consumption and improve pain scores in the first 24 hours following TKA when used in combination with peri-articular LAI. These results are in keeping with previous findings using saphenous catheters in combination peri-articular infiltration[6]. Furthermore the block improved ambulation and facilitated a quicker discharge from hospital. The sample group presented however is small and therefore large randomised trials are necessary to ensure these results can be reliably reproduced.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
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Abstract: 1610
Medically Challenging Cases (report of up to 4 cases)

Blood Patch to the Brain?

Yili Huang, Roniel Weinberg
Weill Cornell New York-Presbyterian Hospital

Introduction

Spontaneous intracranial hypotension (SIH) results in postural headache in the setting of low CSF (<60mm H2O [60-200mm]. Because the brain weighs more than CSF (1.5kg vs 48g), when CSF decreases, there is decrease in the buoyancy of the brain resulting in traction on the pain sensitive intracranial meningeal structures. This results in headache, nausea, emesis and associated neurological changes. These symptoms are similar to that of subdural hemorrhage (SDH) an extremely rare complication of SIH that is often associated with epidural, intrathecal or ventricular puncture. Our case demonstrates neurologic degeneration, and worsening intracranial pressure during treatment SIH with epidural blood patch, in the setting of prior subdural collections.

Results/Case report

45 year-old female with pmhx of SVT ablation with 3 months history of non-positional occipital headache associated with dizziness, nausea, vertigo as well as a transient episode of right hand and jaw numbness. MRI brain showed pachymeningeal enhancement, right 7mm and left 4mm fluid collections, low lying cerebellar tonsils consistent with spontaneous intracranial hypotension. MRI total spine demonstrated extradural fluid collection in anterior epidural space at T1/2 and L1/2 with small extradural fluid collection in anterior and posterior epidural space at T9-12. Inter-laminar epidural blood patch was performed with the patient placed in prone position (which she was having difficulty tolerating), at L1-2 with 17 gauge Touhy needle and loss of resistance to air. Patient complained of increased frontal pressure with injection of blood. Immediately after 15cc of blood was injection, patient became unresponsive for 5 seconds with HR increasing from 70s-140s while blood pressure maintained at 130/80. The procedure was aborted; patient was turned supine as the patient regained consciousness without any memory of the event.

The patient was admitted for observation. She now complained of severe frontal headache, associated with photophobia, nausea, intermittent 10-minute episodes of left upper extremity, and tongue numbness. Neurology exam was normal along with normal EEG, but CT brain showed acute blood layering in chronic subdural collection (figure 1). Patient was placed on levetiracetam and dexamethasone. CT myelogram demonstrated elevated opening pressure of 36cm H2O without evidence of CSF leak. Repeat MRI demonstrated improved intracranial hypotension, subdural collection with layering of hematocrit. After stabilization of imaging and symptoms, the patient was discharged post procedure day 6.

Subsequant head CT demonstrated unchanged subdural hematoma measuring 2.5cm and patient continued to complain of frontal pressure, blurry vision, tinnitus, and intermittent episodes of unintentional left hand jerking movements over the next month. Burr hole evacuation of SDH (figure 2) was performed post procedure day 23, leading to resolution of the front pressure and tinnitus.

Discussion

SDH after SIH must be considered with persisting headache and neurologic dysfunction, especially after epidural blood patch and careful evaluation and treatment may prevent severe neurological sequelae.

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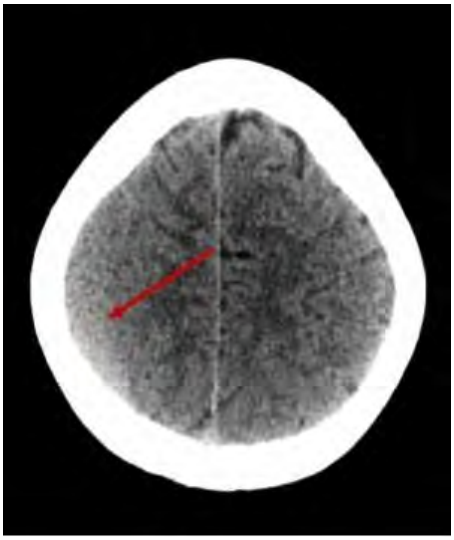

Figure 1: CT brain showing acute blood layering in chronic subdural collection

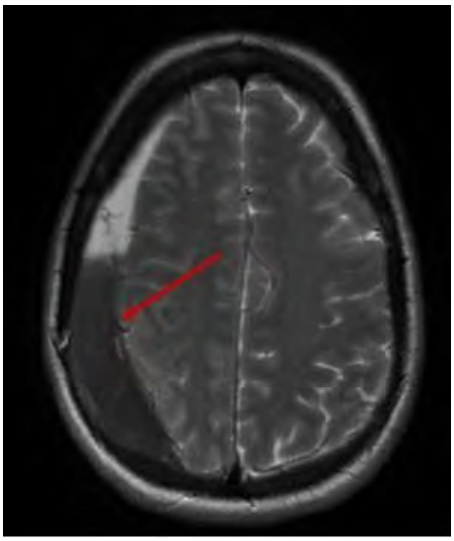

Figure 2: Post Burr hole evacuation of SDH

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1612
Scientific abstract: Regional anesthesia

Clinical indicators of the need for telemetry postoperative monitoring in patients with Obstructive Sleep Apnea undergoing total knee arthroplasty

Natasha Desai, Kethy Jules-Elysee, Yan Ma, Wei Zhang, Stavros Memtsoudis, Gregory Liguori
Hospital for Special Surgery

Introduction

Obstructive sleep apnea (OSA) has been associated with higher complication rates perioperatively (1). Due to this increased risk, patients with OSA are often admitted to the telemetry unit postoperatively for overnight observation. The current literature does not provide adequate guidance in appropriate decision-making regarding management of these patients. The objective of this study was to use the STOP-BANG questionnaire to identify patients at risk of OSA without previous diagnosis and to correlate the STOP-BANG score with the number of episodes of desaturation following total knee arthroplasty (TKA). In an environment of limited healthcare resources, this information may potentially identify patients who should undergo respiratory monitoring following TKA. We hypothesized that the STOP-BANG scoring model, as a predictor of OSA (score ≥ 3), would significantly correlate with the number of oxygen desaturation episodes experienced by patients during the first 48 hours following surgery under neuraxial block.

Materials and methods (NA for case report)

After institutional IRB approval, the STOP-BANG questionnaire was administered to 110 patients preoperatively. Patients were connected to a pulse oximeter (Nellcor Oximax N-600x, Covidien, Boulder, CO) during surgery and postoperatively for a total of 48 hours. All patients underwent combined spinal-epidural anesthesia with either saphenous or femoral nerve block, and intravenous sedation. Postoperatively, patient-controlled epidural analgesia (PCEA) was administered until POD1, at which time the epidural was discontinued.

Results/Case report

A total of 98 patients were included in the final analysis. Sixty-eight patients had a score ≥ 3 (69%); of those, 30 (or 44%) had a score ≥ 5. Thirty-one percent of the total population had a score < 3. One-third of patients with a score ≥ 5 were suspected of having OSA from obstructive events noted in the operating room by the anesthesiologist. No significant difference in the total number of desaturation events were noted between groups. The total number of desaturation events on postoperative day 1 was greater than on day 0 (32.90 ± 42.70 vs. 4.10 ± 10.04, $p < 0.0001$). Oral opioid use was greater on POD1 compared to POD0, 60.01 ± 36.99 vs. 13.06 ± 16.94, $p < 0.0001$. There was a significant correlation between total number of desaturation events and length of hospital stay, $r = 0.329$, $p = 0.001$. Patients with a STOP-BANG score ≥ 3 had a higher preoperative serum hematocrit (39.90 ± 4.23 vs. 38.50 ± 3.20, $p = 0.05$). Patients with a preoperative serum CO^2 ≥ 30 had significantly longer episodes of desaturation on POD0 (233.70 ± 410.09 vs. 81.98 ± 126.19 seconds, $p = 0.044$).

Discussion

This study focused on TKA patients undergoing spinal-epidural anesthesia with peripheral nerve block, followed by postoperative PCEA. While PCEA was maintained, the number of desaturation events were low overall. However, it significantly increased on POD1 and POD2 as oral opioid use increased. Modalities to decrease postoperative opioid use should be further explored. A high preoperative value of CO^2 should alert the physician about the possibility of prolonged episodes of desaturation postoperatively, and trigger further investigation for possible OSA. Given the correlation between length of stay and the number of desaturation events, investigations into a causal relationship should be considered.

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Tables/images

Variables	Sample Correlation	P Value
Total # Desaturation Events with PACU LOS	-0.16128	0.12
Total # Desaturation Events with Hospital LOS	0.32927	**0.001**

Table 1 - Correlations between total number of desaturation events and LOS

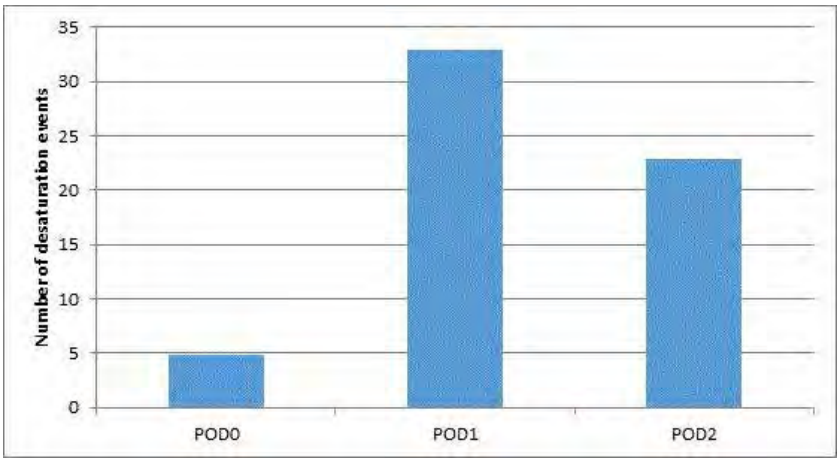

Figure 1 - Daily number of desaturation events in postoperative study period.

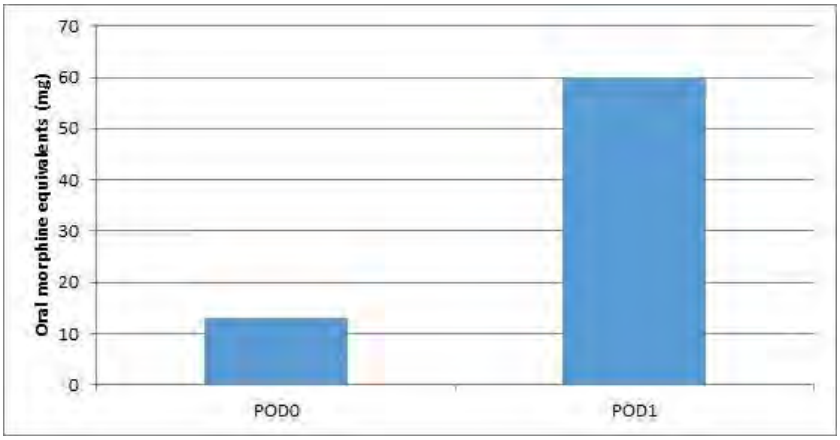

Figure 2 - Oral opioid medication usage, as measured in oral morphine equivalents, on day of surgery and postoperative day 1.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1613
Scientific abstract: Chronic pain

Updates to Measurement Invariance of the Oswestry Disability Index (ODI) Across Different Pain Populations

Aaron Przybysz, Rashad Albeiruit, Chad Brummett, Afton Hasset, Jena Goesling, Stephanie Moser
University of Michigan

Introduction

The Oswestry Disability Index (ODI) is considered the gold standard for measuring degree of disability and quality of life in a person with low back pain. The ODI has also been used to assess disability in other non-low back pain populations, however, there have been no studies examining the construct validity of the ODI in other pain populations to ensure the ODI is measuring the same underlying construct, disability. Group differences between various pain populations may underlie instrument bias or lack of equivalence. Our aim is to assess whether the ODI is measuring the same construct in four pain populations: low back pain (reference), neck pain, headache/facial pain, and pelvic/abdominal pain (comparison).

Materials and methods (NA for case report)

1,501 new patients seeking treatment for chronic pain at the University of Michigan's Back & Pain Center were included. Patients completed the ODI along with other measures of pain, affect, and functioning. Pain groups were created using ICD9 codes of the primary diagnosis. Multi-group confirmatory factor analysis was used to test measurement invariance for each pain sample compared to the low back pain sample in MPlus 7.3. This method tests whether scale items measure the same construct in different populations, informing scale use and comparison across different populations. A series of increasingly restricted factor analysis models were conducted to assess equality of 1) factor structure (configural invariance), 2) factor loadings (metric invariance), and 3) item thresholds (scalar invariance). Model fit was assessed with Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA). Significant changes in model fit were assessed using CFI difference testing.

Results/Case report

The single factor structure fit the data adequately in each pain group when tested individually (Table 1). Evidence of strong measurement invariance (i.e. scalar invariance) was found for the both the pelvic pain group and cervical pain group compared to the low back pain group (Table 2). Only weak measurement invariance (i.e. metric invariance) was achieved in the head/face pain group compared to the low back pain group.

Discussion

This study provides support for use of the ODI in non-low back pain populations. Evidence of measurement equivalence in the pelvic pain group and cervical pain group compared to the low back pain group indicates that differences in ODI scale scores between these groups will be due to underlying differences in disability, rather than measurement bias. Only weak invariance was achieved for the head/face group compared to the low back pain group. Although the ODI does appear to measure the same latent construct in these groups, differences in observed ODI scale scores may be due to measurement bias rather than true underlying differences in disability. Clinicians can compare ODI scale scores in low back pain patients to cervical or pelvic pain patients, but should be cautious when comparing ODI scale scores in patients with head/face pain to those with low back pain.

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Tables/images

Table 1. Fit of single factor model for each pain group individually.

	N	Chi-square	CFI	RMSEA (95% CI)
Low back	678	$\chi^2(32) = 220.27$, $p < .001$	0.97	0.09 (0.08-0.11)
Head/face	296	$\chi^2(35) = 130.96$, $p < .001$	0.97	0.10 (0.08-0.11)
Pelvic/abdominal	171	$\chi^2(33) = 85.05$, $p < .001$	0.97	0.10 (0.07-0.12)
Cervical (neck)	356	$\chi^2(35) = 128.26$, $p < .001$	0.98	0.09 (0.07-0.10)

Table 2. Model fit indices for increasingly restrictive models.

	Chi-square	CFI	RMSEA
Low Back vs Head/Face			
Configural	$\chi^2(64)=336.15$, $p < .001$	0.97	0.09 (0.08-0.10)
Metric	$\chi^2(73)=372.62$, $p < .001$	0.97	0.09 (0.08-0.10)
Scalar	$\chi^2(123)=1510.06$, $p < .001$	0.85	0.15 (0.15-0.16)
Low Back vs Pelvic			
Configural	$\chi^2(82)=338.52$, $p < .001$	0.96	0.09 (0.08-0.10)
Metric	$\chi^2(91)=292.36$, $p < .001$	0.97	0.07 (0.06-0.08)
Scalar[a]	$\chi^2(113)=338.03$, $p < .001$	0.97	0.07 (0.06-0.08)
Low Back vs Cervical			
Configural	$\chi^2(64)=308.21$, $p < .001$	0.98	0.09 (0.08-0.10)
Metric	$\chi^2(76)=292.61$, $p < .001$	0.98	0.07 (0.07-0.08)
Scalar[b]	$\chi^2(115)=458.81$, $p < .001$	0.97	0.08 (0.07-0.08)

a. Item thresholds for items 3 and 6 were free to vary between groups.
b. Item thresholds for items 4 and 6 were free to vary between groups.

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1616
Medically Challenging Cases (report of up to 4 cases)

Central anticholinergic syndrome after diphenhydramine administration for contrast allergy prophylaxis for a transforaminal lumbar epidural steroid injection under fluoroscopy, treated with physostigmine: a case report

Neeti Arora, Michael Kiselev
Weill Cornell Medical Center - New York Presbyterian Hospital

Introduction

Central anticholinergic syndrome (CAS) is an underdiagnosed condition in which muscarinic cholinergic receptors within central nervous system are blocked by anticholinergic medications that cross the blood-brain barrier. Manifestations are variable and may include delirium, coma, hyperpyrexia, ataxia, and nystagmus. Implicated medication classes include antispasmodics, first generation antihistamines, anti-Parkinsonian agents, benzodiazepines, opioids, multiple classes of anti-depressants, and halogenated inhaled anesthetics. We report a case of iatrogenic overdose of diphenhydramine in the setting of a fluoroscopic procedure in a patient with shellfish allergy.

Results/Case report

A 43 year-old female was admitted for a bilateral L5-S1 transforaminal epidural steroid injection (ESI) under fluoroscopic guidance without sedation. Her past medical history included chronic radiating lower back pain, seizure disorder (off antiepileptic medications for 10 years), obesity, asthma, hyperlipidemia, and poorly controlled hypertension. Her home medications included metoprolol, losartan, duloxetine, gabapentin, dicolfenac gel, albuterol, and naproxen. She had not taken her anti-hypertensives the morning of surgery. Patient had numerous food and drug allergies including anaphylactic reaction to shellfish. Of note, she was pretreated with diphenhydramine for her previous 3 fluoroscopically guided ESI without perioperative complications.

Prior to this procedure patient was given 50 mg of oral diphenhydramine. Intraoperative course was unremarkable. She arrived to the post anesthesia care unit ambulating, conversant. Her vitals were: HR 86, BP 157/97, RR 16 Temp 36.8. Thirty minutes after arrival patient complained of nausea, dizziness, flushing and malaise and was treated with an additional 50 mg intravenous diphenhydramine. Shortly thereafter, she became obtunded and horizontal nystagmus was noted. Her vitals changed to BP186/76, HR 120, Temperature 37.6. CAS was suspected and treatment with a physostigimine infusion of 2 mg over 15 minutes was initiated. CAS was confirmed upon rapid improvement of mental status and vital signs without residual motor weakness. The patient was transferred to the medical step down unit for close monitoring. Workup of other etiologies for her CNS symptoms, including stroke and seizures was negative.

Discussion

CAS is infrequent, underdiagnosed condition in the perioperative setting partially due lack of specific laboratory tests. The differential diagnosis often includes cerebral vascular accidents, seizures, and metabolic derangements. Its pathogenesis is rooted in anticholinergic medications crossing the blood-brain barrier and inducing various nonspecific mental status changes. Physostigmine is the treatment of choice due to its ability to cross the blood-brain barrier and reverse the cholinergic blockade.

Pretreatment with first generation antihistamines is routine for patients with mild allergic reactions to iodine contrast, despite the decreasing incidence of allergy with non-ionic iodinated contrast media. Antihistamine with and corticosteroid are given prior to fluoroscopic procedures as prophylaxis, but the pharmacokinetics should be kept in mind as overdosing may occur. We report this case to remind clinicians of CAS, a rare and underdiagnosed condition, and to recognize its potential induction by commonly used perioperative medications such as diphenhydramine.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1617
Medically Challenging Cases (report of up to 4 cases)

Activated Prothrombin Complex to Reverse Post Surgical Coagulopathy and Allow for Thoracic Epidural Removal

Patrick Discepola, Daryl Henshaw
Wake Forest Baptist Medical Center

Introduction

Activated prothrombin complex concentrates (aPCC), such as anti-inhibitor coagulant complex (FEIBA), are FDA approved to control spontaneous bleeding episodes and prevent bleeding during surgical interventions in hemophilia A and hemophilia B patients with inhibitors to factor VIII. They have also been used to reverse modern anticoagulant medications in emergency scenarios including intracranial hemorrhage 1-3. Here we present a novel use of an aPCC for correction of coagulopathy after surgery for removal of an epidural catheter.

Results/Case report

A 54 year-old female with a history of squamous cell carcinoma of the bladder, hypothyroidism, and depression presented for cystectomy with creation of an ileal conduit. Preoperative laboratory values were significant for a platelet count of 488, protein of 6.7, albumin of 3.5, and prealbumin of 9.1. Liver function tests were within normal limits and no coagulation studies were performed, as the patient had no history of coagulopathy. Prior to surgery a T7-8 thoracic epidural was placed for postoperative pain management. Placement was uncomplicated and success was confirmed by loss of sensation to cold from T7-T12. The intraoperative course was complicated by a prolonged surgical time (10 hours) and an estimated total blood loss of 1600mL. The patient was transfused 2 units of packed red blood cells and later 2 units of fresh frozen plasma (FFP) when the international normalized ratio (INR) was elevated to 1.88. At the end of surgery the INR was 1.5. Postoperative pain was treated with the thoracic epidural and intravenous patient controlled hydromorphone given a history of preoperative opioid use. On post-operative day 5 repeat INR was obtained in anticipation of epidural removal, and was found to be significantly elevated at 3.93. Repeat INR was 4.98. The patient was treated with 10mg of IV vitamin K and 2 units of FFP. INR post treatment was still grossly elevated at 2.66. At this time the patient was treated with 516 units of activated prothrombin complex concentrate and repeat INR one hour later demonstrated complete reversal of INR to 1.07. At this time the epidural was removed without any further complication.

Discussion

We presented a case where an aPCC was used to correct post surgical coagulopathy in a patient with a thoracic epidural in place. Intraoperative coagulopathy was likely related to blood loss, platelet and factor consumption, and dilution during surgery. On post-operative day 5 the patient remained coagulopathic secondary to post surgical coagulopathy and possible vitamin k deficiency resulting from poor preoperative nutrition, as evidenced by a low prealbumin. Treatment with anti-inhibitor coagulant complex was able to completely reverse her coagulopathy within one hour of administration in a situation where vitamin K and FFP were unable to correct it over a period of four hours. This rapid correction with anti-inhibitor coagulant complex likely stems from replacement of vitamin k dependent factors as well as the addition of activated factor VII. (Figure 1) This case represents a novel use of the aPCC (FEIBA) in the correction of coagulopathy to allow for removal of a thoracic epidural catheter.

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Tables/images

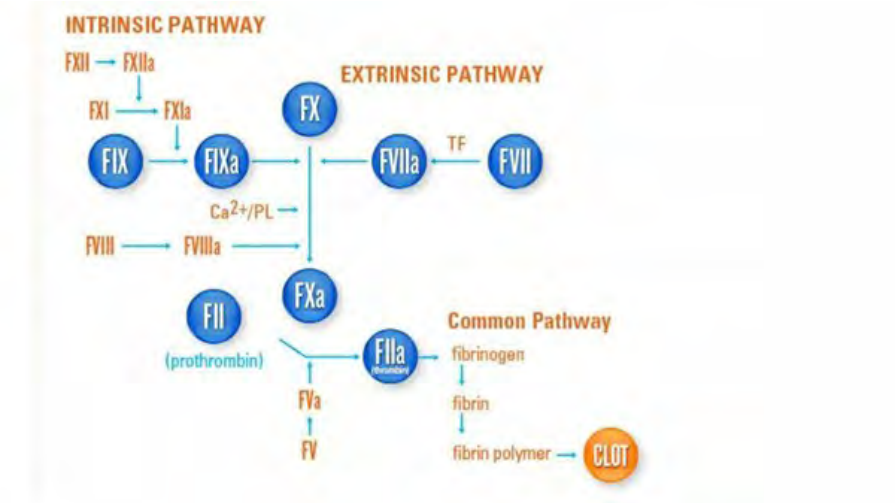

Figure 1. Mechanism of action of anti-inhibitor coagulant complex4

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1618
Scientific abstract: Acute pain

Perioperative Surgical Home and the Total Knee Arthroplasty Patient: Improving Care and Reducing Costs

Lydia Andras, Leslie Thomas, Diedra Dias
Ochsner Clinic Foundation Hospital

Introduction

As the climate of medicine continues to change, physicians and healthcare administrations seek to improve both the quality of the care we provide patients, as well as reducing the cost at which we provide that care, and the satisfaction of the patients. One approach to doing this involves anesthesiology in the care of the patient from the preoperative through the intraoperative and postoperative phases of a patient's surgical experience. The Perioperative Surgical Home (PSH) model is a multidisciplinary team approach to care that has shown success in reducing cost, length of stay, and admission to after care facilities. Our own institution showed such an improvement in these numbers when implementing a program for elective total hip arthroplasty that we expanded the program to elective total knee arthroplasty (TKA). Additionally, the success and growth of the project, partnered with the continued goal of improving the caliber and scope of resident training led us to develop a PSH curriculum for the residents.

The following data were gathered from January 1 to October 31, 2015.

Results/Case report

Preoperative: A thorough triage process to optimize patients' medical comorbidities, educate, and minimize unnecessary testing. Frailty scoring to identify at risk patients and "prehabilitation" therapies to formulate a plan for the support and care they would need post operatively, if necessary.

Intraoperative: Both spinal and combined spinal anesthetic were used successfully as the anesthetic of choice, and perineural analgesia in the form of an adductor canal catheter and single shot IPACK injection were used to minimize pain and narcotic usage while maintaining the patient's ability to ambulate with physical therapy. Additionally, multimodal analgesia was achieved with non- opioid analgesics (acetaminophen, NSAIDS, gabapentanoids) and opioids. Aggressive fluid management and administration of steroids and ketamine also took place intraoperatively.

Postoperatively: A team consisting of a physician anesthesiologist, acute pain nurse, anesthesia resident, and pharmacist as well as physical therapists, case managers, and orthopedic surgeons managed the patients throughout their stay. Multimodal analgesia was continued, and the catheter was removed post op day 2 or in patients sent home on day 1, they were sent home with a home infusion system for an additional 48 hours of local anesthetic via their adductor canal catheter. Physical therapy was initiated in PACU and continued at a minimum of BID thereafter. Low frailty patients were eligible for discharge on POD 1 after meeting physical therapy criteria.

Average Length of Stay (ALOS): 2.86 days in 2014 down to 2.13 in 2015 for a 25% reduction

Discharge Mix: 71% to home independently or with home health in 2014 increased to 79% in 2015, reduction in SNF from 24% to 17%

Hospital Cost: $11,126.34 in 2014 vs $10,643.80 in 2015.

Discussion

Our PSH program continued to achieve improved care and reduced cost that it had demonstrated in the THA population. Additionally, by involving

the residents we are producing physicians capable of implementing similar programs and expanding these results to other institutions.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1619
Medically Challenging Cases (report of up to 4 cases)

Multimodal Management of Pain in a Patient with Proteus Syndrome (Wiedemann syndrome)

Rachel Roberts, Lakshmi Kurnutala, Ike Eriator
Univ of Mississippi Medical Center

Introduction

An 11 year old Caucasian male with a BMI of 15 presented to our pain clinic for worsening of his pain. The patient complained of frontal headache, back pain, and chest pain for the last two weeks. The pain was dull, aching, and constant; he rated his pain as a 10/10. He had a medical history of Proteus Syndrome, spasticity, and multiple episodes of hemarthosis. His current medication regimen included tramadol 25mg every 8 hours as needed and baclofen 10mg daily as needed. Upon further questioning, he had been to the emergency room three times in the last month for headaches which were only controllable with IV morphine. He stated he was worried he would worsen his disease if he engaged socially, so he stopped attending school, playing with friends, and even going outside. He also discussed a history of emotional abuse two years prior.

Materials and methods (NA for case report)

NA

Results/Case report

We discussed the importance of continuing his medications but also the need for more interventions such as physical therapy and psychological counseling for both the patient and his family. He and his mother agreed that he needed more than just medication management, and they were open to the treatment plan. Several months later, he presented back at pain clinic with improving headaches and hopes of restarting school the next month.

Discussion

Proteus syndrome is a rare congenital disorder with skin overgrowth and atypical bone development. It was named for the Greek sea-god Proteus, who could change his shape. The condition was first described in the literature by Dr. Samia Temtamy and Dr. John Rogers in 1976. Approximately 200 cases have been confirmed worldwide and about 120 people are currently alive with the condition. Patients with Proteus syndrome require more than simply medical management of their pain; appropriate treatment involves a multimodal approach including physical therapy and psychological treatment, such as behavioral counseling and family counseling.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1620
Medically Challenging Cases (report of up to 4 cases)

Intraoperative Use of a Home CPAP Machine During Monitored Anesthesia Care: A Case Report

Lindsay Borg, Tessa L. Walters, Lawrence C. Siegel, John Dazols, Edward R. Mariano
Stanford University

Introduction

Patients with obstructive sleep apnea (OSA) present a challenge to the anesthesiologist especially during monitored anesthesia care (MAC) with intravenous sedation. While perioperative use of continuous positive airway pressure (CPAP) is recommended by the American Society of Anesthesiologists, an intraoperative delivery system is not typically available or appropriately fitted. We present the use of a patient's home CPAP machine during outpatient surgery under MAC.

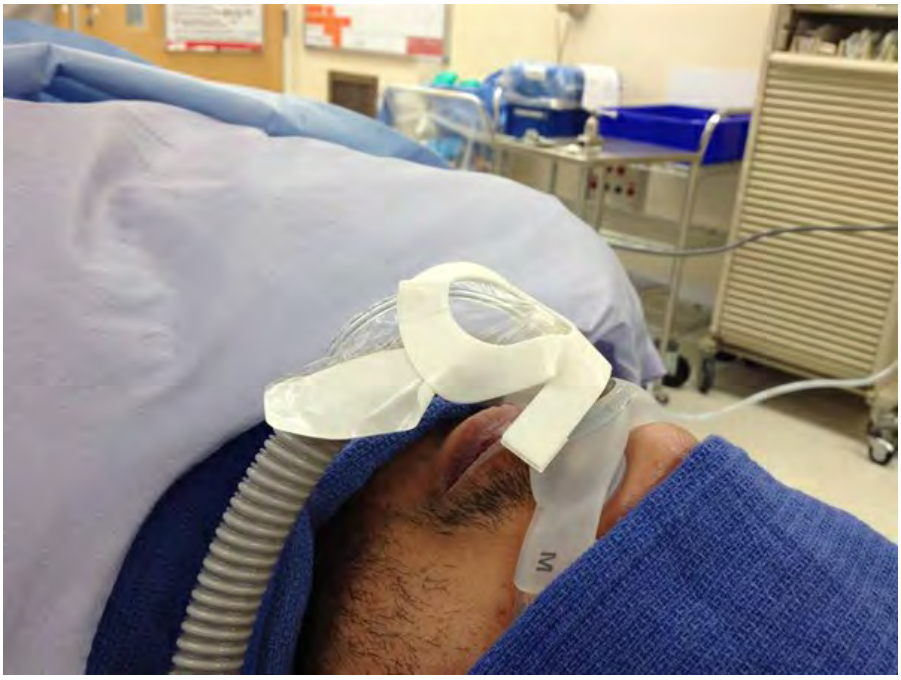
Results/Case report

A 50 year-old man with severe OSA, status post uvulopalatopharyngoplasty and treated with nightly nasal CPAP, presented for outpatient neuroma excision of his foot. The patient brought his home CPAP machine to the hospital as recommended by preoperative clinic staff. After discussion of CPAP delivery options, including the patient's preference for his own nasal pillows over a facemask, the team agreed to bring his machine into the operating room. Supplemental oxygen (10 L/min) was connected to the inflow tubing via a T-piece adaptor and end-tidal carbon dioxide monitoring was achieved by taping the end of the gas sampling line to the exhalation vent just proximal to the nasal pillows. The surgery was performed under MAC with local anesthesia. Intravenous sedation consisted of 2 mg of midazolam, 100 mcg of fentanyl, and propofol infusion (25 mcg/kg/min). Intraoperatively, the patient's oxygen saturation remained above 97%, and no airway obstruction occurred throughout the case.

Discussion

Home CPAP machines potentially provide a preferable alternative to more invasive methods when managing patients with OSA during MAC. There are minor equipment compatibility issues as well as biomedical engineering and infection control concerns to consider prior to intraoperative use.

Tables/images



Patient shown under MAC wearing his home nasal CPAP mask. Distal end of end-tidal CO2 sampling line taped with a clear adhesive dressing used for peripheral intravenous catheter fixation.

Detailed view of end-tidal CO2 sampling line taped to expiration vent of the CPAP mask. The line was taped loosely to allow expired gases to escape the mask.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1621
Scientific abstract: Regional anesthesia

Randomized prospective study to evaluate efficacy and safety of single versus multiple injection ultrasound guided paravertebral blocks for breast surgery

Vishal Uppal, Rakesh Sondekoppam, David Johnston, Parvinder Sodhi, Shalini Dhir, Maria Lopera, Sugantha Ganapathy
Dalhousie University

Introduction

Paravertebral block (PVB) has been documented to provide excellent analgesia following major breast surgeries resulting in reduced narcotic consumption, reduced nausea, improved quality of recovery, reduced chronic pain and possibly reduced metastasis with breast cancer.[1-3] Traditionally, PVB is done by multiple injections below T1-T5 transverse processes. With multiple injections, the risk is increased for a pleural, an intraneural, and/or an intravascular injection. The use of ultrasound imaging enables real-time needle visualization during the procedure. This may improve efficacy and reduce the chances of complication like pneumothorax. Currently, there are no data comparing ultrasound-guided single injection technique with multiple injections technique with regards to extent of spread for PVB. Our objective was to investigate the extent of dermatomal spread of PVB when equal volumes of local anesthetic are injected at one versus five paravertebral sites for patients undergoing major breast surgery.

Materials and methods (NA for case report)

After local REB approval, 72 patients undergoing a unilateral mastectomy were randomised to receive either single or multiple injections PVB. The PVB was performed in prone position under real-time ultrasound guidance using a para-sagittal approach.[4] Patients and assessors were blinded to group allocation. The patients in single injection group received single injection PVB at T3-T4 level with 25 ml of 0.5% ropivacaine and four subcutaneous sham injections. Patients in the multiple injection group received five injections of PVB from T1 to T5 level. 5 ml of 0.5% ropivacaine was injected at each level. The pinprick method was used to assess the extent of dermatomal blockade, 20 minutes following the completion of procedure. Any adverse events including pneumothorax, epidural spread, LA toxicity/seizure, total spinal, were recorded.

Results/Case report

Table 1: Shows main results. Values in mean (SD) OR median [IQR]

	Single injection PVB	Multiple injection PVB	P-value
Procedure duration (min)	6.2 (4.2)	11.9 (7.5)	<0.001
Block spread (Thoracic dermatomes)	4.1 (1.5)	4.5 (1.3)	0.273
Upper level of block, median (IQR)	T2 [T2-T2]	T2 [T1-T2]	0.067
Lower level of block, median (IQR)	T6 [T6-T7]	T6 [T6-T7]	0.885
Duration of block (hours)	13.7 (6.5)	15.1 (6.2)	0.546

There were no reported complications attributable to PVB in either group.

Discussion

Our study shows that when PVB is performed under ultrasound guidance, single level PVB produces similar dermatomal spread when compared to multiple level PVB (Figure 1). This is contrary to the previous published literature when landmark techniques were used.[5] The time to performance of single injection PVB was shorter (6.2 min) compared to multiple injection group (11.9 min), mean difference 5.7 min (95% CI: 2.7 - 8.6 min).

We conclude that with ultrasound-guidance PVB is a safe procedure with low complication rate. The single injection PVB is equivalent to multiple injection PVB with regards to dermatomal spread and duration of analgesia. Single injection technique takes less time to perform and may be associated with less patient discomfort. Therefore, single injection PVB should be preferred over multiple injection technique.

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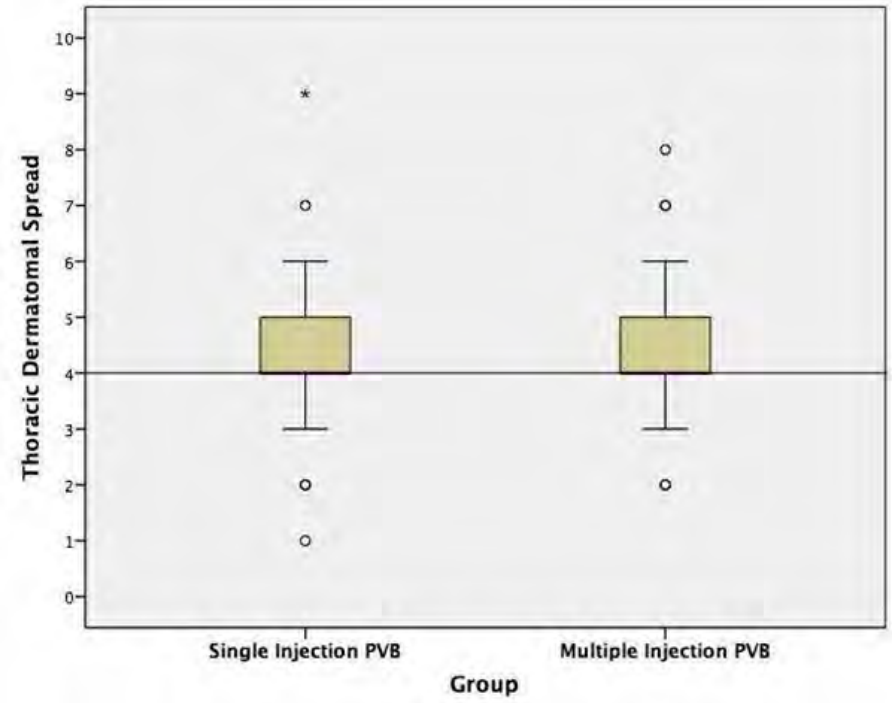

Figure 1: Box plot showing dermatomal spread. Boxes represent interquartile range. Whiskers represent range. Circles and star represent outliers and extreme outlier respectively

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1623
Scientific abstract: Regional anesthesia

The impact of peripheral nerve blocks on perioperative outcome in hip and knee arthroplasty - a population based study

Stavros Memtsoudis, Jashvant Poeran, Crispiana Cozowicz, Nicole Zubizarreta, Umut Ozbek, Madhu Mazumdar
Weill Cornell Medical College / Hospital for Special Surgery / Paracelsus Medical University (Salzburg, Austria)

Introduction

The role of anesthesia techniques and resulting outcomes among the millions of patients undergoing orthopedic surgery has recently gained widespread interest on a public health care level. Numerous studies have shown superior outcomes after neuraxial compared to general anesthesia. However, evidence on the impact of peripheral nerve blocks (PNB) -another mode of regional anesthesia- on perioperative complications and resource utilization on a population level is still missing. Therefore, using a large national database, we aimed to determine characteristics associated with the use of PNBs and to study the association between PNBs and perioperative complications and resource utilization.

Materials and methods (NA for case report)

We conducted a retrospective cohort study using data from the national Premier Perspective database (2006-2013; N=1,062,152 total hip/knee arthroplasty procedures). Multilevel multivariable regression models measured associations between PNB use and outcomes related to complications and resource utilization. Complications included cardiac, pulmonary, gastrointestinal and renal complications, cerebrovascular events, infections, wound complications, thromboembolic complications, inpatient falls and mortality. Resource utilization variables included need for blood transfusions, admission to an intensive care unit, opioid consumption (in oral morphine equivalents), length of hospital stay, and cost of hospitalization. Odds ratios (OR) and 95% confidence intervals (CI) are reported.

Results/Case report

Overall, 17.9% of the patients received a PNB, with a particular increase among knee arthroplasty patients: from 15.2% in 2006 to 24.5% in 2013. When controlling for relevant covariates, the use of PNB was significantly associated with lower odds for almost all complications. The strongest associations were seen for wound complications (OR 0.45 [95% CI 0.44-0.66]) in hip arthroplasty patients and for cardiac complications (OR 0.72 [95% CI, 0.67-0.76]) in knee arthroplasty patients, when comparing those with PNBs versus those without. Similar beneficial patterns were observed for resource utilization. Results remained supported by several sensitivity analyses using three approaches for propensity score analysis.

Discussion

The use of PNB was significantly associated with lower odds for numerous complications and improved resource utilization parameters. Considering the relatively low utilization of PNBs, these results suggest that a wider implementation of regional anesthetic techniques, may potentially lead to a large impact on medical and economic perioperative outcomes.

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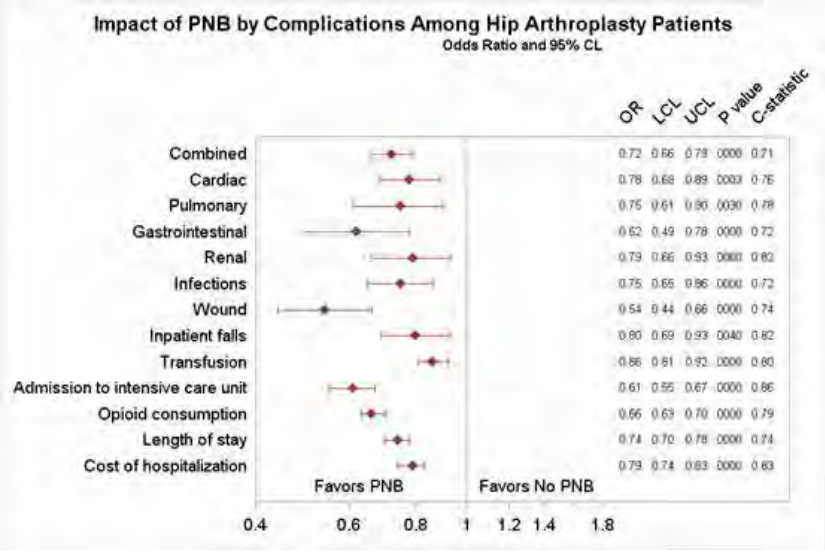
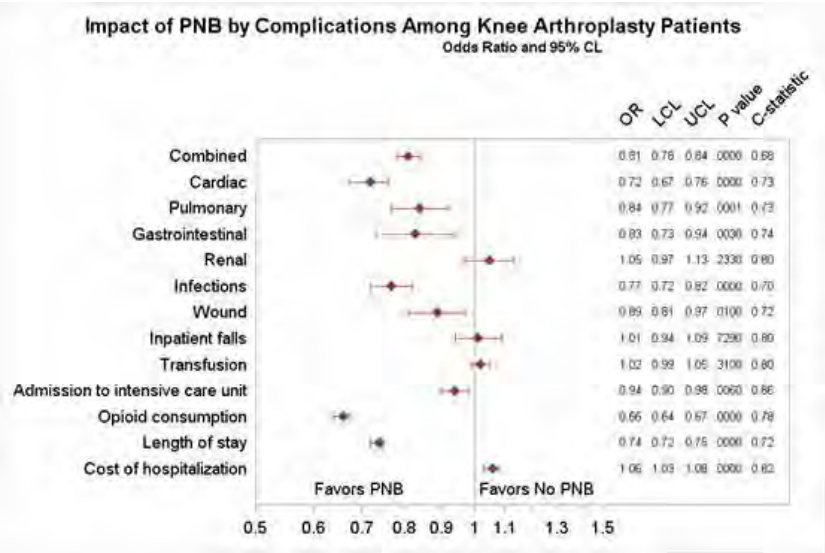


Outcome of multivariable models depicting impact of PNB by complications among hip arthroplasty patients.



Outcome of multivariable models depicting impact of PNB by complications among knee arthroplasty patients.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1624
Scientific abstract: Acute pain

Oral Opioids Are Superior to PCA IV Opioids For Ambulation Following Total Knee Arthroplasty As A Component Of A Multimodal Analgesic Pathway

W. Michael Bullock, Stuart A. Grant, Mitchell R. Klement, Brian T. Nickel, Alexander Lampley, Gavin Martin, Thorsten Seyler, Michael Bolognesi
Duke University Hospital

Introduction

Early ambulation after total knee arthroplasty (TKA) has been associated with decreased post-operative pain scores, decreased hospital length of stay (LOS) and increased patient satisfaction. Early ambulation additionally leads to less surgical manipulations and reoperations. To promote early ambulation, varying post-operative analgesia modalities have been used including perioperative multimodal analgesia with patient controlled analgesia (PCA), single shot and continuous peripheral nerve blocks, and local infiltration analgesia (LIA) techniques. A multimodal analgesic approach with immediate use of oral opioids has been postulated to be beneficial in achieving early ambulation.

Materials and methods (NA for case report)

A retrospective case review of patients undergoing unilateral total knee arthroplasty (TKA) was approved by Duke University IRB. This was a continuous case series with a clinical change in practice from post-operative IV PCA opioid to oral opioid without any changes in surgeon, surgical technique or physical therapy during this time period. Patients received either general or spinal anesthesia followed by local infiltration analgesia (LIA) using liposomal bupivacaine infiltrated by surgeons. Group one received multimodal analgesia including post-operative PCA with peri-operative oral acetaminophen, pregabalin, celecoxib and IV ketamine and dexamethasone while group two received identical treatment except with oral opioids replacing PCA. Post-operative pain scores, time to first physical therapy, distance ambulated, and hospital LOS were reviewed.

Results/Case report

Both groups were comparable in age and co-morbidities including obesity, chronic pain, and depression. More ASA 3 patients were in group one, however, more patients with diabetes and anxiety were in group two. There were no differences in time to first physical therapy or in immediate post-operative pain scores. Average pain scores POD1 were significantly decreased in group two. LOS was shorter in group two. Adverse events were higher in the PCA group one, including a 3 fold higher rate of post-surgical manipulations and reoperations.

Discussion

Knee arthroplasty is seen as a painful operation and most studies and clinical institutions use PCA IV opioid as first line treatment. A multimodal analgesic approach incorporating early oral opioid treatment, as demonstrated here, was superior to PCA opioid at improving early ambulation in patients following TKA. Additionally, pain scores were decreased over the first 24 hours in patients receiving early oral opioid. Patients were able to ambulate earlier and farther than the patients receiving PCA. Post-operative complications, including manipulations under anesthesia and reoperations, were reduced. Hospital LOS was decreased significantly. Taken together, the oral multimodal approach without PCA opioid delivered better analgesia, improved outcomes, and reduced health care costs compared to post-operative analgesia using PCA.

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
Dr. Grant's institution has received funding for his research from SPR Therapeutics, Cara Therapeutics, and Durect Corp. Dr. Grant also acts as a consultant to BBraun Medical.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1625
Medically Challenging Cases (report of up to 4 cases)

Persistent allergic skin reaction to a lumbar plexus catheter

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Boston Children's Hospital

Introduction

Patients who receive peripheral nerve block catheters have the potential for allergic reactions to the catheter, adhesive solution, adhesive tape, or antiseptic solution. We report a patient who developed a widespread rash on her back during two distinct uses of lumbar plexus catheters.

Results/Case report

A 12-yr-old girl with a history of bilateral hip dysplasia was admitted for a left periacetabular osteotomy (PAO). She reported no known drug allergies, but after an earlier right PAO, she developed a large blistering rash on her back (Figure 1). Despite being wider than the dressing area, the rash was thought to be due to leakage around the catheter causing a pool of local anesthetic under the Tegaderm adhesive dressing (3M, St. Paul, MN; product code 70200749664).

After induction of anesthesia, the patient was positioned in the right lateral decubitus position and prepped with chlorhexidine gluconate antiseptic solution. The lumbar plexus block was performed under ultrasound and nerve stimulation guidance with response to stimulation lost at 0.8mA using an 18-gauge Pajunk stimulating Touhy tip needle. A 20 mL bolus of Ropivacaine 0.2% followed by threading of a 20-ga Perifix Braun open-tip epidural catheter (Perifix™; B. Braun Medical Inc., Bethlehem, PA). The catheter insertion site was sealed with an adhesive glue (Dermabond Topical Skin Adhesive; Ethicon, Somerville, NJ), followed by application of adhesive liquid (Mastisol liquid adhesive; Ferndale labs, Ferndale, MI) to allow for more durable adherence to the IV3000 transparent dressing (IV3000 Non-ported; Smith & Nephew Global Products, Andover, MA; Product Code 4654). Surgery proceeded uneventfully. The patient had adequate analgesia post-operatively using a Ropivacaine 0.1% infusion, but she developed a diffuse widespread pruritic rash the morning after surgery (Figure 2). There was no rash near the surgical site which was prepared with the same chlorhexidine antiseptic solution. An allergy consultation diagnosed it as contact dermatitis most likely due to the lumbar plexus catheter and recommended topical steroids and antihistamines for pruritus. The catheter was removed. The rash began to blister 3 days after insertion of the catheter and began to peel at 5 days. At 9 days, she developed approximately ten discrete lesions on her back, which mostly resolved by14 days after catheter insertion. She will undergo allergy testing to the catheter, mastisol, tegaderm, dermabond, and chlorhexidine with the hope that more definitive information will be obtained.

Discussion

Although allergic reactions have been reported in the literature with the use of the same type of nylon polyamide catheters, this rash had a markedly different presentation and duration of symptoms [1,2]. Reported cases showed images of rashes that were thick trails following the course of the epidural catheters; these resolved within 1-2 days. We are unaware of such a case with a widespread blistering rash that didn't follow the distribution of the catheter, dressing, or antiseptic solution. Additionally, none of the cases described had such a protracted course of 2 weeks. Allergic reaction to the catheter should be considered when a patient develops a local rash.

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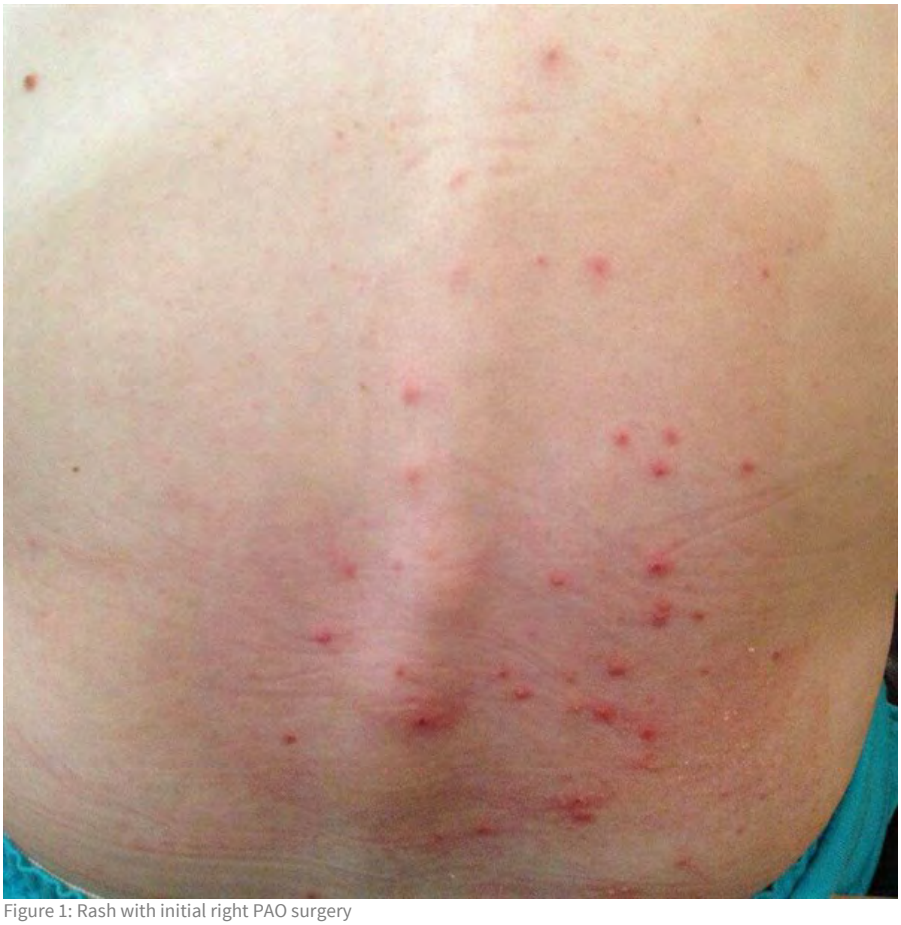

Figure 1: Rash with initial right PAO surgery

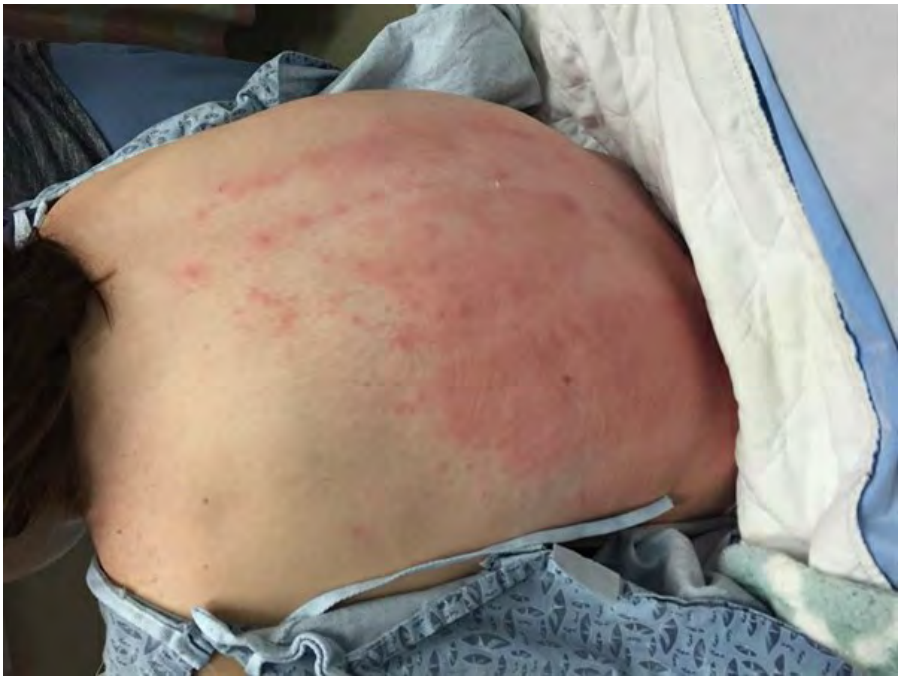

Figure 2: Rash with second left PAO surgery

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1628
Scientific abstract: Acute pain

Perioperative opioid utilization in a claims database: a validation study

Jashvant Poeran, Jason Babby, Nicole Zubizarreta, Karina Borrani, Anthony Rizzuto, Madhu Mazumdar, Patrick McCormick
Icahn School of Medicine at Mount Sinai

Introduction

Health services researchers increasingly use data on pharmaceuticals from claims data for pharmaco-epidemiological research. Given that these studies can potentially impact clinical practice and health care policy by addressing effectiveness, safety and cost questions, thorough assessment of validity of these data is crucial. As we intend to address clinical and resource utilization questions regarding the perioperative utilization of opioid analgesics -both local and national- we aimed to assess the validity of claims information on opioid utilization in this setting for a variety of surgeries.

Materials and methods (NA for case report)

After IRB approval, we extracted data on perioperative use of opioids (grouped into intravenous (i.v.) fentanyl, i.v. and oral hydromorphone, i.v. and oral morphine, and oral oxycodone) from claims captured in the Premier database between January 2012- June 2014 for patients undergoing hip/knee arthroplasty, spinal fusions, hysterectomy, open colectomy, or coronary artery bypass graft (CABG). Perioperative utilization was categorized into day of surgery ('day 0'), the day after ('day 1') and beyond ('day 1+'). These claims data were then compared to data extracted from our electronic health record (EHR) system's ('EPIC') pharmacy module to assess agreement based on the type of opioid used, and the day of use. Agreement was expressed in sensitivity, specificity, positive and negative predictive value (PPV, NPV).

Results/Case report

We included 1,395 hysterectomies, 814 open colectomies, 1,395 hip/knee arthroplasties, 3,206 spinal fusions, and 1,314 CABG procedures. The most commonly used opioid on 'day 0' was i.v. fentanyl for almost all procedures (25-78%) while on 'day 1+' oral oxycodone was the most commonly used (10-44%) with overall, oral morphine the least utilized (0-2%). For the highest volume surgery -spinal fusions- 70% (67 of 96) of calculated sensitivities, specificities, PPVs and NPVs had values that were >85%. Notable exceptions (for any perioperative use) were a 54% specificity, and 69% PPV for i.v. hydromorphone and a 61% PPV for i.v. morphine. In other words, assuming that pharmacy data captures true utilization, this would mean that for every 100 patients labeled as having perioperative i.v. morphine in claims data, 39 patients did not receive this drug, so-called 'false positives'. This pattern of overall agreement for perioperative opioids except for notably i.v. hydromorphone and i.v. morphine was reflected generally throughout the other surgeries.

Discussion

To our knowledge this is the first study assessing validity of perioperative drug utilization in claims data as validity studies often focus on billing (e.g. ICD-9) codes. For most opioids the Premier claims database generally agrees with the data recorded in the pharmacy EHR, however with some exceptions. While agreement between these two data sources does not automatically translate into measures of actual administration, it does demonstrate that for most opioids highly processed claims data do not substantially differ from EHR pharmacy source data. These findings are important for further research into validity of perioperative pharmaceutical claims data as well as comparative effectiveness research addressing perioperative pain management practices and resulting patient outcomes including pain control, opioid-related side effects and patient satisfaction.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1629
Medically Challenging Cases (report of up to 4 cases)

Easy to Program Pumps, a Benefit or Harm to Patient Safety?

Lawrence Montalto, Bryan Allen
Vanderbilt University Medical Center

Introduction

Patient controlled analgesia (PCA) is an important and integral part of post surgical care. There is small inherent risk with allowing patients to assist in their medication administration. This risk is compounded when patients have access to the epidural space through a PCA. This case describes the first known patient modification at Vanderbilt University Medical Center of an epidural infusion pump.

Results/Case report

C, J a 33yo WM has a PMH of active ileocolic and small bowel Crohn's disease complicated by a psoas abscess. He presented for elective laparotomy, ileocolic resection w/ ileocolostomy. He has a long history of narcotic use, and multiple hospital admissions for pain control. Preoperatively he had a thoracic epidural catheter placed to assist with intra-operative management and post-operative pain control. On POD #1, C, J was placed in a private, closed room on contact precautions due to suspected C.Diff. He was not satisfied with his level of pain control or the speed of nursing care. Knowing he had access to hydromorphone in the infusion bag he attempted to reprogram his pump to obtain better analgesia. He informed us after the fact that he had watched the nurses program his pumps over several previous hospital admissions. With this information he felt comfortable using the simple interface of his thorasic epidural catheter infusion pump. He was successful at reprogramming his pump to deliver 15ml boluses of 0.1% bupivicane with 10mcg/ml hydromorphone to his epidural space, as well as changing the programmed concentration. Volumes this high could easily cause a high spinal, resulting in respiratory depression. This could be particularly dangerous on an un-monitored bed as this patient was on. Luckily he was unsuccessful at finalizing the program and we believe he was unable to deliver a new dose prior to discovery.

Discussion

This case illustrates a new problem health care providers will have to navigate in the future. Physicians should be aware that as our medication delivery systems become more automated this introduces new risks into practice. Patients are becoming more tech savvy, often more than the healthcare workers. In an era of mobile phones at bedside with easy access to online manuals and video tutorials for hospital equipment, patients have access to information they have not had in previous years. All major manufacturers pumps have multiple explicit videos and manuals available easily online accessible by smartphone. This represents a new front for patient safety. Well or ill meaning patients, family and or visitors could easily adjust unlocked medication infusions. New or modified safety practices should be added to prevent these new risks from multiplying. In an era of increasing access to information we must remain cognizant of patient access to this equipment.

References

This Case Report has been approved by the VUMC IRB, Reference #151968 on 12/29/2015.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1630
Medically Challenging Cases (report of up to 4 cases)

Extended Release Bupivacaine in Peripheral Nerve Catheters Achieves Adequate Post-Operative Analgesia

Yoon-Jeong Cho, Wael Saasouh, Hesham Elsharkawy
Cleveland Clinic Foundation

Introduction

Major abdominal procedures lead to significant postoperative pain and lead to several complications (2). Quadratus lumborum block (QLB) has been shown to be a suitable adjunct to postoperative pain regimens (1, 2, 3).

A QLB can be performed under ultrasound guidance (2) starting in the area between the coastal margin and the iliac crest. After identifying the transversus abdominis muscle, its fascia can be followed till it meets posteriorly with the thoracolumbar fascia surrounding the quadratus lumborum muscle. Local anesthetic can then be injected at the fascia transversalis plane which should be visualized spreading around the quadratus lumborum muscle. A catheter can then be introduced and embedded within the QL fascial plane.

A QLB can also be performed with some variation depending on the angle of entry and site of injection around the QL muscle.

Results/Case report

Management of acute surgical pain in a patient with history of chronic pain can be challenging to many anesthesiologists. In this case presentation, we utilized extended-release local anesthetics just before removal of the peripheral nerve block (QL block) in order to maximize the analgesic effect and duration.

A 23 year-old male with history of ulcerative colitis, persistent postsurgical pain, and allergies to fentanyl and oxycodone presented for completion proctectomy. Bilateral quadratus lumborum blocks with catheters were placed postoperatively in OR under general anesthesia for management of acute surgical pain. Catheters were infused with 0.2% ropivacaine at 8mL/hr with a patient-controlled bolus dose of 4mL every 60 minutes. As part of multimodal analgesia, patient also received IV acetaminophen, ketorolac, and hydromorphone PCA which was later changed to fentanyl PCA due to complaints of itching.

Patient reported 8/10 pain on postoperative (POD) day 2, which then subsided to 5/10 after doses through the peripheral nerve catheters. On exam, patient was noted to have a sensory level coverage from T9-T12.

On POD 3, each catheter was bolused with 10mL (133mg) of extended-release liposomal bupivacaine in 10mL NS (20mL of volume each, 40mL and 266mg total) prior to removal in anticipation of discharge home. Adequate pain control was noted until POD6.

Discussion

Quadratus lumborum block is a valid addition to a postoperative pain regimen after major abdominal surgery. The choice of local anesthetic can be modified based on the postoperative plan for discharge.

Extended release local anesthetics has a sustained duration of effect and thus can be used to maximize the analgesic benefit of a peripheral nerve catheter. Extended release local anesthetics in home catheters can potentially be used to avoid use of a home infusion device and can be bolused by a clinician every three days for continued effects.

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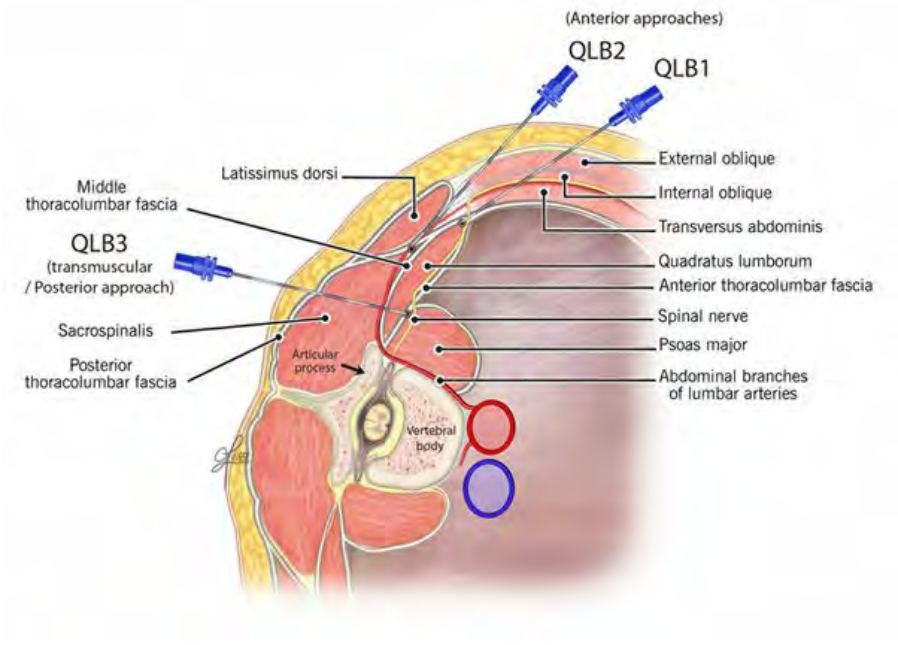
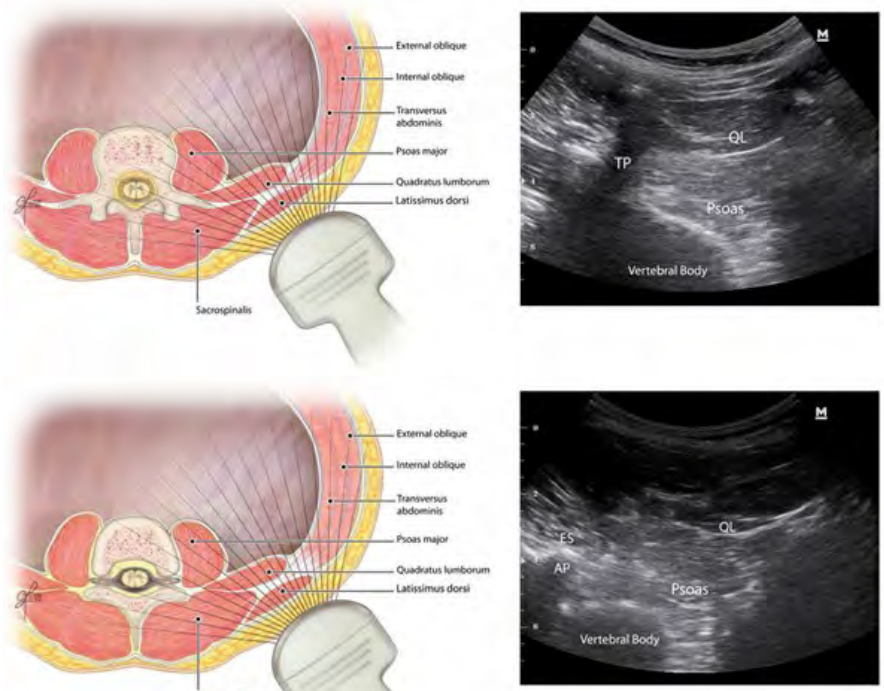
Tables/images





Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1631
Scientific abstract: Case series (5 or more patients)

A case series of post-neuraxial peripheral nerve blocks in pediatric patients

Douglas Wetmore, Naomi Dong, Angie Zhang, Chris Edmonds, Pamela Wendel, Andrew Lee, Kathryn DelPizzo
Hospital for Special Surgery

Introduction

Regional anesthesia in the pediatric population while awake or under light sedation is challenging due to uncooperative patients and may be associated with increased complications.[1,2] General anesthetic agents may have an impact on the developing brain.[3,4] Current joint recommendations from ASRA and the ESRA state that regional anesthesia while undergoing general anesthesia or deep sedation is safe in children and is the current standard of care.[5] At our institution the predominant anesthetic for lower extremity orthopedic surgery in children is neuraxial anesthesia. At the surgeon's request, a peripheral nerve block is performed, often after the primary anesthetic. We present a case series of 186 patients receiving post-neuraxial peripheral nerve blocks using Pediatric Regional Anesthesia Network (PRAN) data collected at our institution.

Materials and methods (NA for case report)

IRB approval was obtained to participate in PRAN in July 2014. PRAN is a prospective data registry formed to obtain highly audited data on practice patterns and complications from multiple centers and to facilitate collaborative research in regional techniques in infants and children.[6] Data was collected on every regional anesthetic performed by an anesthesiologist at our institution on patients 18 years of age and under. Data was collected for demographics, block type, dosing, technology used, and anesthetic type. Extensive intraoperative and postoperative complication data was recorded (Figure 1). Patients experiencing a complication were followed by the treating anesthesiologist until resolution, and contacted by a PRAN research assistant at 3 months to determine outcome data. Data was collected and then de-identified and entered into a secure database maintained by Axio Research, LLC.

Results/Case report

From November 3rd, 2014 to November 30th, 2015 we have performed 194 post-neuraxial peripheral nerve blocks on 186 patients at our institution with zero intraoperative or postoperative complications. Demographic data for all patients is presented in Table 1. Our case series includes 139 adductor canal blocks (72%), 30 popliteal sciatic nerve blocks (15%), 21 femoral nerve/fascia iliaca blocks (11%), 3 distal saphenous nerve blocks (1.5%), and 1 lumbar plexus block (0.5%). 96% of blocks were performed under ultrasound guidance. Given the zero numerator in our case series, we can infer with 95% confidence that the long-run risk of complications with post-neuraxial peripheral nerve blocks is ≤ 1.6%.[7]

Discussion

Regional anesthesia has many benefits in pediatric patients.[8] Recent research has shown that regional anesthesia in children undergoing general anesthesia has a lower rate of postoperative neurological complications (0.93/1000) than in children who are awake or undergoing sedation (6.82/1000).[2] General anesthetic agents may have an impact on the developing brain and the cumulative dose of anesthesia may be important[3,4] -- general anesthetics <1h in infants have recently been associated with no cognitive dysfunction at 2 years of age.[9] Post-neuraxial peripheral nerve blocks may present an alternative technique that has the potential to decrease a child's exposure to general anesthesia while providing similar clinical conditions and a potentially similar safety profile. Based on our findings, this technique warrants more research and discussion in the pediatric regional anesthesia community.

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Tables/images

Intraoperative Complications Measured	Postoperative Complications Measured
• Whenever "other" was an option, its details were specified • Positive test dose and method of detection (heart rate increase, arterial blood pressure change, electrocardiogram change, other) • Inadvertent dural puncture (cerebrospinal fluid aspirate) • Inadvertent vascular puncture (blood aspirate) • Abandoned block (unable to place) • Failed block (completed but not successful) • Respiratory: pneumothorax, diaphragmatic paralysis, other • Cardiovascular: arrhythmia, hypotension, cardiac arrest, other • Neurological: seizure, paresthesia, other • Other complications • Interventions needed: none, repeated block in same location, repeated block in different location (specified), altered anesthetic medications (specified), administered other medications (specified), canceled surgery, other • Outcome: resolved without sequelae—no change in treatment; resolved without sequelae—change in treatment (specified); resolved with sequelae lasting <3 mo; resolved with sequelae lasting >3 mo (specified); death • Was length of hospitalization increased as a result of the complication?	• Whenever "other" was an option, its details were specified • Unintentional unilateral block • Prolonged block (>12 h for single-injection) • Excessive motor blockade • Catheter problem: occluded, kinked, accidental dislodgement, other • Adverse drug reaction: nausea/vomiting, pruritus, other • Respiratory: respiratory depression, apnea, diaphragm paralysis, other • Neurological: seizure, paresthesia, dysesthesia, paralysis, postdural puncture headache, altered mental status, Horner syndrome, other • Hematoma • Infection: insertion site, deep tissue, other • Other complications • Location where complication was identified: postanesthesia care unit, intensive care unit, ward, home, other • Days between placement and complication • Intervention: none; change in infusate, rate, or contents; remove catheter; diagnostic test (computed tomography, magnetic resonance imaging, electromyogram, nerve conduction, other); consultation (neurology, neurosurgery, infectious disease, rehab medicine, other); medication (antibiotics, anticonvulsants, other); other • Outcome: resolved without sequelae—no change in treatment; resolved without sequelae—change in treatment (specify); resolved with sequelae lasting <3 mo; resolved with sequelae lasting >3 mo (specify); death • Was length of hospitalization increased as a result of the complication?

Figure 1: Complication Documentation[6]

Age (years)	Number of Patients	Percent of Total Patients
<1	0	0.00%
1	0	0.00%
2	0	0.00%
3	0	0.00%
4	1	0.53%
5	0	0.00%
6	1	0.53%
7	2	1.07%
8	1	0.53%
9	3	1.60%
10	5	2.67%
11	4	2.14%
12	11	5.88%
13	13	6.95%
14	21	11.23%
15	33	17.65%
16	29	15.50%
17	34	18.18%
18	28	15.50%
ASA Status	**Number of Patients**	**Percent of Total Patients**
I	143	77.00%
II	41	22.00%
III	2	1.07%
IV	0	0.00%
V	0	0.00%
Gender	**Number of Patients**	**Percent of Total Patients**
Male	97	54%
Female	89	46%

Table 1: Demographic Data

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1632
Scientific abstract: Case series (5 or more patients)

Examination of Intraoperative Thermoregulation in Total Joint Arthroplasty: An Observational Study

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Introduction

Hypothermia is a temperature less than 36°C. The deleterious effects of perioperative hypothermia include cardiac events, coagulopathy, and poor wound healing. Studies have also shown an increase in infection and blood loss during total joint arthroplasty. While hypothermia tends to occur at induction of anesthesia, it is still unknown when or how fast hypothermia develops in total joint arthroplasty. The purpose of this study was to identify periods of greatest heat loss or gain that can lead to the development of prevention strategies for hypothermia.

Materials and methods (NA for case report)

This is an IRB approved prospective observational study of temperature changes in patients undergoing elective total knee or hip arthroplasty. All patients 18 years and older were eligible with 120 patients included in the study. Temperature measurements were taken with an temporal thermometer (precise to 0.1°C) upon (1) leaving holding area; (2) OR arrival; (3) after anesthetic induction; (4) upper-body warmer initiation; (5) incision; (6) every 30 minutes after incision; (7) leaving the OR; and (8) PACU arrival. Each temporal measurement was taken three times for accuracy. OR temperature and humidity were recorded throughout. OR mattress temperature was measured with an infrared laser thermometer on arrival to the OR.

Results/Case report

102 patients completed the study. The mean subject age was 63.3 years and 67% were female.. Mean temperature was 36.3 ± 0.6°C across all time points. Almost two-thirds (73%) of patients experienced hypothermia and 20.6% were hypothermic for more than 1 hour. The lowest average temperature (36.1 ± 0.9°C) time point occured when forced air warmer was started after draping. The odds of developing hypothermia were increased by female gender (P=0.041, 95% CI 1.02-6.12), TKA (P =0.033, 95% CI 1.04-2.55), and general anesthesia (P =0.016, 95% CI 0.09-0.75).

Hypothermia was associated with older age (P =0.015), female gender (P =0.008), procedure (P =0.005), anesthesia type, and baseline temperature (P <0.001) in univariate models. Multivariate analysis showed a 1°C decrease baseline temperature was associated with 4.8 times the odds of developing hypothermia (P <0.001, 95% CI 2.52-9.45); spinal, epidural, or combined spinal-epidural anesthesia had 2.2 times the odds of experiencing hypothermia than general anesthesia (P <0.001, 95% CI 1.80-9.42); a 1°C cooler mattress temperature increased the odds of experiencing hypothermia by 18% (P =0.046, 95% Cl 1.00-1.40); and TKA had 2.5 times the odds of experiencing hypothermia vs. THA (p<0.001, 95% CI 1.48-4.11).

Discussion

Our study revealed 73% of patients developed hypothermia during total joint arthroplasty with 20.6% being hypothermic for an extended period of time. Although gender and procedure type are not modifiable, baseline patient and OR mattress temperature increased the incidence of hypothermia and are potentially modifiable variables deserving further study. Our results indicate hypothermia remains a significant perioperative issue. Given the recent controversy concerning forced air warmers, our goal was to identify key times to employ heat conservation strategies for hypothermia prevention.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1633
Scientific abstract: Acute pain

Restricting intravenous acetaminophen use: effectiveness of an institutional approach

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Introduction

Although widely used, the utility of intravenous (IV) acetaminophen relative to its price is still controversial; the wholesale acquisition cost per vial increased from $12.43 in 2013 to $35.40 in 2014. Therefore, its use is subject to restrictions in hospitals nationwide. While the type of restrictions vary, information is lacking on their effectiveness. Therefore, we aimed to study the effectiveness of the approach to limit IV acetaminophen ordering at our hospital (>1000-bed, tertiary-care urban teaching hospital): from June 2014 on, electronic ordering was restricted to 1) specific services (Anesthesia, Pain Service, Palliative Care, Catheterization Laboratory, Pediatrics), 2) only nothing-by-mouth patients, and 3) orders active for 24 hours except for Palliative Care.

Materials and methods (NA for case report)

We extracted all IV acetaminophen orders from June 2012 to June 2015 and plotted it by monthly intervals for time series analysis to estimate changes between the period before (24 months) and after the restriction (13 months). A segmented regression analysis assessed immediate changes (change in intercept of the plotted line) and changes over time (change in slope of the plotted line) in ordering behavior while controlling for baseline trends. This is the strongest quasi-experimental approach for evaluating longitudinal effects of policy implementations. Analyses were performed for institution-wide IV acetaminophen orders, and stratified by 1) type of ordering provider (residents versus others including physician assistants, fellows and attendings), 2) top 30 most frequent prescribers versus others, and 3) type of orders (‘once every 4 hours’ [the current default] versus other order types including ‘once’ and ‘once every 4 hours AS NEEDED’).

Results/Case report

Overall, IV acetaminophen use increased sharply from 435 (June 2012) to 1,342 (June 2015) orders/month with residents and anesthesiology providers ordering the most. Following the restriction, IV acetaminophen orders briefly decreased (intercept change -326 orders/month P=0.002) only to increase again and exceed pre-intervention levels with the same positive slope as before the intervention (P=0.257). The restriction did not change ordering behavior among residents (intercept change -137 P=0.075; slope change +5.2 P=0.514) while other types of providers did demonstrate changes. Moreover, the restriction did affect the top 30 prescribers (intercept change -279 P=0.001; slope change -24.1 P=0.003) while not significantly affecting less frequent prescribers. ‘Once every 4 hours’ orders decreased after the restriction (intercept change -348 P<0.001; slope change -37.7 P<0.001) while ‘once’ orders- increased (slope change +24.9 P<0.001) and ‘once every 4 hours AS NEEDED’ did not change.

Discussion

Overall, it appears that the restrictions at our hospital did not affect long term IV acetaminophen prescribing behavior. Our results, however, provide useful insights into the groups to target (residents, non-frequent prescribers) as well as additional changes in the electronic ordering of IV acetaminophen, e.g. changing the default order from ‘once every 4 hours’ to ‘once every 4 hours AS NEEDED’, or even to just ‘once’. These changes are currently under discussion at our institution; continued monitoring will provide insights into the effectiveness of these interventions which might prove useful to other institutions as well.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1634
Medically Challenging Cases (report of up to 4 cases)

Fibrin glue epidural patching for pediatric patients with Spotaneous Intracranial Hypotension: A Case Series

Stacy de la Motte, Genevieve D'Souza, Elliot Krane
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Introduction

Spontaneous intracranial hypotension (SIH) most commonly results from a spontaneous CSF leak. Certain connective tissue disorders, like Marfan's syndrome and Ehlers-Danlos syndrome, are known to be associated with meningeal abnormalities that potentially may lead to dural defects, resulting in SIH. Successful treatment of SIH symptoms with fibrin glue has been reported in post-dural puncture headache secondary to long-term intrathecal catheterization. Additionally, fibrin glue is widely used to achieve dural closure in neurosurgical operations.

Results/Case report

We report our observations of 4 pediatric pain patient's with SIH seen over a 6 month period at Lucile Packard Children's Hospital multidisciplinary pain clinic. Patient ages ranged from 11 years to 22 years old (median: 12 years, 6 months). Three patients carried the diagnosis of unspecified connective tissue disorders and concomitant intracranial hypotensive symptoms, notably orthostatic headache, dizziness, tinnitus, and improvement of the symptoms in the supine position. The fourth patient carried the diagnosis of erythromelalgia with severe intractable lower extremity pain requiring periodic intrathecal drug therapy. The three patients with connective tissue disorders failed initial conservative treatment consisting of hydration and caffeine, while the fourth patient had an extensive history of SIH symptoms following intrathecal catheter insertion, and thus underwent prophylactic fibrin epidural patching immediately prior to placement of intrathecal catheter for the purpose of intrathecal drug trial for chronic pain.

The duration of SIH symptoms ranged from 1 year to 4 years to (median: 2 years, 6 months). Initial SIH treatment with epidural blood patching at the L4-L5 interspace failed to resolve their symptoms as well, with successful cessation of SIH symptoms were ultimately achieved by epidural patching with fibrin glue at L4-L5 interspace in 3 of the 4 patients. Of the 3 successful interventions, one patient required 2 rounds of fibrin epidural patching to return to her pre-SIH baseline. The patient that failed the fibrin epidural patch treatment eventually experienced resolution of symptoms following a repeat epidural blood patch at the C7-T1 interspace, suggesting a cervicothoracic location as the site of the spontaneous CSF leak. At their 1 month follow-up appointments, the patients reported continued symptom relief and satisfaction with their treatment.

Discussion

These cases are novel as they illustrate that epidural patching with fibrin glue may be a good alternative to autologous epidural blood patching when blood patching does not result in resolution of the SIH symptoms in connective tissue disorder patients. Additionally, review of the literature shows this to be the first reported case series on the use of fibrin glue for SIH in the pediatric population.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1635
Scientific abstract: Regional anesthesia

Continuous Rectus Sheath Block Compared to Intrathecal Morphine for Analgesia Following Donor Hepatectomy

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Introduction

Many analgesic techniques have been proposed to manage the pain of hepatectomy for living donor liver transplantation. However, effective implementation of these interventions can be limited by safety and logistic concerns. Since epidural analgesia is often avoided due to concerns of postoperative coagulopathy, single shot intrathecal morphine (ITM) has been utilized as an adjunct to intravenous (IV) opioids.(1) As an alternative, thoracoabdominal nerve blockade can provide improved analgesia compared to IV opioids alone.(2) The supraumbilical midline incision of donor hepatectomy is particularly well-suited for rectus sheath block. Furthermore, rectus sheath blocks utilizing catheters (RSCs) have been shown to provide prolonged somatic analgesia for abdominal surgeries.(3,4) For patients undergoing donor hepatectomy, we hypothesized that the use of RSCs instead of ITM would be associated with decreased postoperative opioid consumption.

Materials and methods (NA for case report)

After obtaining IRB approval, we conducted a retrospective cohort study of subjects undergoing donor hepatectomy at Columbia University from 07/01/2012 to 09/15/2015. Subjects were divided into two groups: those receiving bilateral ultrasound-guided RSCs and those receiving ITM. The primary outcome was total opioid consumption in the first 48 postoperative hours. Secondary outcomes included postoperative opioid consumption at 12, 24, and 72 hours; pain scores; time to oral intake, bowel movement, and ambulation; incidence of opioid complications; and duration of stay.

Results/Case report

We identified 23 sequential donor hepatectomy patients meeting the inclusion criteria. Of these, 11 received bilateral RSCs and 12 received ITM. RSCs were placed prior to emergence and infused with ropivacaine 0.2% (mean total rate 14.8 mL/hr) for a mean duration of 70 hours (range 46-93 hours). ITM was injected immediately prior to surgery (mean dose 0.45 mg). Total postoperative opioid consumption at 48 hours (in IV morphine equivalent) was significantly lower in the RSC group than the ITM group (mean 41.9 mg and 75.3 mg, respectively; $P < 0.01$ using linear regression adjusting for incision length). Similarly, mean postoperative opioid consumption from 12 to 24 hours, from 24 to 48 hours, and totaled at 72 hours was significantly less in the RSC group ($P = 0.02$, $P < 0.01$, and $P < 0.01$, respectively). Pain scores at 18, 24, and 48 hours were significantly lower in the RSC group ($P = 0.03$, $P < 0.01$, and $P = 0.01$, respectively). No difference was detected in time to oral intake, bowel movement, or ambulation. Nausea was reported in 55% and 92% of RSC and ITM patients, respectively ($P = 0.07$). There were no differences detected in incidence of opioid complications or in duration of intensive care unit or hospital stay.

Discussion

In this retrospective cohort study of patients undergoing donor hepatectomy, use of bilateral ultrasound-guided rectus sheath catheters instead of single shot intrathecal morphine was associated with significantly decreased postoperative opioid consumption. Although further study is needed to assess the relative incidence of side effects and complications, rectus sheath catheters seem to be a safe, feasible, and more effective alternative to opioid-based techniques for providing analgesia for liver donation.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1636
Scientific abstract: Acute pain

Welcome back! Hospital-based acute care after discharge following outpatient arthroscopic shoulder surgery

David Flynn, Wai-Man Liu, Nabil Elkassabany, Jiabin Liu
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Introduction

Arthroscopic surgeries of the shoulder are commonly performed outpatient orthopedic surgeries.[1] The increasing frequency and volume of outpatient surgery has been met with a call for quality metrics that can differentiate between low and high quality centers and drive quality improvement. The rate of hospital-based acute care (defined as hospital transfer at discharge, emergency room [ER] visit, or subsequent inpatient hospital [IP] admission) following an outpatient procedure is gaining momentum as a quality metric for ambulatory surgery.[2,3] We conducted a large retrospective study using administrative data from the state of New York. We examined the rate of hospital-based acute care within 7 days of outpatient shoulder arthroscopy, as well as the diagnoses, timing, and hospital charges associated with these events. The results of our study could inform policymakers and help providers identify preventable complications following shoulder arthroscopy.

Materials and methods (NA for case report)

We studied adult patients who underwent outpatient arthroscopic shoulder procedures in New York State between 2011 and 2013 using the healthcare cost and utilization project (HCUP) outpatient surgery database. Direct transfer to an inpatient facility was determined through discharge codes from the outpatient surgery database. ER visits and IP admissions within 7 days of surgery were identified using HCUP emergency and inpatient databases. Diagnoses responsible for these events were determined from ICD-9 diagnosis codes. When possible, similar diagnoses were grouped into categories.

Results/Case report

The final cohort included 103,476 patients. 69 patients (0.06%) were discharged to an inpatient facility following surgery. 1,776 patients (1.7%) received acute care within 7 days of discharge (Table 1); the majority of these encounters were ER visits (1,563), while IP admissions after discharge were relatively uncommon (213). The most common reasons for seeking acute care were musculoskeletal pain (24% of encounters), followed by cardiovascular complaints (8.7% of encounters), respiratory complaints (8.5% of encounters), urinary retention (7.4% of encounters), abdominal pain (6.9% of encounters), and nausea or vomiting (5.1% of encounters). Median charges associated with ER visits were $1,420, while those for IP admissions were $13,724. Nearly half of the events (46%) occurred on the day of discharge or on post-operative day 1 (Table 2). ER visits were more common within 24 hours of surgery, whereas the rate of IP admissions was relatively steady during the study period (Figure 1).

Discussion

The rate of hospital-based acute care following outpatient shoulder arthroscopy in our cohort was low (1.7%), reflecting the low risk nature of the procedure and selection of relatively healthy patients for the ambulatory setting. Complications triggering acute care visits often occurred within one day of surgery. However, very few complications were anticipated at the time of discharge, reflected by the low rate of hospital transfer (0.06% of patients, approximately 4% of events). Many of the events were likely related to complications from anesthesia or inadequate analgesia, suggesting anesthesiologists must play a central role in efforts to reduce the rate of acute care visits following outpatient shoulder arthroscopy.

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Tables/images

Table 1. Hospital based acute care within 7 days of surgery

	N (%)	Charges, median (IQR)	Diagnosis Associated with Encounter				
			First	Second	Third	Fourth	Fifth
ER visit	1,363 (1.5%)	$1,400 ($840-$2,765)	Musculoskeletal pain (26.2%)	Urinary retention (8.3%)	Respiratory disorders (8.1%)	Abdominal pain (7.2%)	Cardiovascular disorders (6.8%)
IP admission	213 (0.2%)*	$13,724 ($8,151-$24,268)	Cardiovascular disorders (22.1%)	Respiratory disorder (10.8%)	Musculoskeletal pain (6.1%)	Abdominal pain (3.9%)	Nausea/vomiting (3.4%)
Total	1,776 (1.7%)	$1,634 ($914-$3,788)	Pain (24.5%)	Respiratory complaints (8.8%)	Cardiovascular complaints (8.2)	Urinary retention (7.6%)	Nausea/Vomiting (7.0%)

Table 2. Events associated with acute care visit by day

	Post Operative Day						
Diagnosis	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Musculoskeletal pain	60	195	45	40	34	29	20
Urinary retention	53	51	11	6	7	3	0
Abdominal pain	4	12	18	21	23	29	14
Nausea and/or vomiting	17	28	20	10	5	6	4
Respiratory disorders	51	24	26	14	8	16	11
Cardiovascular disorders	40	33	21	16	13	14	16
Other	112	136	114	105	93	75	58
Total	**337**	**479**	**255**	**212**	**183**	**172**	**123**

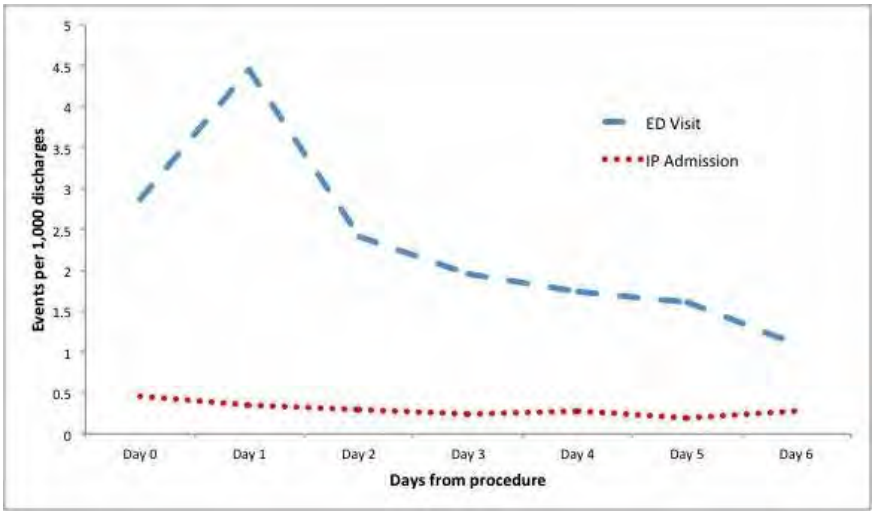

Figure 1. Rate of hospital-based acute care by day following outpatient arthroscopic shoulder surgery

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1637
Scientific abstract: Regional anesthesia

Anesthetic technique and hypotension during hip fracture repair: a retrospective study of 2916 patients

Jeff C. Gadsden, Matt Levine, Malikah Latmore, Isabel Fernandez, Gerardo Fernandez, Daquan Xu, Siddarth Sata
Duke University

Introduction

Femoral neck fracture is a common injury and is associated with a high degree of morbidity and mortality. There is a lack of consensus on the optimal anesthetic technique (neuraxial versus general) for this high risk population.[1] Continuous spinal anesthesia (CSA) is a technique less commonly practiced than single injection spinal (SA) or general anesthesia (GA) for this procedure, despite evidence from small studies that it is associated with improved hemodynamic stability due to the fractional administration of local anesthetic.[2,3] We undertook this retrospective review of patients undergoing hip fracture repair with these three techniques, with the hypothesis that the CSA technique would be associated with a lower incidence of hypotension.

Materials and methods (NA for case report)

Following IRB approval, electronic intraoperative anesthetic records (Compurecord, Philips Healthcare, Andover MA) of patients undergoing hip fracture repair over the course of 7 years were analyzed for a number of patient, anesthetic and hemodynamic variables (see below). The incidence of hypotension was the primary outcome and was defined as a decrease in mean arterial pressure of ≥30% from baseline. Secondary outcomes included vasoactive medication use, blood loss, and blood and fluid administration.

Results/Case report

A total of 2916 patients received an anesthetic for hip fracture repair between the years 2005 and 2012 inclusive (CSA=623, SA=1528, GA=745). Categorical and continuous variables are presented in Tables 1 and 2. The incidence of hypotension was significantly greater in the GA group than in either the SA group ($p<0.0001$) or the CSA group ($p=0.01$); however, there was no difference in hypotension rates between the SA and CSA groups. Blood loss was similar between groups. The GA group had higher requirements for phenylephrine, synthetic colloid, blood, and plasma compared to either SA or CSA group ($p<0.001$).

Discussion

CSA has been advocated as a sound anesthetic option for hip fracture repair.[2] The ability to deliver small, fractionated doses of local anesthetic to achieve a sufficient, but not too high, level of sensory blockade is an attractive concept in this elderly population who frequently lacks the cardiovascular reserve to compensate for hypotension observed with either bolus spinal or general anesthesia.[4] In our retrospective analysis of 2916 cases, CSA was not associated with an improved rate of normotension compared with SA, although both neuraxial techniques were associated with less hypotension than GA. It is unclear if there is truly no difference, given the retrospective nature of the study and the potential for selection bias. For example, more patients with heart failure received CSA, and this may have contributed to a higher than expected incidence of intraoperative hypotension. Additionally, more patients required blood and plasma in the GA group, but were also more likely to be taking anticoagulants. In summary, CSA appears to provide equivalent hemodynamic stability to SA, with both spinal techniques offering a hemodynamic advantage over GA. Large, randomized trials have yet to be done and are indicated to clarify this question further.

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Tables/images

Variables	Spinal Continuous (n=623) (n, %)	General Anesth. (n=745) (n, %)	Spinal Bolus (n=1548) (n, %)	p-value
Gender (Female)	481 (77%)	530 (71%)	1184 (77%)	
ASA Physical Status				
1 or 2	172 (28%)	222 (30%)	742 (48%)	<0.001
3	357 (57%)	429 (59%)	739 (48%)	
4	94 (15%)	94 (13%)	67 (4%)	
History of hypertension (Yes)	397 (64%)	473 (63%)	907 (59%)	NS
History of congestive heart failure (Yes)	103 (17%)	89 (12%)	111 (7%)	<0.001
History of arrhythmia (Yes)	80 (13%)	132 (18%)	157 (10%)	0.005
History of stroke (Yes)	83 (13%)	117 (16%)	151 (10%)	0.002
History of pulmonary disease (Yes)	110 (18%)	93 (12%)	217 (14%)	NS
History of valvular heart disease (Yes)	72 (12%)	81 (11%)	91 (6%)	<0.001
Patient taking aspirin (Yes)	123 (20%)	165 (22%)	338 (22%)	NS
Patient taking anticoagulants (Yes)	53 (9%)	125 (17%)	116 (8%)	0.020
Patient taking clopidogrel (Yes)	5 (1%)	96 (13%)	19 (1%)	<0.001
Patient taking ACEi or ARB (Yes)	180 (29%)	227 (30%)	412 (27%)	NS
Patient taking Beta-Blockers (Yes)	223 (36%)	292 (39%)	422 (27%)	<0.001
Synthetic colloid administered (Yes)	1 (0.2%)	26 (3.5%)	25 (1.6%)	<0.001
Sympathomimetic drugs administered				
Ephedrine (Yes)	248 (40%)	339 (46%)	614 (40%)	NS
Phenylephrine (Yes)	310 (50%)	419 (56%)	669 (43%)	<0.001
Blood given (Yes)	56 (9%)	102 (14%)	55 (4%)	<0.001
Plasma given (Yes)	10 (1.6%)	35 (4.7%)	14 (0.9%)	0.016

Table 1. Descriptive and simple analytic statistics for categorical variables

Variables	CSA (n=623) (mean ± sd)	GA (n=745) (mean ± sd)	SA (n=1548) (mean ± sd)	p-value
Age (yrs)	85.6±8.1	81.2±8.7	83±10	NS
BMI	22.9±3.4	24.3±6.4	23±7	NS
Volume of fluid (Colloid and Crystalloid) (mL)	1342±755	1500±1698	1170±667	NS
Colloid (mL)	500±0	506±347	512±378	NS
Crystalloid (mL)	1341±754	1483±1689	1162±662	NS
Volume blood and other product (mL)	394±196	543±420	466±286	NS
Blood given (mL)	384±172	506±332	424±243	NS
Plasma given (mL)	412±216	494±250	530±265	NS
Duration of Surgery (min)	86±38	86±51	75±46	NS
Blood loss (mL)	256±194	284±360	215±226	NS
Highest heart rate (beats/min)	100±44	99±17	95±17	NS
Lowest heart rate (beats/min)	66±12	64±12	67±12	NS
Baseline systolic BP (mmHg)	154±26	150±25	151±52	NS
Baseline diastolic BP (mmHg)	76±29	71±16	72±18	NS
Baseline Mean BP (mmHg)	101±21	94±19	96±20	NS
Lowest systolic BP (mmHg)	93±19	85±15	97±191	NS
Lowest diastolic BP (mmHg)	42±11	41±9	42±14	NS
Lowest Mean BP (mmHg)	60±13	55±11	58±13	NS
Incidence of hypotension (n,%) (decrease in MAP by ≥ 30% from baseline)	490 (79%)	569 (76%)	1144 (74%)	<0.0001 (GA v SA); 0.01 (GA v CSA)

Table 2. Descriptive and simple analytic statistics for continuous variables

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
Consulting fees received from Pacira Pharmaceuticals; Consulting fees from B.Braun Medical; Speaker's bureau Mallinckrodt Pharmaceuticals

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1639
Scientific abstract: Regional anesthesia

Bilateral paravertebral perineural catheters: A novel multimodal analgesic pathway for patients undergoing myocardial bridge unroofing surgery

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Stanford School of Medicine

Introduction

Myocardial bridging is an anomaly in which an epicardial coronary artery tunnels through the myocardium resulting in compression during systole. Associated symptoms range from angina with exertion to myocardial ischemia or sudden cardiac death. Surgical unroofing via sternotomy with possible cardiopulmonary bypass is reserved for patients with refractory symptoms[1]. Within our institution, variation in pain management led to unreliable postoperative pain control and poor patient satisfaction. Studies show that ultrasound-guided paravertebral blocks (PVBs) provide effective pain management for cardiothoracic surgery patients resulting in lower pain scores, decreased narcotic usage, improved patient experience[2,3,4] and comparable analgesia to thoracic epidural with lower risk of hypotension and epidural hematoma[5,6,7]. We present a protocol for managing postoperative pain in a unique patient population and discuss the complexities of instituting this protocol in a large tertiary care center.

Materials and methods (NA for case report)

Patients are first identified by the cardiology service who notifies the regional anesthesia nurse coordinator of the upcoming surgery. Patients are then scheduled for outpatient placement of PVB catheters. Instructions regarding PVBs, anticoagulation management, skin disinfection protocol, and NPO status are discussed during a preoperative clinic evaluation and reviewed by telephone prior to admission for PVB placement. Patients are admitted 24 hours prior to surgery to the preoperative block area where bilateral PVB catheters are placed under ultrasound guidance using saline. Prior to being discharged home, patients recover in the PACU during which catheter placement is confirmed by radiograph imaging after contrast dye is injected through the catheters. The day of surgery, the regional anesthesia team boluses bupivacaine 0.25% 10-15 mL bilaterally and assesses dermatomal spread. The intraoperative anesthesia team reboluses 10-20 mL of bupivacaine 0.25% bilaterally prior to extubation. Patients then recover in the ICU for 1-2 days where the acute pain service manages the PVBs and initiates a multimodal pain regimen consisting of bupivacaine 0.25% 6 mL/hr with a 10mL bolus q6h PRN per catheter, gabapentin TID, vitamin C BID, acetaminophen q6h and oxycodone q4h PRN. Twelve hours prior to discharge, the catheters are clamped and discontinued if pain control is adequate on oral pain medications. Gabapentin and acetaminophen are continued until their first follow-up appointment with cardiology 2 weeks after surgery.

Discussion

Development of this novel protocol required coordination among multiple subspecialties. Compared to the general cardiac surgery population, these patients choose elective surgery, are younger, and often have complex pain histories highlighting why excellent pain management is essential. PVB catheters are placed 24 hours prior to surgery due to possible anticoagulation for cardiopulmonary bypass to avoid delays in surgery in the event of traumatic PVB placement per ASRA guidelines[8]. To facilitate communication through several different phases of care, we have designated coordinators for each subspecialty team. Each team leader is responsible for patient communication, hand-off communication, and nursing education. The collaboration and implementation of this unique protocol has built a foundation upon which these patients may have improved perioperative pain management and, hopefully, overall patient experience.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1640
Scientific abstract: Regional anesthesia

Ultrasound guided pectoral nerve block (PEC 1 and 2) as an alternative for pain management in patients with multiple rib fractures

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Introduction

Optimal pain control is an important aspect of care in patients with thoracic injuries and is critical to avoid undesired pulmonary complications i.e. pneumonia. Regional anesthesia of the pectoral, some intercostal and long thoracic nerves can be obtained with a recently described block technique PEC 1 and 2. This block has been used successfully for postoperative pain management after certain anterior chest surgical procedures. We studied retrospectively the efficacy of this block in patients with multiple traumatic rib injuries and thoracotomies where neuraxial analgesia was contraindicated.

Materials and methods (NA for case report)

A total of 13 patients received ultrasound (US) guided PEC 1 and 2 for pain management after multiple unilateral or bilateral traumatic rib fractures. In all patients, epidural or paravertebral blocks were contraindicated because of infection, coagulopathy, therapeutic anticoagulation or vertebral injuries. After obtaining patient consent US guided PEC 1 and 2 was performed, 10 cc of 0.5% ropivacaine (0.25% for bilateral blocks) plus 8 mg of dexamethasone was injected between the pectoralis minor and major at the 3rd rib level and 15 cc between minor and serratus anterior muscle at level of 4th rib.

Results/Case report

Pain scores improved in all patients ranging from 8 to 10 pre-procedure to 5 or less within 30 minutes post procedure. In addition the volume of Incentive Spirometry generated increased at least by 500 cc in all patients. The analgesic effect of the block persisted for 18 to 24 hours. No complications including pneumothorax, hematoma, intravascular injection or local anesthetic toxicity was observed.

Discussion

Poor pain control after thoracic injuries is associated with respiratory complications, increase morbidity and prolong ICU and hospital stay. Thoracic epidural and or paravertebral block analgesia has been the most common regional pain controlling intervention in these patient population, however many of these patients present conditions like infection, coagulopathy and or spinal injuries that are contraindications to those regional analgesia techniques. The PEC blocks 1 and 2 have been used successfully to provide analgesia after breast and axillary surgery[1,3] with advantages including supine position, superficial approach and easily recognizable anatomic structures under US guidance. All patients in our study experienced significant improvement of their pain scores, inspiratory volumes and decrease in intravenous narcotic needs, all of which, may help to decrease the incidence of pulmonary complications, faster recovery and ultimately shorten hospital stay.

We concluded that PEC blocks can be useful as an alternative approach to pain management after thoracic injuries when other conventional regional interventions are contraindicated, and it is effective, easy to perform and avoid several complications associated with more traditional techniques.

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Tables/images

No	Age	Sex	Fractured Ribs	Pain Score pre	Pain Score post	Contraindication	Complication
1	50	F	Right 2-7, Left 4-7	10	5	Plavix	None
2	88	F	Left 3-10	8	0	Plavix	None
3	70	M	Right 3-7, 11, Left 1-9	8	3	Spine Injury	None
4	38	F	Left 1-10	10	1	Spine Injury	None
5	32	M	Left 1-11	7	4	Spine Injury	None
6	56	M	Left 3-8	9	0	Heparin infusion	None
7	44	M	Left 3-8	10	5	Spine Injury	None
8	36	M	Right 3-4, 6-10	10	2	Transverse Fracture	None
9	53	M	Left 2-5, 7, 10, 11	8	0	Compression Fracture	None
10	85	F	Left 2-7	8	4	Spine Injury	None
11	67	M	Right 3-7	6	0	Plavix	None
12	58	F	Right 3-6, Left 4-7	10	0	Spine injury	None
13	65	F	Right 3-7, Left 5, 7, 8	10	5	Transverse Fracture Spine	None

PEC Block Table

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1641
Scientific abstract: Acute pain

Multimodal Analgesia in Polytrauma Combat Injured Servicemembers: Why aren't we using NSAIDS?

Sandeep Dhanjal, Michael Kent, Kristine Lyons, Winifred Rojas, Andrew Lizek, Joseph DeCicco
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Introduction

Patients who have suffered from combat-related polytrauma often present with pain which is complex and challenging to control. Multimodal analgesia has been promoted on the battlefield via aggressive use of interventional and non-opioid pharmacologic modalities[1-3]. With the use of such modalities, improvements in battlefield analgesia and throughout the transport chain have been noted. However, upon return to stateside care, injured patients require extensive surgeries associated with a significant pain burden. While the DoD has embraced multimodal regimens, there is no formal audit of what types and frequencies of interventional and pharmacologic modalities predominate. As a secondary descriptive analysis of an ongoing chart review, we sought to describe data relating to location of injury, cause of injury, use of invasive and non-invasive analgesic treatment modalities, and demographics of the patients involved in this ongoing study.

Materials and methods (NA for case report)

After obtaining IRB approval, we conducted a preliminary descriptive analysis of an ongoing chart review of patients from 2007 to 2014, who were injured by blast and non-blast injuries in OIF or OEF and subsequently treated with ketamine. During this retrospective study, we collected data relating to the specific injury sustained by the patient, demographic data, and modalities of pain management (invasive and non-invasive) at the time of initiation of a ketamine infusion.

Results/Case report

At the time data was last observed, greater than 30 patients were included in the preliminary descriptive analysis. Patients predominant injury etiology was due to Improvised Explosive Device (78.8%%) and the 67.6% of patients suffered amputation. Regarding oral opioids, 97% of patients were prescribed long acting opioids and 76.4% of patients were prescribed short acting oral opioids. Regarding non-opioid medications, a notably low percentage of 21.9% of patients were prescribed NSAIDs, while percentages for opioids, acetaminophen, anticonvulsants, and tricyclic antidepressants were 100%, 68%, 78.1%, and 40.6%, respectively. Finally, interventional modalities including epidural and perineural infusions were utilized in 46.2% and 38.5% of patients, respectively.

Discussion

In this assessment of information of an ongoing chart review of patients receiving intravenous ketamine for treatment of combat-related polytrauma, we were impressed by the finding that other non-opioid modalities were utilized more frequently than NSAIDs. This is concerning, especially when considering the "overwhelming" evidence for effectiveness of NSAIDs in treating acute and chronic pain conditions[4]. Avoidance of NSAID therapy in these patients may be due to concerns for side effects including delayed bone healing, bleeding, exacerbation of renal insufficiency, or other common side effects. Gastrointestinal and renal side effects are indeed a concern in polytrauma patients[5]. Concern for impairment of bone healing by NSAIDs is currently based largely on conflicting animal studies[6] and bleeding risk associated with COX-2 selective NSAIDs is minimal. Further investigation is needed to determine if NSAID use is avoided, why NSAID use is avoided, and whether or not this patient population would benefit from increased use of NSAIDs.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1642
Scientific abstract: Regional anesthesia

The Patterns of Utilization of Interscalene Nerve Blocks for Total Shoulder Arthroplasty in the United States

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Introduction

The interscalene block (ISB) is a common adjunct to general anesthesia for total shoulder arthroplasty (TSA). To date, there have been limited studies performed at a national level which have described the patterns of the utilization of regional anesthesia in TSAs . We aimed to explore anesthesia care for TSA in the United States, focusing on practice variations with ISBs.

Materials and methods (NA for case report)

Information collected by the Anesthesia Quality Institute (AQI) is de-identified according to national and international legal requirements, including the Health Insurance Portability and Accountability Act of 1996. This study was approved by our institutional review board and was exempt from the consent requirement. We carried out a retrospective analysis of data from the National Anesthesia Clinical Outcomes Registry (NACOR). We analyzed patient, procedural, and provider data from 2010 to 2015. Case characteristics and clinical outcomes were compared using chi-squared or t-tests. We used logistic regression to identify associations of patient and case characteristics with the utilization of ISB. Geographic and annual data in utilization of ISB for TSA are presented graphically.

Results/Case report

There were 28,570 cases that met inclusion criteria, of which 41.6% and 58.4% did or did not receive an ISB, respectively. The utilization of ISB for TSA is not homogeneous across states. Age, American Society of Anesthesiologists physical status (ASA PS) classification score, hospital facility type, time of day, urban versus rural patient zip codes, and case duration were all associated with whether an ISB is used or not. Among patients that received an ISB, the ASA PS score, hospital facility type, and urban versus rural patient zip codes were associated with the utilization of a perineural catheter for continuous blockade versus a single shot approach. In addition, ISB was associated with a decreased likelihood of extended stay in recovery area and decreased postoperative nausea or vomiting when compared to patients undergoing TSAs without the nerve block.

Discussion

In the present investigation, we carried out one of the largest studies of anesthesia for TSA to date. There is considerable geographic variation in the use of ISB for TSA across the United States. We have identified national patterns and disparities for the utilization of regional anesthesia for TSAs. This study may serve as a baseline for assessment of changes in anesthesia care for TSA over time.

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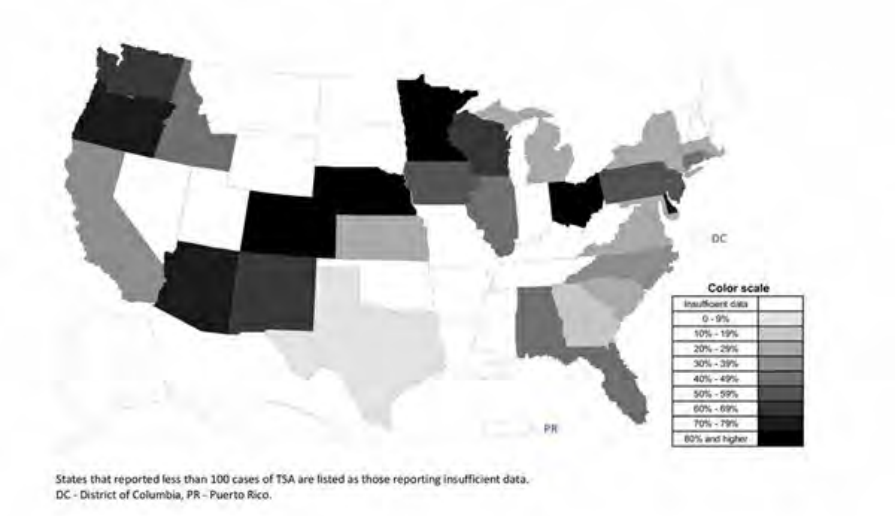
Tables/images



Heat map demonstrating percentage of TSA cases performed with ISB

Table 1. Characteristics of cases included in the analysis.

	No ISB		ISB		p-value
	n	%	n	%	
Total	16695	-	11875	-	
Patient age					
Mean age (SD)	69.5 (10.1)		69.7 (9.8)		0.078
Age < 18	7	0.04	3	0.03	
Age 19 - 49	518	3.1	301	2.5	
Age 50 - 64	4216	25.3	2972	25.0	
Age 65+	11954	71.6	8599	72.4	
Sex					
Male	7263	43.5	5299	44.6	
Female	9432	56.5	6576	55.4	
ASA PS					
I-II	8343	50.0	6828	57.5	
III-V	8352	50.0	5047	42.5	
Case duration					
Mean case duration, minutes (SD)	180.3 (132.1)		167.2 (58.0)		< 0.001
Facility type					
University hospital	951	5.7	322	2.7	
Large community hospital	2737	16.4	2339	19.7	
Medium community hospital	8349	50.0	4090	34.4	
Small community hospital	726	4.4	1417	11.9	
Other	3932	23.6	3707	31.2	
Anesthesia resident presence					
Present	1123	14.6	639	15.2	
Not present	6586	85.4	3577	84.8	
CRNA presence					
Present	7403	52.9	6376	64.1	
Not present	6586	47.1	3577	35.9	
Time of day					
Day shift (07:00-17:00)	14937	89.5	11603	97.7	
After hours shift (17:01 - 06:59)	1758	10.5	272	2.3	
Urban/rural zip code					
Urban	4003	24.0	3044	25.6	
Rural	1360	8.2	961	8.1	
Urban/rural	9296	55.7	7681	64.7	
Not reported	2036	12.2	189	1.6	

ISB – interscalene nerve block; SD – standard deviation; ASA PS – American Society of Anesthesiologists Physical Status Classification; CRNA – certified registered nurse anesthetist.

Table 2. Results of logistic regression analysis for potential association between patient, case, provider, or facility characteristics and the utilization of interscalene nerve blocks in total shoulder arthroplasty.

Characteristic	Reference group	Univariate analysis: ISB vs no ISB		Covariates	Multivariate analysis: ISB vs no ISB	
		OR (95% CI)	p-value		OR (95% CI)	p-value
	Age 19- 49			ASA PS, facility type		
Age < 18		0.74 (0.19 – 2.97)	0.66		0.73 (0.18 – 2.92)	0.66
Age 50 - 64		1.21 (1.04 – 1.41)	0.01		1.22 (1.05 – 1.42)	0.01
Age ≥ 65		1.24 (1.07 – 1.43)	0.004		1.28 (1.11 – 1.49)	0.001
	Female					
Male		1.05 (1.0 – 1.11)	0.06			
	ASA PS I-II			Age, facility type		
ASA PS III-V		0.74 (0.70 – 0.77)	< 0.001		0.72 (0.69 – 0.76)	< 0.001
	University hospital			ASA PS, age		
Large community hospital		2.52 (2.20 – 2.90)	< 0.001		2.43 (2.12 – 2.79)	< 0.001
Medium community hospital		1.45 (1.27 – 1.65)	< 0.001		1.37 (1.20 – 1.57)	< 0.001
Small community hospital		5.76 (4.94 – 6.73)	< 0.001		5.58 (4.78 – 6.52)	< 0.001
Other facility types		2.78 (2.43 – 3.18)	< 0.001		2.65 (2.32 – 3.03)	< 0.001
	Case duration ≤ 180 minutes			ASA PS, age, facility type		
Case duration > 180 minutes		0.81 (0.77 – 0.85)	< 0.001		0.90 (0.86 – 0.95)	<0.001
	Resident not present					
Resident present		1.05 (0.94 – 1.16)	0.386			
	CRNA not present					
CRNA present		1.60 (1.52 – 1.69)	< 0.001		1.41 (1.34 – 1.49)	< 0.001
	Day shift (07:00 - 17:00)			ASA PS, age, facility type		
After hours shift (17:01 - 06:59)		0.20 (0.17 – 0.23)	< 0.001		0.18 (0.16 – 0.21)	< 0.001
	Urban zip code			ASA PS, age, facility type		
Rural zip code		0.93 (0.84 – 1.02)	0.13		0.82 (0.74 – 0.90)	< 0.001
Urban/rural zip code		1.09 (1.03 – 1.15)	0.004		0.99 (0.93 – 1.05)	0.686

ISB – interscalene nerve block; ASA PS – American Society of Anesthesiologists Physical Status Classification; CRNA – certified registered nurse anesthetist.

Table 3. Results of logistic regression analysis for potential association between patient, case, provider, or facility characteristics and the utilization of continuous versus single-shot interscalene nerve blocks in total shoulder arthroplasty.

Characteristic	Reference group	Univariate analysis: continuous ISB vs single-shot ISB		Covariates	Multivariate analysis: continuous ISB vs single-shot ISB	
		OR (95% CI)	p-value		OR (95% CI)	p-value
	Age 19- 49			ASA PS, facility type		
Age < 18		0.88 (0.08 – 9.83)	0.92		0.37 (0.03 – 4.90)	0.45
Age 50 - 64		1.26 (0.98 – 1.64)	0.077		1.10 (0.83 – 1.46)	0.49
Age ≥ 65		1.46 (1.14 – 1.88)	< 0.003		1.19 (0.9 – 1.56)	0.22
	Female					
Male		0.96 (0.89 – 1.05)	0.392		-	-
	ASA PS I-II			Age, facility type		
ASA PS III-V		1.18 (1.08 – 1.28)	< 0.001		1.20 (1.09 – 1.31)	< 0.001
	University hospital			ASA PS, age		
Large community hospital		12.05 (8.62 – 16.85)	< 0.001		11.90 (8.51 – 16.65)	< 0.001
Medium community hospital		75.46 (53.64 – 106.4)	< 0.001		74.94 (53.15 – 105.67)	< 0.001
Small community hospital		19.94 (14.11 – 28.18)	< 0.001		19.48 (13.78 – 27.54)	< 0.001
Other facility types		16.85 (12.09 – 23.48)	< 0.001		16.84 (12.08 – 23.48)	< 0.001
	Case duration ≤ 180 minutes			ASA PS, age, facility type		
Case duration > 180 minutes		0.80 (0.73 – 0.87)	< 0.001		0.71 (0.64 – 0.78)	< 0.001
	Resident not present					
Resident present		0.86 (0.72 – 1.03)	0.11		-	-
	CRNA not present					
CRNA present		0.33 (0.30 – 0.37)	< 0.001		0.36 (0.32 – 0.41)	< 0.001
	Day shift (07:00 - 17:00)			ASA PS, age, facility type		
After hours shift (17:01 - 06:59)		1.03 (0.77 – 1.36)	0.852		-	-
	Urban zip code			ASA PS, age, facility type		
Rural zip code		0.98 (0.83 – 1.16)	0.81		1.34 (1.12 – 1.60)	0.001
Urban/rural zip code		1.13 (1.03 – 1.25)	0.01		1.32 (1.19 – 1.47)	< 0.001

ISB – interscalene nerve block; ASA PS – American Society of Anesthesiologists Physical Status Classification; CRNA – certified registered nurse anesthetist.

Table 4. Adverse outcomes in patients undergoing total shoulder arthroplasty.

	No interscalene nerve block			Interscalene nerve block			X-squared	p-value
	Numerator	Denominator	%	Numerator	Denominator	%		
Extended PACU stay	147	4152	3.54	10	550	1.82	3.95	0.047
Postoperative nausea/vomiting	164	4595	3.57	12	974	1.23	13.59	< 0.001
Unexpected ICU admission	9	4791	0.19	3	916	0.33	0.20	0.65
Stroke	0	1988	0	0	228	0	-	-
Unplanned Reintubation	1	4242	0.02	2	964	0.21	1.97	0.16

PACU – post-anesthesia care unit; ICU – intensive care unit.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1643
Scientific abstract: Chronic pain

Ultrasound Guided Botulinum Toxin, Type A (BoNT-A) Chemodenervation: A potential role in scoliosis-associated chronic back pain.

Brittany Grovey, Gemayel Lee, John Finneran, Timothy Furnish
University of California, San Diego

Introduction

Degenerative scoliosis affects 10-70% of the adult population; and its incidence is expected to increase as life expectancy increases and the population ages. Ninety percent of people with scoliosis experience some form of chronic back pain, with the gold standard of treatment being operative correction of the deformity. However, in some patients, the risks associated with surgery may outweigh the potential benefits, leaving these patients with few therapeutic options for pain management if conventional pharmacologic therapy fails. In addition, the systemic side effects of centrally acting muscle relaxants, opiates, gabapentinoids, and non-steroidal anti-inflammatory drugs may also limit treatment options.

Although off label, intramuscular injection with BoNT-A is a minimally invasive therapy that can be considered in specific patients for treatment of scoliosis-associated back pain. Given the abnormal curvature of the spine and muscle hypertrophy that may accompany the more severe forms of scoliosis, care must be taken to avoid inadvertent intrathecal puncture, making an understanding of spinal anatomy under ultrasound an imperative skill. We detail the successful use of ultrasound guided, intramuscular BoNT-A injections for chronic back pain in a patient with inoperable, degenerative scoliosis secondary to osteogenesis imperfecta (OI) with specific focus on spinal anatomy under ultrasound and the unique properties of BoNT-A that make it an attractive treatment consideration for these types of patients.

Results/Case report

The patient was a 37 year-old female with severe, inoperable degenerative scoliosis secondary to OI. She was referred to our clinic for chronic back pain refractory to conservative management. She initially received a series of ultrasound guided, intramuscular injections with 0.25% bupivacaine into the right thoracic paraspinal and quadratus lumborum muscles with 80-90% pain relief lasting 5-10 days. Given the short duration of effect, we proceeded with chemodenervation of the same muscles with BoNT-A. She experienced 90% pain relief lasting 3 months. The ultrasound guided, intramuscular BoNT-A chemodenervation injections have been repeated every 3 months for the past year with similar efficacy.

Discussion

In degenerative scoliosis, compression of neural elements by asymmetric disc degeneration, facet joint hypertrophy, and/or osteophyte formation coupled with dystonia and abnormal hypertrophy of the paraspinal musculature can result in a pain syndrome consisting of myofascial and neuropathic elements.

The BoNT-A subtype has anti-spasmotic, anti-nocioceptive and anti-inflammatory properties and is currently being investigated for use in a multitude of chronic pain syndromes. Separate from its action on decreasing neurotransmitters (Acetylcholine, Substance P, calcitonin gene related peptide) in the neuromuscular junction, studies suggest that interruption of 1a fiber transmission, increase in local blood flow and a decrease in central pain sensitization contribute to the therapeutic action of BoNT-A. In patients who are not candidates for operative correction of their scoliosis, intramuscular BoNT-A injections may improve range of motion and pain scores, thus improving function and quality of life.

We suggest that the unique etiology of scoliosis-associated chronic back pain make it a prime target for intramuscular BoNT-A therapy. Given the abnormal anatomy in these patients, relevant spinal anatomy and intramuscular needle placement should be verified prior to medication administration.

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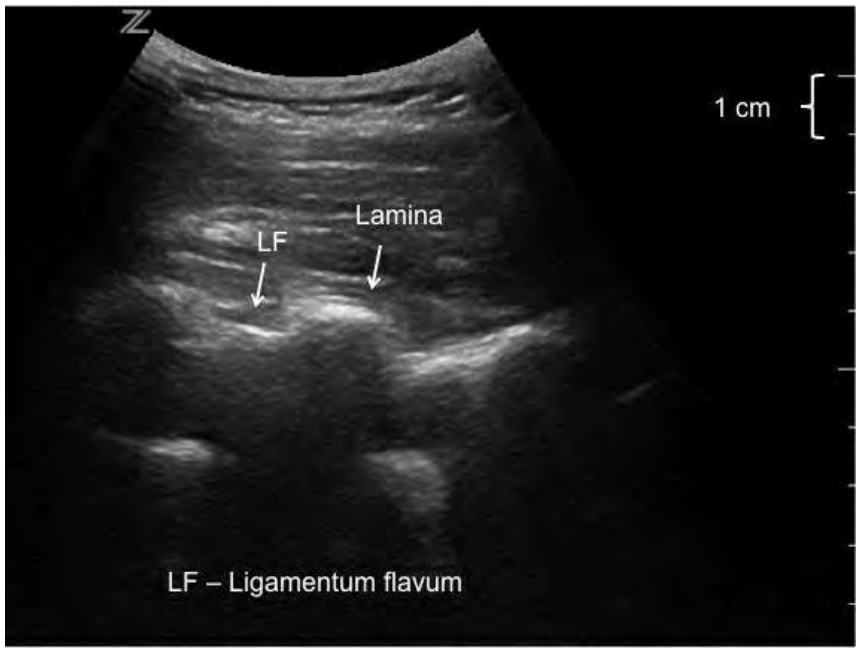
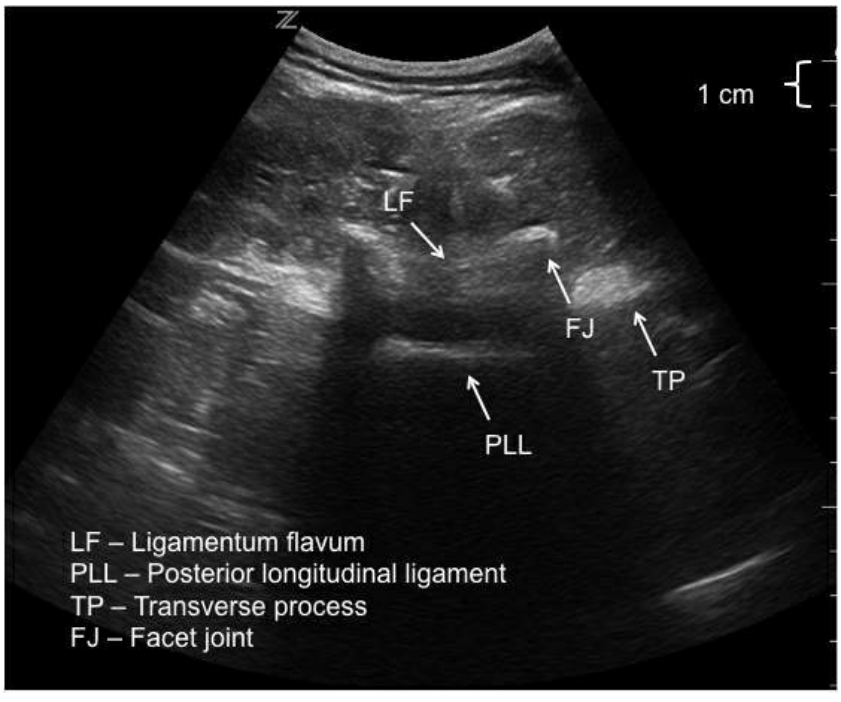


Spinal anatomy ultrasound - parasagittal view



Spinal anatomy ultrasound - transverse view

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1644
Medically Challenging Cases (report of up to 4 cases)

Failed spinal due to a lumbar seroma: would ultrasound pre-scanning have saved the day?

Amber Franz, Jeff C. Gadsden
Duke University

Introduction

Previous spine surgery is a risk factor for difficult spinal anesthesia. We present the case of a failed spinal in a patient presenting for hip arthroplasty 5 months following a lumbar fusion. The attempts at spinal anesthesia were complicated by an undiagnosed persistent lumbar seroma that confused the clinical picture during needle placement.

Results/Case report

Permission obtained from patient to report case. A 68 year-old woman was scheduled to undergo right total hip arthroplasty. Medical history included obesity, chronic pain, and asthma. Five months prior to her hip arthoplasty, the patient had undergone an L2-S1 lumbar fusion for lower back pain. She reported good healing of her surgical incision.

The anesthetic plan consisted of a spinal followed by fascia iliaca nerve block for post-operative pain. A 24-Ga Sprotte needle was introduced in the L3-4 midline interspace with the patient in the sitting position. Upon stylet removal, clear yellow fluid was observed filling the hub. No blood was present, and the fluid continued to drip at a rate typical of CSF. The needle was withdrawn and reinserted at L4-5, with the same result. Our differential at this point included a serous collection, stained local anesthetic from infiltration or, less likely, a spinal infectious process. After collecting a sample of this fluid, we injected 12.5 mg of bupivacaine and proceeded with the fascia iliaca nerve block. Thirty minutes after the "spinal" injection the patient had no evidence of motor or sensory block. A decision was made to proceed with general anesthesia for the case, which went uneventfully.

The fluid sample showed a high protein level (3000 mg/dL; normal CSF protein level = 20-40 mg/dL) and glucose of 74 mg/dL (blood glucose of 138 mg/dL; normal CSF:blood glucose ratio = 0.6). Postoperatively we performed an ultrasound scan of the patient's back and found a large fluid collection measuring 9 x 4 x 2 cm deep lying several centimeters below the skin surface, superficial to the spine, but in the vicinity of her recent spine surgery (Figure 1). This confirmed our suspicion that the fluid was from a seroma related to her spine surgery, explaining the failed spinal anesthetic.

Discussion

Seroma is a known complication of surgery with an incidence of up to 2% after spine fusion (1, 2). Our patient developed a persistent lumbar seroma confounding the placement of our spinal anesthetic. We were suspicious during spinal placement as the fluid was yellow, rather than the typical colorless appearance of CSF. In retrospect, a point-of-care ultrasound scan of the patient's back when the yellow fluid was obtained would have revealed the seroma and its location relative to the intrathecal space, and would have aided in clinical decision-making and possibly the effective placement of the local anesthetic. Ultrasonography is easy to use, inexpensive and non-invasive, and is being used increasingly for diagnostic dilemmas such as this. Based on this experience, we recommend using ultrasound to pre-scan the backs of all patients who have had lumbar spine surgery within the past year in whom a lumbar neuraxial anesthetic is planned.

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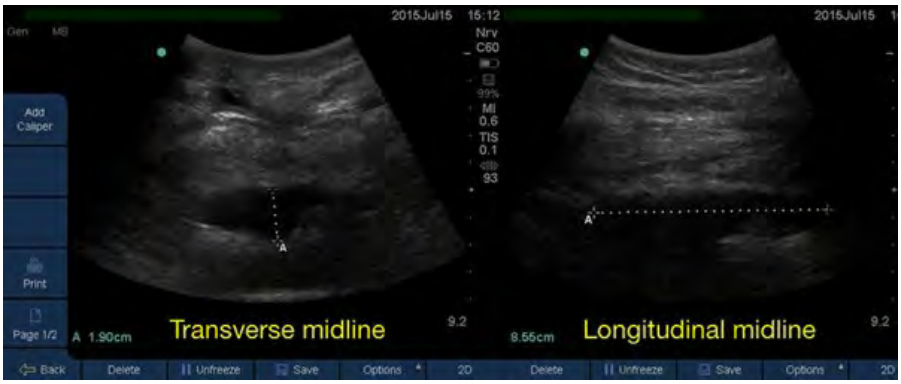

Ultrasound images of the lumbar spinal area showing a fluid collection measuring approximately 2 cm x 4 cm x 8.5 cm

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
GADSDEN: Consulting fees received from Pacira Pharmaceuticals and B.Braun Medical; Speaker's Bureau for Mallinckrodt Pharmaceuticals.

No conflicts for Dr. Franz

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
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Abstract: 1645
Scientific abstract: Regional anesthesia

Etiology of Spinal-Epidural Abscess Ultimately Attributed to Acid-Fast Bacillus Confounded by Recent Epidural Labor Analgesia

Roulhac D. Toledano, Olivia Ringo
NYU Lutheran Medical Center

Introduction

Tuberculosis (TB) is a worldwide health problem that affects over 9 million people annually. Spinal involvement, called Pott Disease, occurs in less than 1% of affected patients. In the United States, undiagnosed immigrants from countries where TB is endemic comprise the majority of documented cases. Delayed diagnosis due to the vague nature of symptoms and the rarity of the disease, may result in irreversible neurologic damage. In this case report, the diagnosis, etiology, and treatment of our patient's spinal-epidural abscess (SEA) was confounded by her relatively recent epidural labor analgesic.

Results/Case report

A 34 yo G3P2 native of Algeria presented to our Labor and Delivery unit at 40 weeks' gestation in rapidly progressing labor. She had a history of 2 prior normal spontaneous vaginal deliveries with epidural labor analgesia, and was otherwise healthy. At 7 cm cervical dilatation, the patient received a standard epidural analgesic under strict aseptic technique on the third attempt by two different anesthesia providers. She remained comfortable, and delivered a healthy male two hours after the epidural placement.

6 months after discharge, the patient presented to our Emergency Department complaining of severe mid-back pain and lower extremity weakness. She denied bowel or bladder dysfunction, nausea/vomiting, headache, nuchal rigidity, visual changes, and fever. Magnetic resonance imaging (MRI) studies revealed a T10-11 SEA with extensive osteomyelitis and cord displacement. The patient was initiated on broad-spectrum antibiotics for presumed gram-positive flora, possibly related to her recent epidural labor analgesic, and underwent an emergent laminectomy and fusion of spinal segments T8-L2, with evacuation of a large, purulent abscess. Intraoperative cultures and gram stains were negative for organisms and white blood cells (WBCs), and the patient was discharged on continued treatment with intravenous cefepime and vancomycin, as well as oral levofloxacin. On postoperative 20, cultures returned positive for acid-fast bacillus, and the patient's antibiotic regimen was changed to a quadruple oral anti-TB regimen.

Discussion

SEA is a rare disorder that affects elderly and immunocompromised patients disproportionately. Individuals with prolonged ICU stays, intravenous drug users, and patients with bacteremia, DM, alcohol dependence, cancer, HIV, and end-stage renal disease are at increased risk compared with the general population. In recent decades the incidence of SEA has increased, in part due to the increase in spinal instrumentation, the rise of illicit drug use, and the aging population. In the United States, Pott disease is an extremely rare cause of SEA, and appropriate diagnosis and treatment may be delayed or attributed to neuraxial techniques performed for unrelated clinical reasons.

An estimated 5% of SEAs are associated with epidural procedures. Risk factors include extended epidural catheter infusions and localized or systemic infection at the time of initiation of the block. Poor adherence to sterile technique and, possibly, multiple attempts at epidural placement may place patients at additional risk.

Early diagnosis, prompt treatment, and consistent follow-up are essential to avoid irreversible neurologic damage. Most likely owing to a delay in diagnosis or an initial misdiagnosis, morbidity associated with SEA remains high at 33 to 47%, while mortality is estimated to be 5%.

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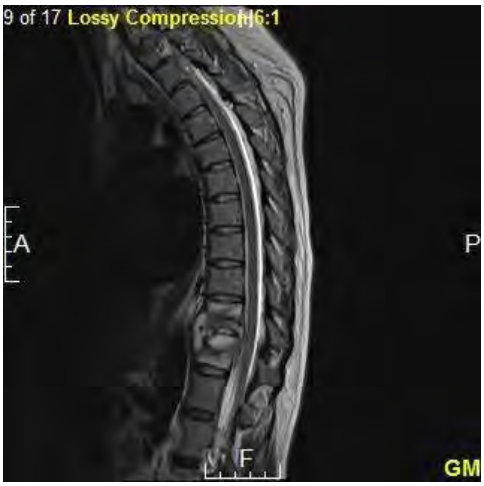

SEA

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1646
Medically Challenging Cases (report of up to 4 cases)

A Case of Local Anesthetic Toxicity Despite Administration Sub-Maximum Dose of Lidocaine.

Jenny Chan, Rano Faltas
Rush University Medical Center

Introduction

As a widely used local anesthetic, lidocaine is generally considered a safe anesthetic when administered below the maximum dose (5 mg/kg alone, 7mg/kg with epinephrine,). Considerations should be made depending on the area of administration; for example areas of greater vascularity results in greater degree of absorption.

Results/Case report

29 year old female, weighing 70.3kg, with past medical history of CRPS of RLE, and family history of pseudo-cholinesterase deficiency presented to outpatient surgery center for explanation of a recently implanted spinal cord stimulator. The patient showed signs of spinal cord stimulator internal pulse generator site infection, including fevers, elevated WBC, ESR, and CRP. On physical exam, patient exhibited erythema, warmth and pain around the battery site, a CT scan confirmed the presence of a collection at the IPG site. Intra-operatively, MAC sedation was administered. The patient was sedated with 2 mg of versed at the beginning of the case and a total of 340 mg propofol given via infusion throughout the course of the 100 minute case. A total of 50 ml of 1% lidocaine in 1:200,000 epinephrine (about 7.0mg/kg) was given in small interval subcutaneous injections. Upon emergence the patient started shivering, grimacing, and retching. Though hemodynamically stable throughout the case, patient became sinus tachycardic with heart rate in the 160s post-operatively, maintaining saturations above 95% on 4L. Patient also started having multiple episodes of bilateral upper extremities convulsions, without resolution from 4 mL midazolam administration. Convulsions resolved immediately after administration of 100 mg of propofol and initiation of 100ml of Intralipid. Patient was subsequently intubated and admitted to the MICU. Initial CMP, CBC, EKG, urine toxicology screen, lactate were unrevealing, showing normal LFTs. Head CT showed no abnormalities. EEG done during hospital course showed no signs of epileptiform activity or seizures. patient entually recovered and was discharged, her consent was obtain to present her case.

Discussion

The descion to administer local anesthetics to infected subcutaneous tissue should be assessed carefully. Inflammatory mediators released during response to infection causes increased permeability and blood flow 1. The vasoconstrictor effects of epinephrine in this environment might potentially be attenuated. The overall effect might be quicker than expected lidocaine absorption into the systemic circulation. Therefore administration of below or at “textbook” maximum levels of local anesthetics could result in larger than expected plasma levels, translating to increased risk of systemic toxicity. Once toxicity is suspected, immediate administration of benzodiazepines, propofol, and/or intralipid emulsions could terminate the central nervous system effects. 2 It would be advisable in these cases to administer General anesthesia instead.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1647
Medically Challenging Cases (report of up to 4 cases)

Continuous PEC 2 Analgesia in a Trauma Patient with Multiple Rib Fractures and Contraindication to or Failure of Other Modes of Analgesia

Fletcher Moore, Vikas Kumar, Mohammed Gaber, Manuel Castresana
Medical College of Georgia/Georgia Regents University

Introduction

Rib fractures are common injuries not infrequently associated with significant pain and morbidity. Uncontrolled pain may lead to inspiratory splinting which can result in atelectasis, pneumonia or possibly directly contribute to respiratory failure. These complications are observed to occur more readily as the number of fractured ribs increases. Neuraxial analgesia has been used with good result to control the pain associated with rib fractures, however there are frequently contraindications that make traditional approaches less than ideal. Here we present a case in which a PEC 2 catheter was placed to provide continuous pain control resulting in improved incentive spirometry scores in a patient with multiple right-sided rib fractures and contraindication to epidural/paravertebral analgesia.

Results/Case report

The patient was a 36-year-old white male with no significant medical history who was admitted to the intensive care unit following a 40 foot fall. Computed tomography scan of the thorax revealed right rib fractures at ribs 3, 4, and 6 to 10 along with multiple vertebral transverse process fractures and pulmonary contusions. The acute pain service was consulted because of poor pain control with intravenous narcotics. A PEC block was felt to be the best approach for regional analgesia in this patient as the transverse process fractures represented a relative contraindication to neuraxial technique. Initially a PEC 1 and PEC 2 single-injection block was performed with significant improvement in numeric pain scores and incentive spirometry performance. The following day the procedure was repeated and in addition a catheter was inserted above the serratus anterior muscle at the level of the 4th rib using an 18 gauge Tuohy needle. An infusion of 0.2% ropivacaine was used for continuous analgesia. The patient continued to have good pain relief with significant improvement in inspiratory volumes for the following two days. The patient was transferred to the floor the day following catheter removal and subsequently discharged home.

Discussion

Adequate analgesia in patients with multiple rib fractures is critical. We present a novel approach for continuous relief of pain from chest trauma where other modalities of analgesia are contraindicated or unsuccessful. In our patient we left the catheter in place only for 48 hours due to the significant improvement in pain and lung function. To our knowledge this is the first case reported of continuous catheter analgesia for chest trauma using the PEC 2 approach. Our good results warrant further studies utilizing this novel technique.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1649
Medically Challenging Cases (report of up to 4 cases)

Successful Stellate Ganglion Block In Atypical Sympathetically Maintained Pain

Ahmed Haque, Yaohua Lu
University Of Vermont

Introduction

Complex Regional Pain Syndrome is classically described as a disease affecting the distal extremities, usually hands, arms, feet, or legs. It is believed to often be associated with a dysfunction of the autonomic nervous system, usually after an injury or trauma. The diagnosis is usually formed from meeting clinical criteria; most commonly continued pain, allodynia, signs of edema, changes in blood flow locally, or abnormal sudomotor activity. However, most cases of CRPS involves distal extremity, here we report a case of proximal shoulder pain exhibiting signs of CRPS responding to treatment with sympathetic blockade.

Results/Case report

Patient is a 55 year old female with history of a right shoulder labrum tear that required extensive surgery to repair and subsequently had developed a chronic right shoulder pain after injury. Her pain is localized over the right anterior shoulder, described as deep burning and aching, exquisitely sensitive to touch and palpation, and has had limited range of motion of her shoulder due to significant episodes of sharp, shooting pain. Despite 4 years of aggressive multimodal management including medications and physical therapy, patient's pain remained unremitting and only marginally improved which included significant functional limitation. The patient was consented for a right stellate ganglion block performed at the right C7 vertebrae level. The procedure was performed total of three times. Initial block was performed with 3ml of 0.5% bupivacaine mixed with 3 mL of Isovue contrast. The subsequent procedures were performed similarly but with addition of 50mcg of clonidine.

Patient ultimately underwent a series of 3 stellate ganglion blocks in 2–3 month intervals. The initial block provided 3-4 days of greater than 95% relief with return to baseline at 8 days. After addition of clonidine, she received greater than 95% relief for 2-3 weeks. Though her pain consistently returned around the 6 week mark, she had significantly increased her functional status in terms of range of motion as well as activities she is able to perform. She also noted that her exquisite tenderness to light touch over the affected area had a noticeable decrement.

Discussion

Our patient did not fully meet all items for diagnosis of CRPS using the Budapest criteria. However, she undoubtedly displayed a sympathetically maintained pain syndrome that responded favorably to a sympathetic nerve block consistently on multiple occasions. Though the mechanism is not fully understood, sympathetically maintained pain is thought to be a result of a positive feedback loop due to changes in both the peripheral and central somatosensory processes. It is encouraging that some patients that may not represent a classic indication for sympathetic nerve block may still attain significant relief secondary to blockage of the sympathetically maintained component of patient's pain.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1652
Scientific abstract: Regional anesthesia

Vocal cord function after Interscalene Nerve Block

Karina Gritsenko, Eugene Du, Victor Polshin, Pariket Dubal, Konrad Gruson, Melin Tan-Geller
Montefiore Medical Center

Introduction

Interscalene brachial plexus block (IBPB) for orthopedic shoulder procedures provides superior analgesia and improved outcomes. However, due to the proximity of the phrenic nerve, stellate ganglion, and recurrent laryngeal nerve, several complications have been described in the literature, including diaphragmatic paresis,[1-3] Horner's syndrome,[4-6] and dysphonia.[7-9] With twitch monitoring and ultrasound guidance local anesthetic volume required to achieve a successful block has decreased, reducing undesired local anesthetic diffusion.

Previous studies note an incidence of dysphonia in the post-anesthesia care unit between 15 and 31%,[9,10] depending on the volume of anesthetic used. However, these studies used a subjective measurement of dysphonia, which may have been confounded by airway manipulation or nerve injury during surgery.

In this prospective cohort study, an evaluation of vocal cord impairment by an otolaryngologist was performed directly prior to the nerve block and one hour following IBPB. This was done prior to any airway manipulation or surgery to represent a pure comparison of functionality at baseline to that following a nerve block with standard local anesthetic, nerve block technique, and timing of the assessments.

Materials and methods (NA for case report)

After IRB approval, patients undergoing ambulatory arthroscopic shoulder procedures, requiring IBPB were recruited into this prospective cohort study. Each patient received standard pre-anesthetic evaluations; patients with respiratory disease, pneumonectomy, head and neck anatomic disease (radiation, cancer, or previous surgeries), previously known vocal cord disease, were excluded. Following informed consent, the vocal cords were assessed via standard fiberoptic ENT evaluation by an otolaryngologist using a fiberoptic with recording video capabilities. Subsequently, IBPB using of 0.5% bupivacaine 20cc was performed under ultrasound-guidance and nerve stimulator confirmation. After confirming a successful block, 1 hour after the injection, the patient was re-evaluated for hoarseness and vocal cord changes via a repeat fiberoptic ENT assessment. All patient received general anesthesia with endotracheal intubation.

Baseline characteristics, including age, gender, body mass index, past medical history, and ASA score, were recorded for each enrolled patient. Our primary outcome measure included incidence of vocal cord paresis, as seen on ENT evaluation, 1 hour after IBPB.

Results/Case report

Eight patients were enrolled in the study. Upon otolaryngological evaluation both prior to and after IBPB, as well as postoperatively, no patients had dysphagia, dysphonia, or diminished vocal cord motion.

Discussion

IBPB was not associated with vocal cord paresis as confirmed by otolaryngological evaluation. The limitation of this study is that we have a limited patient sample, as it was difficult to organize ENT evaluations. Although larger studies are required to determine the true incidence of vocal cord paresis following ultrasound guided IBPB, our results suggest that incidence of unwanted blockade of nerves other than the brachial plexus is much lower than previously described.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1654
Scientific abstract: Acute pain

Characterizing the Postsurgical Pain Experience: A Pilot Study

Lindsay Chun, David Dickerson
University of Chicago Pritzker School of Medicine

Introduction

Post-procedure pain may be an expected part of the surgical experience, but severe, uncontrolled postsurgical pain presents serious health implications to patients and can burden health care resources[1]. High postsurgical pain levels put patients at risk for developing various comorbidities ranging from psychological distress to adverse humoral effects that lead to chronic pain and disability, highlighting the clinical necessity for effective pain management strategies[2,3,4]. As postsurgical pain impacts patients' recovery, there is clinical value in preemptively identifying surgical patients or practice patterns that may have an increased risk for postsurgical pain. Our pilot study aimed to develop an evidence-based risk assessment tool to identify patients at risk for experiencing high, uncontrolled levels of pain following surgery at a single institution. We hypothesized that retrospective and comprehensive review of surgical patients would reveal clinical factors that have predictive value for postsurgical pain.

Materials and methods (NA for case report)

Data were collected through a retrospective, manual chart review of the electronic health records at the University of Chicago Medical Center. Subjects whose charts were reviewed were adult patients ≥18 years of age who were admitted for and received surgical services requiring anesthesia in the month of April 2015 (n=221).

The use of patient information for this study was approved by the University of Chicago Institutional Review Board (IRB15-094).

The statistical analysis of the data was descriptive, thus non-parametric tools were used to determine the effects of patient and procedure characteristics on pain scores. Average pain scores were collected on a 0-10 Likert scale. Stepwise multiple regression was performed to evaluate for associations between patient characteristics and average pain scores. Statistical significance was achieved at $p < 0.05$.

Results/Case report

Across surgery types, patients with preoperative pain conditions documented in their medical history had higher average pain scores up to 7 days following surgery. Age and preoperative pain condition were the only factors analyzed that had a significant effect on postsurgical pain experiences up to 7 days following surgery ($p<0.05$) in this regression model.

On the day after surgery and through days 0-7 or until discharge, significantly higher ($p<0.05$) average pain scores were seen in females than in males, in patients with psychosocial conditions documented in their problem list and medical history than those with no documented psychosocial conditions, and in patients who had prescribed opioids in their outpatients medications list report.

Discussion

This pilot study's preliminary findings suggest that certain patient and procedure characteristics predispose to higher levels of postoperative pain. The agreement between the findings of this study and those of other studies signifies the clinical importance of thoroughly characterizing patients' pain conditions and medical history to optimize the patients' perioperative care[3]. These findings strengthen the validity and urgency of the standards and guidelines put forward by the Joint Commission and the ASA regarding pain assessment and management in hospitals[5,6], and provides insight into institutional measures that may be taken to improve the integrity of data management and the care of patients to allow for a well-managed recovery process and subsequent superior quality of life.

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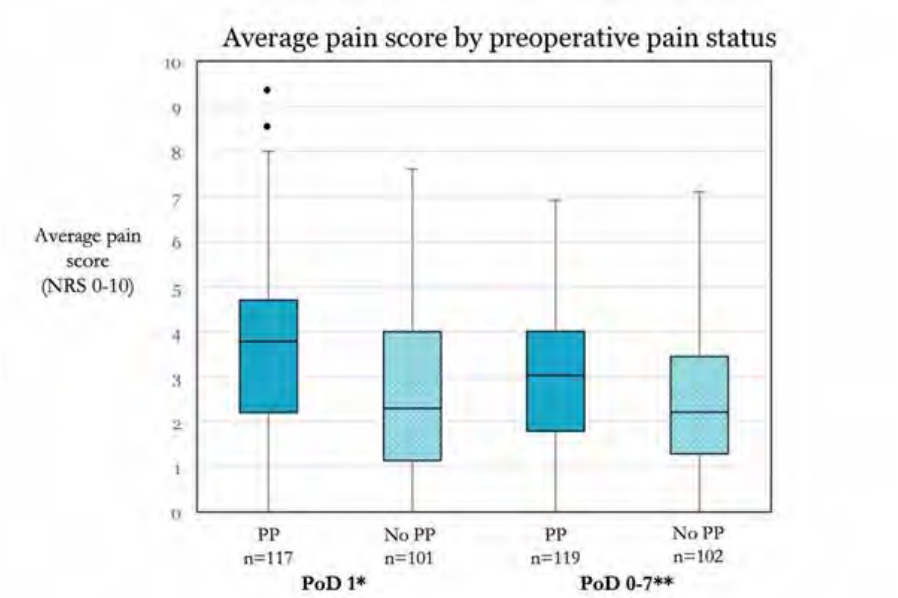
Tables/images

		PoD 1			PoD 0-7		
Preoperative factor	**Status**	**n**	**Average pain score**	**p value**	**n**	**Average pain score**	**p value**
Preop pain condition	Present	117	3.4	0.0014*	119	2.6	0.0046*
	Absent	101	3.0		102	2.5	
Gender	Female	127	3.3	0.0296*	128	2.9	0.0368*
	Male	91	2.6		93	2.5	
Psychosocial condition	Present	39	3.7	0.0182*	39	3.4	0.0184*
	Absent	179	2.9		182	2.6	
Preop opioid use	Present	61	3.6	0.0057*	61	3.2	0.0081*
	Absent	157	2.8		160	2.6	
History of previous surgery	Present	180	3	0.6164	183	2.8	0.6276
	Absent	38	2.9		38	1.7	

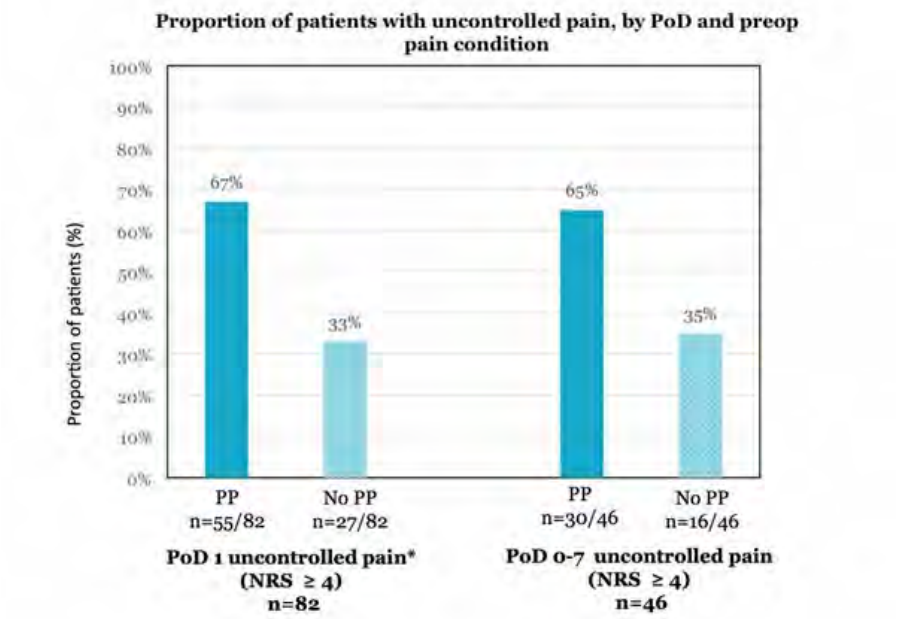
(PoD = postop day) Average postoperative pain scores by preoperative patient characteristics. All preoperative characteristics analyzed except history of previous surgery were significantly associated with postoperative pain scores (*p<0.05).

PoD 1	**Coefficient**	**Std. error**	**t stat**	**p value**	**Lower 95%**	**Upper 95%**
Age	-0.03	0.01	-3.79	<0.001*	-0.04	-0.01
Gender (female)	-0.46	0.27	-1.68	0.09	-1.00	0.08
Psychosocial conditon	0.52	0.35	1.48	0.14	-0.17	1.22
Preoperative pain condition	-0.72	0.28	-2.61	0.01*	-1.27	-0.18
PoD 0-7	**Coefficient**	**Std. error**	**t stat**	**p value**	**Lower 95%**	**Upper 95%**
Age	-0.02	0.01	-3.85	<0.001*	-0.04	-0.01
Gender (female)	-0.37	0.22	-1.72	0.09	-0.80	0.06
Psychosocial conditon	0.52	0.28	1.84	0.07	-0.04	1.07
Preoperative pain condition	-0.47	0.22	-2.13	0.03*	-0.90	-0.03

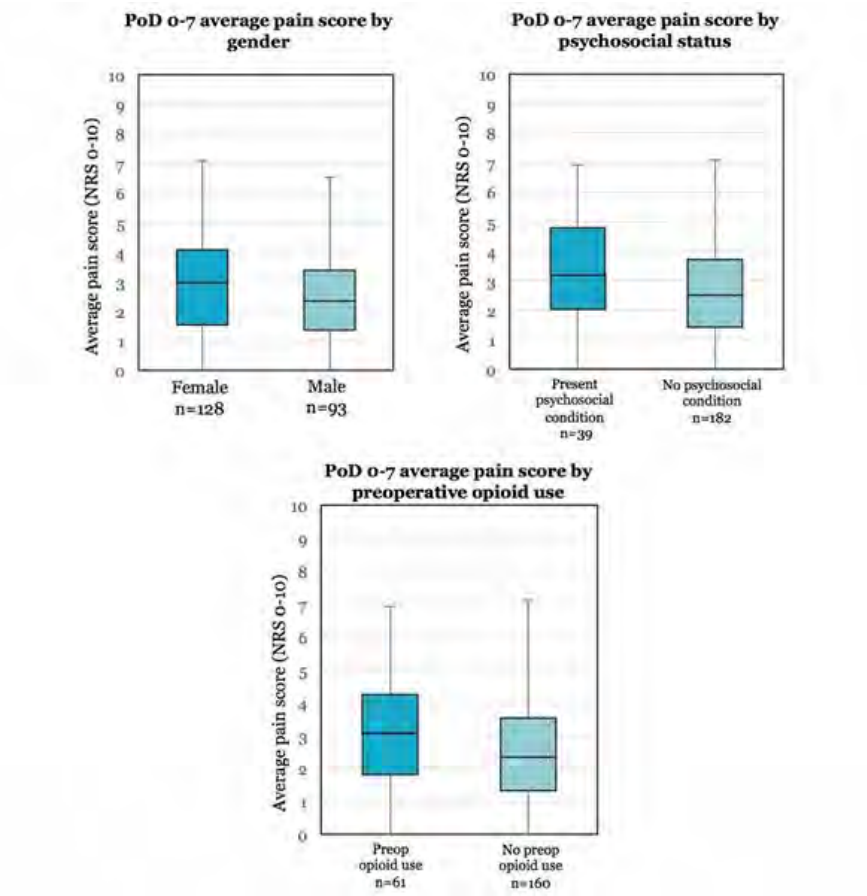
(PoD = postop day) Multivariate regression using preoperative characteristics of age, gender, psychosocial condition, and preoperative pain condition for average postoperative pain levels. (* Denotes a significant p value<0.05) R-squared = 0.122.



(PoD = postop day; PP = preop pain; NRS = numerical ranking scale) Patients with existing preoperative pain conditions had higher average pain scores on PoD 1 and through PoD 0-7. The average postoperative pain scores had a non-normal distribution.



(PoD = postop day; PP = preop pain; NRS = numerical ranking scale) A higher proportion of patients with preop pain had uncontrolled postop pain (NRS =4). The difference in proportions between the preop pain groups was significant on PoD 1 (*p=0.002).



(PoD = postop day; NRS = numerical ranking scale) Females had higher average pain scores than males through PoD 0-7 (p=0.0368). Patients with psychosocial conditions and opioid use had higher average pain scores (p=0.0184; p=0.0081).

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
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Abstract: 1655
Scientific abstract: Regional anesthesia

Opioid Free Analgesia: A Practical Approach To Patients On A Medical Mission

Rebecca Scholl, Michal Gajewski
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Introduction

Patients can suffer significant postoperative pain after total abdominal hysterectomy (TAH). These patients require an effective multimodal analgesia regimen with negligible side effects. Opioids are conventionally the mainstream modality for treating pain, both during and after surgery in America. Studies have shown that the United States, while comprised of less than 5% of the world's population consumes 80% of the global supply of opioid drugs. Narcotic medications can have many negative side effects and consequences that affect convalescence such as nausea and vomiting, constipation and somnolence. On a recent mission trip to Ghana, where access to opioids was severely limited, we demonstrated successful implementation and analgesic effectiveness of transversus abdominis plane blocks (TAP blocks) with multimodal analgesia for pain management after TAH.

Materials and methods (NA for case report)

We performed eight TAH surgeries in Manpong Akuapim, Ghana at Tetteh Quarshie Memorial Hospital. We brought all our anesthetic medications, except narcotics, due to travel restrictions. Our initial plan was to buy opioid medications at the hospital to supplement our postoperative analgesia; however, the pharmacy only had a couple vials of meperidine. Therefore, we improvised and implemented a multimodal analgesic regimen for our patients TAH, with limited to no opioids, that provided excellent analgesia (see Table 1). Additionally, our patients did not experience any nausea, vomiting, or somnolence and experienced a long period of pain relief before requiring rescue pain medications after the TAP block.

Table 1: Multimodal Analgesia Regimen

Intraoperative	PACU	Postoperative
Preoperative Spinal: 1.5-2.0 mL hyperbaric 0.75% bupivacaine	Ultrasound Guided TAP Blocks	Combination of anti-inflammatories, Tylenol, and Tramadol
Intravenous induction followed by general endotracheal analgesia	Injected 15 mL of 0.25% bupivacaine on each side (provided total dose	Based on Visual Analog Scale: 0-3: Acetaminophen 1 g Q6h 4-7: Naproxen 250 mg Q12h 8-10: Tramadol 50 mg Q6h
Spinal provided intraoperative analgesia	Immediate postoperative analgesia	Patients were all discharged on POD 2

Discussion

Studies have demonstrated analgesic efficacy of bilateral TAP blocks in patients undergoing abdominal surgeries, including TAH. Additionally, it has been shown that TAP blocks, as a component of a multimodal analgesic regimen, provide less variability in dynamic pain (coughing), reduce opioid consumption and time to first administration of rescue narcotic, and decrease postoperative visual analog scale pain scores. This knowledge, combined with the limitation in administering conventional opioid medications, mandated alternative strategies for perioperative analgesia. The combination of neuroaxial and peripheral nerve blocks (TAP), Tylenol and nonsteroidal anti-inflammatories provided sustained surgical pain relief after TAH. This small case series in Ghana provides selected evidence that non-opioid alternatives can effectively alleviate postoperative pain after TAH. Moreover, our multimodal pain medicine regimen could be implemented in the Unites States for similar abdominal surgeries to treat pain, limit imprudent opioid use, minimize opioid related side effects and improve postsurgical recovery.

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Tables/images

Performing Ultrasound Guided Bilateral TAP Blocks in PACU

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
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Abstract: 1656
Scientific abstract: Acute pain

Single View Anterior-Posterior Contrast-Enhanced Epidurography For Confirmation of Thoracic Epidural Catheter Placement is Highly Concordant Between Expert Reviewers

Benjamin Ekstrom, Pezhman Mehrabian, Wyndam Strodtbeck, Kevin Vorenkamp, Daniel Warren
Virginia Mason Medical Center

Introduction

Thoracic epidural analgesia is commonly employed for treatment of postoperative pain after major abdominal or thoracic surgery; however, failure of analgesia is a common complication of therapy with an incidence estimated at 13-47% in published heterogeneous cohorts. Contrast-enhanced epidurography informs two leading causes of failure: incorrect placement of the epidural catheter and inadequate spread of infusate. However, epidurography has not been widely adopted for use in acute pain management given perceived inconvenience and questions of its value in that setting. In this study we evaluate our institution's simplified approach employing single anterior-posterior post-contrast portable roentgenograms. We investigate the validity of this technique by assessing concordance of epidurogram interpretation, and record technical factors that reduced reliability. We hypothesized that independent review by blinded Anesthesiology Pain Medicine specialists would reveal a high level of inter-rater reliability, thus demonstrating the precision of this imaging modality.

Materials and methods (NA for case report)

After approval by our institutional review board, we searched our internal epidural quality data to identify patients who had epidurograms for confirmation of thoracic epidural catheter placement during the study period. These images were anonymized and placed in a secure directory in our PACS and independently reviewed by three pain medicine boarded anesthesiologists who were blinded to each patient's history. The reviewers recorded presence or absence of epidural contrast, technical adequacy of the study and characteristics of epidural spread. The interpretations were evaluated for absolute agreement and correlation via Fleiss' kappa. The incidences of positive or negative interpretations were recorded, as well as factors which led to disagreement and negative or positive interpretation. All statistical analyses were performed with Excel 2013.

Results/Case report

This abstract reports the preliminary findings related to the first 49 epidurograms identified in our study period. The raters agreed on their interpretation of whether or not the contrast was in the epidural space for 94% of images (46/49), with a kappa value of 0.86 ($p << 0.01$). Please see Table 1 for additional findings.

Discussion

Epidurography has been previously shown to be a safe technique for confirmation of epidural catheter placement and may be predictive of spread of epidural infusate. We present an efficient approach to epidurography in acute pain management that can be reliably interpreted with strong correlation between independent, blinded expert reviewers. Inadequate quality of imaging strongly correlated with reduced reliability of interpretation. Midline contrast alone was not specific for epidural location. Further research is needed to determine what training is appropriate for the interpretation of epidurograms, to further define their role in acute pain management, and to evaluate their clinical and economic impact.

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Tables/images

	Adequate Quality of Imaging	Midline Contrast	Appropriate orientation to pedicles	Other confirmatory characteristics
Concordant – epidural contrast (n=39)	92%	100%	100%	100%
Concordant – non-epidural contrast (n=7)	71%	43%	0%	0%
Nonconcordant interpretation (n=3)	0%	55%	33%	22%

Table 1: Additional Findings

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
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Abstract: 1657
Scientific abstract: Acute pain

Safety of Anesthesiologist-Administered Ultrasound–Guided Infiltration Analgesia with Liposomal Bupivacaine compared to Femoral-Tibial Nerve Block in Total Knee Arthroplasty patients

Sanjay Sinha, Jonathan Abrams, Smitha Vellanky, Sivasenthil Arumugam
St. Francis Hospital and Medical Center

Introduction

Anesthesiologist administered ultrasound-guided local infiltration analgesia (US-LIA) pre-operatively is a technique used in our Institution in total knee arthroplasty (TKA) patients. The safety of this technique has not been documented. This study compares complications, analgesic efficacy and mobility of US-LIA to continuous femoral and single-shot tibial nerve block in TKA patients.

Materials and methods (NA for case report)

We evaluated the data of 1536 patients having primary, unilateral TKA between April, 2014 to December 2015 from the Connecticut Joint Replacement Registry. All patient received a standardized multimodal analgesia regimen pre-opeatively, which was continued until discharge.

The study group (n= 1189) received a short-acting femoral nerve block with mepivacaine 1% 10 mL followed by US-LIA of the knee with an admixture Lipo-Bupi 1.3% 20 mL, bupivacaine 0.25% 45 mL, and normal saline 10 mL.

The control group (n= 347) received a continuous femoral catheter and a single-shot tibial nerve block with a total of 25 mL ropivacaine 0.5% followed by an infusion of ropivacaine 0.2% at 6mL/h for 48 hours.

General anesthesia was administered for surgery and oral oxycodone or intravenous hyromorphone was given for break-through pain postoperatively. All patients underwent a standardized rehabilitation protocol. Patients were discharged at the discretion of surgeons.

Incidence of complication including a 90-day follow-up phone call, pain scores, opioid consumption and mobility parameters were analyzed.

Results/Case report

There were no differences in the incidence of wound complications (deep infection, cellulitis, wound dehiscence, Tendon rupture, hematoma), DVT/PE, falls, urinary retention and nerve injury.

The study group had higher pain scores in the first 24 hours after surgery but subsequently had significantly lower pain scores till hospital discharge. The opioid consumption was similar between groups except for higher hyromorphone use in the study group in recovery room and 24-48 hour window postoperatively .

The study patients were able to bear weight, walk earlier and had greater degree of flexion and extension than the control group. The length of stay (LOS) was shorter in the study group (2.6±0.56 versus 3.1±0.37 days)

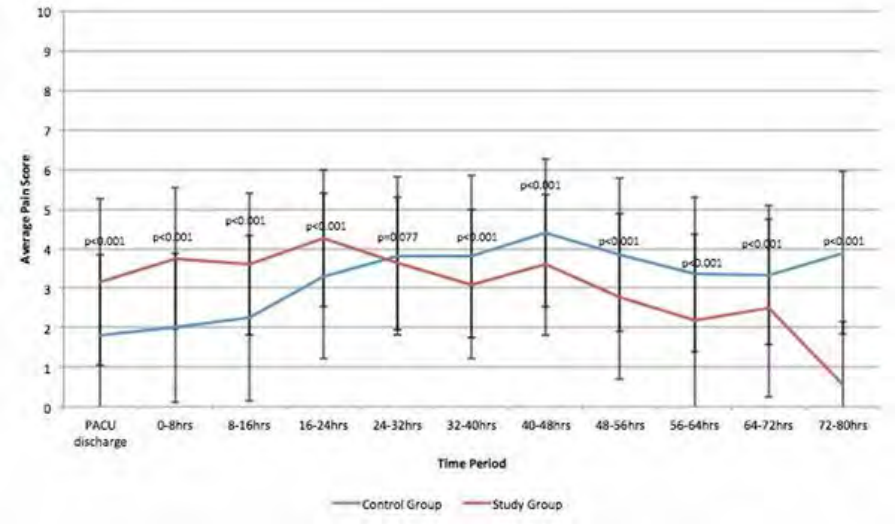
Discussion

Anesthesiologist administered LIA is a safe and efficacious technique. It facilitates earlier mobility and decreases the LOS and increase complications

Tables/images

Complication	Study Group	Incidence rate in Study Group	Control Group	Incidence rate in Control Group	p-value
Cellulitis	1	0.1%	1	0.3%	0.401
Deep infection	10	0.8%	4	1.2%	0.533
Proximal DVT	1	0.1%	1	0.3%	0.401
Fall	8	0.7%	2	0.6%	1.000
Fascial dehiscence	2	0.2%	0	0.0%	
Nerve injury	1	0.1%	0	0.0%	
Periprosthetic fracture	2	0.2%	0	0.0%	
Pulmonary embolism	5	0.4%	0	0.0%	
Tendon rupture	3	0.3%	0	0.0%	
Urinary retention	13	1.1%	2	0.6%	0.542
UTI	6	0.5%	2	0.6%	1.000
Wound dehiscence	5	0.4%	2	0.6%	0.659

Incidence of Complications



Mean Pain Scores

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
Honoraria/Advisory Board with Pacira and Teleflex

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1658
Medically Challenging Cases (report of up to 4 cases)

Accidental infusion of phenylephrine infusion via popliteal catheter

Tiffany R. Tedore, Angela Selzer
New York Presbyterian Hospital Weill Cornell Medical College

Introduction

Drug or fluid infiltration and extravasation injuries occur in 0.1-6% of adult and up to 11% of pediatric patients. Vasopressor infiltrations can cause severe injury via direct α-adrenergic-mediated vasospasm leading to inadequate blood flow and ischemia. Risk factors for vasopressor-induced necrosis include hypotension, diabetes, vasculopathy, Raynaud's disease, coagulopathy, advanced age and altered mental status. Vasopressor extravasations have been successfully treated with phentolamine, topical nitroglycerin, terbutaline and sympathetic block. There are no published case reports of phenylephrine or other vasopressor infusion via peripheral nerve catheter.

Materials and methods (NA for case report)

NA

Results/Case report

The involved patient has approved submission of this case. A 77 year-old male presented for a left below the knee amputation for gangrene. His medical history was significant for end-stage renal disease on hemodialysis, type 2 diabetes, atrial fibrillation, congestive heart failure, mitral and tricuspid valve replacements, biventricular pacemaker, hypertension, obstructive sleep apnea, thyroid cancer, renal cell cancer and chronic myelogenous leukemia. His primary anesthetic consisted of long-acting left popliteal and saphenous nerve blocks with dexmedetomidine sedation. His postoperative pain management regimen consisted of continuous popliteal catheter infusion of ropivacaine 0.2% at 6 mL/hr and dilaudid PCA. His anesthetic course was complicated by hypotension requiring phenylephrine infusion. Upon PACU arrival both ropivacaine and phenylephrine infusions were ordered. Due to a pharmacy delay the phenylephrine bag from the operating room was used until it was titrated to off. Approximately 2 hours after PACU arrival, the bag of ropivacaine was received from pharmacy and placed in a locked infusion box. A two-person check was performed by nursing to verify patient, drug, dose, concentration, pump settings and line attachment. The latter parameters were checked again by the anesthesiology resident on-call and the infusion started. Over the next several hours there were multiple two-person checks by nursing at times of infusion changes and change of shift. Eight hours after the infusion began the patient was transferred from the PACU to the inpatient floor. At this time it was discovered that the infusion pump contained phenylephrine 80 mcg/mL and not ropivacaine. The phenylephrine bag was removed and replaced with ropivacaine. It is uncertain whether the tubing was changed. The anesthesia team was not called for another 3.5 hours. Examination by the anesthesiologist and surgeon showed a slightly mottled but warm stump with intact sensation. No antidote was administered, as the treating physicians were unaware of the hospital's vasopressor extravasation protocol recommending phentolamine. The ropivacaine infusion was continued through postoperative day 5 with the patient remaining comfortable throughout. There were no signs of necrosis during the hospital admission, and on subsequent outpatient follow-up the stump was noted to be intact. Extensive education regarding drug errors and extravasation identification and treatment was provided to members of the nursing, anesthesia and surgery divisions.

Discussion

Both drug errors and failures to follow hospital policies and protocols contributed to this event. Although the recommended antidote was not administered, ropivacaine infusion may have partially counteracted the effects of phenylephrine via sympathetic block.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
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New Orleans LA

Abstract: 1659
Scientific abstract: Regional anesthesia

Liposomal Bupivacaine adductor canal nerve block, posterior capsule block and lateral genicular block versus adductor canal block with catheter and tibial nerve block: a retrospective comparative cohort study.

Victor Polshin, Rae Stewart, Sun Jin Kim, Naum Shaparin, Boleslav Kosharskyy
Montefiore Medical Center

Introduction

Pain control following total knee arthroplasty (TKA) is crucial for improving recovery[1], and regional anesthesia is one of the cornerstones. The major innervation of the knee includes femoral nerve[2,3] and the sciatic nerve[4,5]. Therefore, at our institution we have been using adductor canal block (ACB) and catheter placement, combined with a selective tibial nerve block to avoid motor weakness. However, many other nerves contribute to the innervation of the knee.

Traditional local anesthetics cannot provide analgesia for more than 24 hours. Recently, liposomal bupivacaine (LB) was developed, which extends duration of action up to 72 hours, with a single injection[6].

Based on the recent anatomical evidence and our knowledge about the complexity of the knee joint innervation we created a new regional approach that will assure a more complete sensory blockade, and better analgesia while preserving the quadriceps strength and avoiding potential foot drop. We have used bupivacaine followed by LB (off label use) for ACB, a pre-operative posterior capsule injection[7,8] and a lateral genicular injection[9,10]. Clinically we had good results, and this study compares the outcomes of the two approaches.

Materials and methods (NA for case report)

After IRB approval, we identified patients from one surgeon, who underwent a unilateral TKA with a pre-operative nerve block, and neuraxial anesthesia from June 2015, through December 2015. All patients received a standard multimodal pain medications, and aggressive physical therapy. Patients were excluded if they had an indication for TKA other than osteo or rheumatoid arthritis, underwent other concurrent surgery, did not receive regional anesthesia, had to receive general anesthesia, were on chronic opioid medications prior to surgery, or had current substance abuse.

The control group (n=31) received an ACB (20ml ropivacaine 0.5%), and peripheral nerve catheterOnQ pump (6ml/hr ropivacaine 0.2%); followed by a selective tibial nerve block (4-6ml ropivacaine 0.5%).

For the LB group (n=22), a LB solution (LBS) was made using 20ml LB 1.33% and 20ml saline. An ACB (10ml bupivacaine 0.25%, 20ml LBS), a posterior capsule injection (7.5%-10ml bupivacaine, 7.5-10ml LBS), and a lateral genicular block (5ml bupivacaine 0.25%, 5ml LBS) were performed with ultrasound guidance.

Outcome measures were obtained from the patients' charts, with the primary outcome measure being opioid consumption in the first 24 hours. Secondary outcome measures were opioid consumption in 24-48 hour post-operatively, pain scores in the hospital (measure as AUC), distance ambulated, discharge days, discharge to home versus rehabilitation facility. We also monitored for complications, including nausea and vomiting, falls, and infections.

Results/Case report

No differences were detected in our primary or secondary outcomes. Although, there was a trend towards faster discharges and longer distances walked during physical therapy, this did not reach significance.

Discussion

A prospective, randomized trial should be performed, where pre and post-operative physical therapy measures can be compared; and where patient satisfaction with pain control can be measured.

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Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
One of the authors, Boleslav Kosharksyy is a speaker for the company making liposomal bupivacaine (exparel). This study was done without the involvement of anyone from the company, and was not funded by this company

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1661
Medically Challenging Cases (report of up to 4 cases)

Successful Popliteal-Sciatic Block in a Girl With Ehlers-Danlos, Hypermobility-Type.

David Waisel, Karen Boretsky
Boston Children's Hospital

Introduction

Ehlers-Danlos syndrome (EDS) is a heterogeneous connective tissue condition caused by abnormal collagen production. There are 6 types of EDS. Patients with Ehlers-Danlos syndrome, hypermobility type (EDS-HT), are thought to have an ineffective response to local anesthetic.

Results/Case report

We present a 13 year-old girl with EDS-HT who received effective popliteal-sciatic nerve blocks for post-operative analgesia for open exploration of her left ankle for peroneal subluxation. The patient and her parents have given permission for this presentation.

Her EDS-HT was diagnosed by the clinical criteria of joint hypermobility, joint subluxations with subsequent chronic pain, and a family history of EDS-HT in mother and sister. Mother reports failed anesthesia following skin infiltration of local anesthetic.

In 2013, the patient presented with peroneal subluxation after a horseback riding injury. In March 2013, skin infiltration of local anesthetic did not provide anesthesia for a steroid injection. In December 2013 during her initial operation, a popliteal-sciatic catheter was inserted using ultrasound and nerve stimulation guidance. She experienced appropriate analgesia.

In 2015, she returned for a similar procedure and a popliteal-sciatic catheter was inserted using ultrasound and nerve stimulation guidance. The block provided appropriate analgesia for approximately 24 hours until she started experiencing increasing pain. A challenge of 3% chloroprocaine did not provide relief or a motor block. The catheter was removed. Side effects from patient-controlled analgesia were unbearable, so the popliteal-sciatic catheter was reinserted using ultrasound and nerve stimulation guidance. She experienced appropriate analgesia.

Discussion

Ehlers-Danlos syndrome (EDS) is a autosomal-dominant inherited, heterogeneous connective tissue condition caused by abnormal collagen production.[1] There are six types of EDS. Ehlers-Danlos syndrome, hypermobility type (EDS-HT), is associated typically with a shortened or absent response to local anesthetics.

EDS-HT is clinically diagnosed.[1] Major criteria are generalized joint hypermobility (based on Beighton Hypermobility Score assessing joint mobility) and hyperextensible and/or smooth, velvety skin. Minor criteria include recurring joint dislocation, chronic joint/limb pain and positive family history. Fulfilling two major criteria is strongly indicative for a definitive diagnosis of EDS-HT.

Literature about patients with EDS-HT receiving PNBs is sparse.[2] A case report[3] presented a woman with EDS-HT who had appropriate depth and length of anesthesia for a supraclavicular block. However, she repeatedly had short 15 min responses to articaine for multiple dental procedures

Arendt-Nielsen et al[4] compared EDS-HT patients to controls for cutaneous anesthesia and depth of anesthesia. For both outcomes, EDS-HT patients had a shortened time of anesthesia after skin infiltration of lidocaine and insufficient anesthesia with EMLA as compared to controls. To determine whether this could function as a diagnostic test differentiating EDS-HT from Hypermobility patients (not EDS-HT), the same group repeated the experiment using EMLA comparing 1) EDS-HT patients, 2) Hypermobility patients, and 3) unaffected controls. Controls and hypermobility patients

had similar responses to EMLA; EDS-HT patients were significantly less responsive to EMLA for cutaneous anesthesia and depth of anesthesia. [5]

Knowledge about the interaction between EDS-HT and ineffective local anesthesia is poorly defined. Given the rarity of the disease, multicenter data collection may provide better clinical guidance.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1662
Scientific abstract: Education

A mixed reality simulator augmented with real-time 3D visualization helps develop a modified technique for accessing the thoracic epidural space

David A. Edwards, Rafael Vazquez, David Lizdas, Samsun Lampotang
Vanderbilt University

Introduction

Among several approaches to accessing the epidural space for placement of thoracic epidural catheters, the methods most frequently taught are the midline and paramedian approaches. With either approach, the needle is advanced blindly; most often, after needle contact with boney structures or ligaments, the subcutaneous structures are identified by tactile feedback and the needle is advanced toward the epidural space. Epidural space access can be especially difficult in patients with scoliosis, obesity, or who are unable to be positioned well (e.g. post-traumatic patients in lateral decubitus position).[1,2] Landmarks can be difficult to identify; subcutaneous 3D anatomy is challenging to visualize in one's mind's eye using only tactile feedback. Anatomical simulators facilitate improved understanding of the relative subcutaneous anatomy.[3,4]

Materials and methods (NA for case report)

During evaluation of a new mixed reality 3D simulator of the thorax, the authors were able, through visualization on a computer display, to re-evaluate their own technique of accessing the epidural space. The authors recognized that through the performance of a paramedian epidural, the needle was too distant from midline to identify structures between the skin surface and the lamina. Also, upon identifying the lamina with the needle, the authors realized that often they were very close to the epidural space of the caudal interspace. As a result of these new insights, a modified paramedian approach was developed on the simulator that allowed for improved tactile orientation of the needle on approach, followed by either entering the epidural space inferiorly off the lamina or proceeding superior-medially into the epidural space. After obtaining patient consent for epidural placement in 15 challenging patients, the authors supervised resident trainee performance.

Results/Case report

The modified paramedian approach was taught by the authors to 10 residents who successfully translated the technique and obtained the thoracic epidural space in 15 challenging patients.

Discussion

While the promise of mixed-reality simulation may be primarily for training, new insights gained by experts through heretofore unavailable 3D real-time, color visualization may help improve upon the technique, safety, and efficiency of current practice. Future studies will be needed to evaluate both the superiority of the modified paramedian approach in trainees on complicated patients, as well as the role of mixed reality simulation to enhance learning.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1663
Scientific abstract: Education

WHEN DISASTER STRIKES YOUR PRACTICE

David Zammit, Jonathan Gopman
Alliance Financial Group

Introduction

The goals of the presentation are to assist practitioners in protecting the most valuable asset for themselves and their family, establish a plan for the future handling of their assets and mitigate the tax impact along the way. The presentation will review a real world example of missteps that occurred in the life of a business owner and the impact that the failure had on the family.

Discussion

Will showcase a real world example of missteps that occurred in the life of a business owner and the impact that the failure had on the family. A selection from the following topics will be made that will give the audience an introduction to business concepts and initiatives they can implement to achieve their lifetime goals for themselves and their family. An example of these emerging trends would be: Tax Efficient Corporate Structures, Proper corporate agreements with partners and shareholders, Incent key employees without giving away the business, Importance of an effective Estate Plan, Protect your “Assets” with a family trust, Captive Insurance: Save Taxes, Create Operating Capital & Build Wealth, Strategic Management of Tax Liability when selling your business

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1664
Scientific abstract: Regional anesthesia

Comparison of periarticular infiltration to modified adductor canal blocks for postoperative analgesia following total knee arthroplasty: A randomized equivalence trial.

Rakesh Sondekoppam Vijayashankar, Olawale Sogbein, James Howard, Dianne Bryant, David Johnston, Edward Vasarhelyi, Steven Macdonald, Brent Lanting, Sugantha Ganapathy
Western University

Introduction

Adductor canal blocks (ACB) have been shown to provide adequate analgesia and spare quadriceps muscle strength but do not cover the posterior knee paina nd the tourniquet pain. We modified the technique of performing ultrasound guided adductor canal block (motor sparing block/MSB) by targeting the intermediate and medial cutaneous nerve of thigh while performing the ACB and combined it with the lateral femoral cutaneous nerve block and infiltration in the area of rudinger's plexus. The objective of the current study was to compare the duration of analgesia following MSB in comparison to a standard periarticular infiltration (PAI) analgesia.

Materials and methods (NA for case report)

Eighty two patients scheduled for elective TKA were randomized to receive either the preoperative ultrasound guided MSB (0.5% ropivacaine, 2.5ug/ml epinephrine, 10mg morphine, and 30mg ketorolac) or intraoperative periarticular infiltration (0.3% ropivacaine, 2.5ug/ml epinephrine, 10mg morphine, and 30mg ketorolac). All patients recieved opioid free spinal anesthesia for the surgery. The primary outcome measure was the time to first rescue analgesia which was defined as dynamic pain > 5/10 NRS. Secondary outcomes measured were quadriceps muscle strength (as measured by a hand-held dynamometer), static and dynamic pain scores, TUG test, narcotic consumption and length of stay.

Results/Case report

The Mean (SD) duration of analgesia was 17.86 (± 10.12 hr) with MSB comapred to 9.73 (± 10.34 hr) with PAI with a mean difference of 8.13 hours (95% CI -13.04 to -3.21), p<0.01. There were no significant differences between groups in quadriceps muscle strength at 20 minutes (p=0.57) or 6 hours (p=0.36) after block administration. Postoperative narcotic consumption, pain scores and length of stay were comparable between the groups at different time points.

Discussion

Modified technique of adductor canal block (MSB) provide longer duration of analgesia compared to periarticular infiltration while preserving quadriceps muscle strength. Pain scores, narcotic consumption and physiotherapy outcomes are comparable between the two modalities

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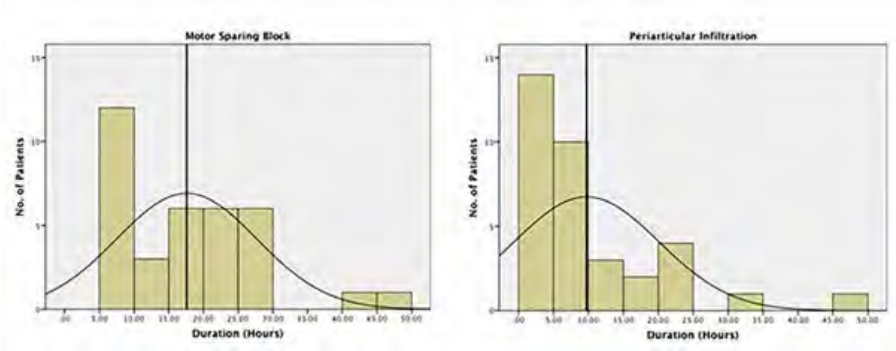
Tables/images



Analgesic duration of MSB versus PAI

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1665
Medically Challenging Cases (report of up to 4 cases)

Safe Use Of Epidural Anesthesia For Open Treatment Of Femur Fracture In An ALS Patient

Rebecca Scholl, Anna Korban, Jean Daniel Eloy
Rutgers--New Jersey Medical School

Introduction

Amyotrophic lateral sclerosis (ALS) is a progressive neurodegenerative disease that affects both upper and lower motor neurons. Patients suffer from muscle atrophy and weakness which eventually leads to respiratory failure and death. Providing safe anesthesia to these patients is challenging. General endotracheal anesthesia poses risks to aspiration, prolonged intubation, or fatal respiratory depression due to their extra sensitivity to muscle relaxants and pre-existing respiratory and bulbar muscle weakness. However, concern for exacerbation of their neurological disease with neuraxial anesthesia creates difficulty in deciding the safest anesthetic for ALS patients. We describe a case of epidural anesthesia for an orthopedic surgery.

Results/Case report

JD, a 78-year-old female with ALS, presented to the emergency department after a fall at home. She suffered a left femur fracture and was scheduled for an intramedullary nailing of her left femur. Her ALS symptoms included: dysphagia (dependent on PEG tube feeds), dysarthria, and respiratory weakness. She is unable to breathe supine, reliant on a nighttime non-invasive ventilator (volume 700-1300 mL, 12 breaths/minute, with cough assist) to prevent carbon dioxide narcosis while sleeping. Given her respiratory compromise, we chose epidural anesthesia for the operation.

Epidural anesthesia was performed between lumbar 3 and 4, via a midline approach, with a 17 gauge Tuohy needle in the right lateral position. The epidural space was located at 4 cm and the catheter was secured at 9 cm. The test dose was negative. Patient was subsequently placed supine with the head of bed elevated for improved respiratory efforts. The epidural catheter was bloused with 10 cc of 2% lidocaine. The level of epidural anesthesia was T10 after 7 minutes and she tolerated incision comfortably. Ketamine, 20 mg in divided doses, was given for sedation with oxygen at 6 L/minute via face mask. Intraoperative vital signs were stable. The patient maintained spontaneous ventilation and there were no complications in the surgery. After she demonstrated her baseline neurological function in the PACU, the epidural catheter was used for postoperative analgesia. Bupivacaine 0.0625% was infused via the epidural at 10 cc/hr. She experienced no respiratory or neurological exacerbation.

Discussion

The anesthetic management for patients with ALS remains controversial. The anesthetic choice depends on the severity of their disease. Both general and regional anesthesia have been performed safely. Patients with bulbar and respiratory involvement are at significant risk for aspiration and respiratory insufficiency after general anesthesia. Regional anesthesia is also relatively contraindicated for fear of exacerbating neurological dysfunction with the neurotoxic properties of local anesthetics. However, for patients with severe symptomatology, neuraxial anesthesia may be safer for select surgeries. Meticulous regional technique must be ensured to avoid blockade above T6, as this could lead to further respiratory compromise. Additionally, given the known neurotoxicty of local anesthetics, we infused our epidural catheter at half the concentration. It is imperative to conduct frequent neurological exams to detect any deterioration while the epidural is in place. This case describes successful neuraxial anesthesia for both the surgery and postoperative analgesia. Regional anesthesia may be a safer choice for ALS patients with tenuous respiratory function.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1666
Scientific abstract: Regional anesthesia

Does a Block Nurse Improve Timeout Compliance? The Re-evaluation of Timeout Compliance During Regional Anesthesia Training.

Jason Johns, Luke McCage, Anne Lehan, Jean-Louis Horn
Stanford University Medical Center

Introduction

Increasing emphasis has been placed on the performance of a pre-block safety pause or “timeout”. Previously we assessed timeout compliance according to trainee experience level and found it to be unsatisfactory, with an overall compliance rate of 56%.[1] After the addition of a dedicated block nurse we re-evaluated trainee compliance to the standardized pre-block timeout.

Materials and methods (NA for case report)

This project was approved by our IRB. One hundred surveys were filled out by the attending anesthesiologist supervising a resident or fellow performing a peripheral nerve block. The primary question was whether or not the addition of a dedicated block nurse would improve timeout compliance. We calculated the percentage representing overall timeout compliance when a dedicated block nurse was present. Then, using a chi square test compared this compliance rate to the rate prior to the addition of the block nurse. In addition, we again recorded the duration of the timeout.

Results/Case report

The addition of a dedicated block nurse improved timeout compliance from 56% to 99% at our institution (Graph 1). The calculated chi square value was 53.018 with a p value of < 0.0001. Similar to prior results, 76% of timeouts were performed in under 1 minute while the remaining 24% took between 1-5 minutes (Table 1).

Table 1:

Question	Total	Percent
Timeout took less than 1 minute	76	76/100 = 76%
Timeout took between 1-5 minutes	24	24/100 = 24%

Discussion

The placement of regional anesthetics inherently involves risks including: allergic reactions, infection, LAST, and wrong-site block.[2] Current literature and safety advisory boards, including The Joint Commission and WHO, advocate the use of checklists and safety pauses or timeouts as a method of mitigating patient risk. [3] In addition, ASRA also recently published its 9 point checklist meant to aid the regionalist in providing safer anesthesia care.[4] The timeout serves as a critical reminder to review this valuable safety checklist which prompts the individual to perform simple, but sometimes forgotten, tasks that help prevent error, prepare for complications, and assure proper block location. Previously we found that when we left trainees responsible for timeout initiation overall compliance was only 56%. However, with the addition of a dedicated block nurse compliance rose to 99%. Some view the time taken to perform a timeout as a “production barrier” but this is not the case however, given that seldom does it take longer than one minute to perform. The implementation of a block nurse is a practical approach to improving adherence to valuable safety protocols such as the timeout. Our concern is that trainees, and possibly many practicing anesthesiologists, frequently do not perform a timeout. In cases where this is occurring we recommend that a dedicated team member, such as nurse, be responsible for assuring timeout completion. Although the addition of a block nurse may not be feasible in all practices environments, more emphasis should be placed on developing a team that can assure adherence to valuable safety protocols and providing safer care for our patients.

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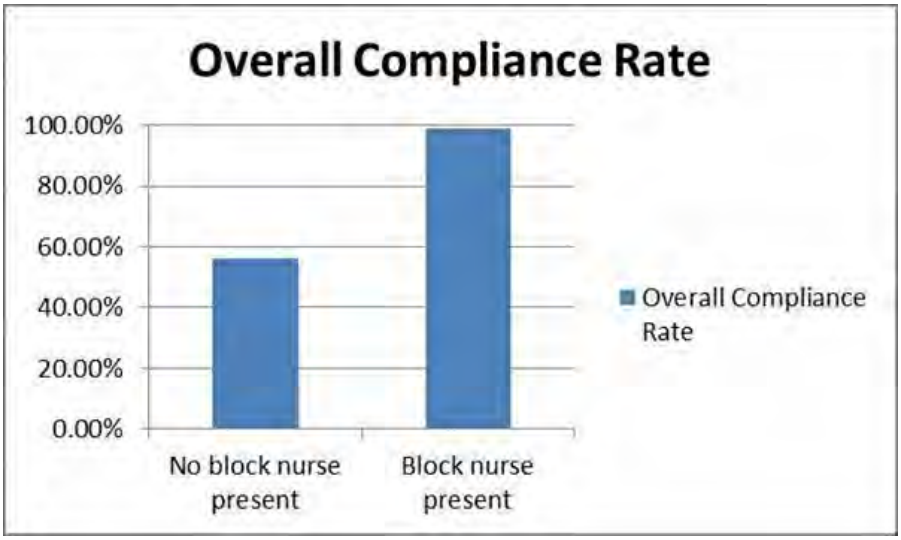
Tables/images



Graph 1

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1667
Medically Challenging Cases (report of up to 4 cases)

Phrenic nerve sparing analgesic management for an elderly patient with limited pulmonary reserve undergoing humerus ORIF

Yolanda Huang, Christopher Webb, Anthony (Robin) Brown
Columbia University

Introduction

Interscalene brachial plexus block (ISB) has been used extensively for postoperative analgesia in shoulder and proximal humerus surgeries [1]. However, this technique is associated with 100% incidence of phrenic nerve palsy, which results in an ipsilateral hemidiaphragm paresis, thus limiting its use for patients with limited pulmonary reserve. Studies have shown equivocal results as to whether low volume (5-10ml) ultrasound-guided ISB can reduce the incidence of hemidiaphragm paresis while not compromising postoperative analgesia [2-4]. Alternative regional techniques, such as the combination of infraclavicular plexus block with selective suprascapular nerve block or the combination of selective suprascapular and axillary nerve blocks, have been proposed as part of the postoperative analgesia plan for patients with impaired lung function undergoing shoulder surgery [5-7].

Results/Case report

A 77-year-old woman with systemic lupus erythematosus and bronchiectasis/chronic Pseudomonas infection was scheduled for an open reduction internal fixation of her left proximal humerus after she sustained a mechanical fall and failed non-operative management. Her preoperative FVC was 0.80L, 28% predicted and FEV1 of 0.57L, 27% predicted, indicating a restrictive ventilatory defect. She had adequate respiratory muscle strength as confirmed by normal MIP and MEP values. Given her poor baseline lung function, we performed ultrasound-guided selective suprascapular and axillary nerve blocks with 10cc of 0.5% ropivacaine at each site as part of the postoperative analgesia plan to limit opioid consumption. The suprascapular nerve block was performed at the suprascapular notch with the patient sitting up and leaning forward via the posterior approach [8]. The axillary nerve was identified first by ultrasonography and was then confirmed by using a nerve stimulator and observing contraction of deltoid muscle at 0.4mA current. The patient was induced with propofol and succinylcholine, and maintained on sevoflurane of 0.7MAC throughout the surgery. Her intraoperative course was uneventful however she failed attempted extubation on completion of the surgery due to shortness of breathe. She was reintubated and transferred to the intensive care unit. After aggressive chest physiotherapy, prophylactic intravenous antibotics, and stress dose steroids, she was successfully extubated on postoperative day 2.

Discussion

Patients with severe respiratory diseases are at an increased risk of developing perioperative pulmonary complication, such as pneumonia, unplanned intubations, and respiratory failure. Preoperative testing to assess patient functional status relative to baseline and to identify those patients who need further optimization before an elective surgery are essential in minimizing complication rates. Postoperatively, adequate analgesia can prevent the development of atelectasis. Strategies minimizing the usage of opioids, including regional techniques, can prevent unwanted respiratory depression as well as decrease the incidence of delirium in the elderly population. In this case, the pulmonologist and the anesthesiologist clearly conveyed to the patient and her family members the high likelihood of her needing postoperative mechanical ventilation support. Based on the fact that the patient had no use of her contralateral upper extremity secondary to nerve damage following the removal of a tumor, the patient and her family chose to proceed with surgery despite the risk.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1668
Medically Challenging Cases (report of up to 4 cases)

Over-Sedation with Ketamine

Kristina Coger, Melanie Donnelly
University of Colorado Denver

Introduction

Ketamine is an N-methyl-D aspartate (NMDA) receptor antagonist that is a dissociative anesthetic. NMDA antagonism produces analgesia, limits the development of opioid tolerance and can reduce opioid requirements by as much as 30-50%. Typically no respiratory depressant effects are seen when given in low doses, making infusions feasible outside of the OR. Adverse effects include nausea/vomiting, hallucinations, anxiety/agitation, somnolence, and hypertension.

Results/Case report

A 49 year-old male with a history of chronic recurrent left shoulder pain following initial injury 15 years ago complicated by recurrent dislocations and peri-prosthetic joint infections s/p multiple revisions presented for left humerus reconstruction . The surgeon requested a post-operative block following a neurologic check. The patient had a stable intraoperative course and received a total of 2 mg midazolam, 600 mcg fentanyl, 100 mg ketamine, and 6 mg hydromorphone.

A left interscalene brachial plexus catheter was placed in the PACU and the patient's pain was well-controlled. He resumed his home pain regimen of oxycontin, fentanyl patch, prn oxycodone, amitriptyline, and pregabalin, and was started on acetaminophen, meloxicam, hydromorphone PCA and a ropivicaine infusion.

On post-operative day (POD) 1, the catheter migrated and became non-functional. He was given toradol and started on a ketamine infusion at 10 mg/hr with a 10 mg bolus with adequate pain control. Overnight, pain was poorly controlled leading to large boluses of ketamine. The ketamine protocol allowed for multiple boluses, but the patient also experienced over-sedation so the infusion was stopped and re-started multiple times by nursing staff. By POD3, the patient was noted to be unresponsive on a rate of 50mg/hr, but vitals were otherwise stable. Ketamine was weaned and PO medications increased based on clarifications of the patient's home regimen. On POD4 all IV pain meds were discontinued and he was discharged home on POD5.

Discussion

The ketamine protocol in place allowed the nurse to titrate from 5-30 mg/hr. The night of POD2 the nurse contacted the pain resident who ordered further increases in ketamine. The protocol included scheduled evaluations for side effects and sedation level. Clearly this patient received an overdose of ketamine without a call to the pain resident. By morning rounds, this patient was on greater than 1mg/kg dosing, sufficient to induce general anesthesia. From this case, the following process changes were made to the ketamine infusion protocol to improve patient safety:

- Remove RN titration protocol
- Remove RN bolus dose
- Initiate dose at 5-10 mg/hr with adjustments only by orders from provider
- Require provider assessment prior to increasing dose above 15 mg/hr
- Require provider assessment and attending approval prior to increasing doses above 30 mg/hr
- Require ICU level care for dosing above 30 mg/hr

In review of this case, strong consideration should have been given to nerve catheter replacement given the patient's chronic pain history. Inadequate pain service coverage over the weekend could be improved with better communication of the plan for complex pain patients. With these changes, perhaps decreased doses of ketamine would have been administered to this patient.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1669
Medically Challenging Cases (report of up to 4 cases)

Continuous bilateral sciatic nerve blocks in a patient with bilateral lower extremity burns requiring early ambulation

Marsha Ritter Jones, Manisha Trivedi
University of Pittsburgh Medical Center

Introduction

Regional anesthesia has been suggested to be beneficial for the management of acute and perioperative pain associated with burns.[1] Bilateral lower extremity burns present the regional anesthesiologist with a choice of approach: neuraxial or bilateral peripheral nerve blocks. It is recommended that patients with lower extremity burns ambulate as soon as possible after skin graft.[2] As with knee replacements, peripheral nerve blocks may provide better pain management with fewer side effects and permit early ambulation for burn victims.[3] In addition, each nerve block infusion can be adjusted independently. Here we report the use of bilateral continuous sciatic nerve blocks for a patient with bilateral lower extremity burns.

Results/Case report

The patient is a 27-year-old female who sustained thermal partial-thickness burns to the bilateral posterior thighs and circumferential calves, totaling 15% total body surface area. Her past medical history was significant for untreated anxiety and depression. The Acute Pain Service was consulted 4 days post injury. Multimodal pain management was instituted which included placement (on day 5 post injury) of bilateral continuous sciatic nerve blocks via the gluteal approach using ultrasound. The infusion solution for the blocks was started at 0.03 (v/v)% bupivacaine at 5 mL/hour but was decreased to 3 mL/hour on the left due to decreased movement in great toe. She was also prescribed ketamine, acetaminophen, extended-release morphine, oxycodone, ketorolac, gabapentin and lorazepam.

Her spray skin graft was performed 6 days post injury; however, the nerve blocks were not used as part of the intraoperative anesthetic; they were restarted postoperatively. On the first day post graft, the concentration of both infusions was increased to 0.06 (v/v)% bupivacaine due to increased pain. She also received a left lateral femoral cutaneous nerve block for pain at the donor site. The patient reported improved pain relief and sleep with these additional interventions.

The sciatic nerve block catheters were maintained for 4 days, 3 of which were post graft. She started ambulating with a walker one day post graft with minimal assistance, ambulating 20 ft. On the subsequent day, the physical therapist reported that the patient was able to ambulate 30ft. Her tolerance of physical therapy improved daily. During the infusion of the nerve blocks, her average hourly opioid consumption was at its maximum 24 hours before the skin grafting (8.8 mg/hr morphine equivalents). Patient was discharged 12 days post injury, 6 days post graft to self-care at home. Two weeks post discharge, the patient's burns had healed and she had no residual pain.

Discussion

Regional anesthesia has been demonstrated to be beneficial for the management of acute pain and is suggested to be beneficial for treatment of pain associated with burns. In some patients, regional anesthesia has been demonstrated to decrease opioid consumption. The use of bilateral peripheral nerve blocks was advantageous in this patient because it allowed for early ambulation and independent adjustments of settings on each block. In addition, the patient experienced minimal side effects of opioids.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1670
Medically Challenging Cases (report of up to 4 cases)

Ultrasound guided supraclavicular block as primary anesthetic for a patient with dystrophic epidermolysis bullosa undergoing extensive upper extremity debridement

Cory Koenig, Margaret Stachurski, Cheryl Mordis, Ligia Cisneros-Gonzalez, Jaime Garzon-Serrano
Henry Ford Hospital

Introduction

Recessive dystrophic epidermolysis bullosa (RDEB) is a rare, genetic, dermatologic condition caused by mutations in genes which encode structural proteins that provide adhesion between the epidermis and dermis. Lack of these proteins results in severe bullous lesions from minimal skin trauma. We report a case of a patient with RDEB who underwent successful surgery using regional anesthesia after a failed office-based procedure under local anesthesia and sedation.

Results/Case report

A 25-year-old female with RDEB presented for bilateral axillary skin biopsies and debridement of her left upper extremity for multifocal squamous cell carcinoma after a failed office-based procedure under local anesthesia and sedation. Complicating factors included low body weight (40kg), joint contractures, increased aspiration risk with esophageal stenosis, extensive scarring of the body also including the supraclavicular fossa, chronic pain, and possible difficult airway.

After extensive pre-operative multidisciplinary discussion and cooperation with the patient, an ultrasound guided supraclavicular brachial plexus blockade was decided as the primary anesthetic.

Intra-operatively, after bilateral axillary skin biopsies were taken under local anesthetic infiltration with 10 mL of 1% Lidocaine and 10 mL of 0.25% Bupivacaine; the supraclavicular block was performed by the regional anesthesia team. Care was taken in patient positioning, skin asepsis preparation and ultrasound probe positioning to minimize pressure and shearing forces on the skin. After appropriate visualization on ultrasound with a high-frequency linear probe, a 22G, 50mm, insulated needle was introduced in plane towards the brachial plexus bundle. Fifteen mL of 0.5% ropivacaine was injected against minimal resistance around the nerve bundle. Complete motor and sensory block ensued shortly after while the surgeons prepped the patient.

Light sedation with 3 mg midazolam and propofol at 20-50mcg/kg/min was given intra-operatively and no airway instrumentation was required.

The patient did not require any pain medication in the post-operative care unit besides her home medications. She was discharged on the same day without any complications.

Discussion

RDEB can best be described as a multisystem disorder that creates many peri-operative challenges for anesthesia providers.

Avoiding trauma and shearing to the skin is essential to patient care as skin lesions create extensive scaring, retraction, and can predispose to skin cancer which results in frequent surgical procedures requiring anesthesia.

A known major challenge in patients with RDEB is the presence of a difficult airway. By performing a regional anesthetic, we were able to avoid any airway manipulation. An additional challenge, due to low body weight and bilateral axillary skin biopsies taken under local anesthesia, was to provide surgical anesthesia without causing local anesthetic toxicity. We performed a low volume supraclavicular block with Ropivacaine given its reduced cardiotoxic profile when compared to Bupivacaine. The peripheral nerve block provided surgical anesthesia throughout the 3 hours of the procedure and provided post-surgical analgesia for an additional 6 hours when sensory and motor function returned back to baseline.

Increasing evidence points to regional anesthesia as an alternative to general anesthesia when appropriate in patients with RDEB. In our case, regional anesthesia provided not only adequate surgical anesthesia, but also provided satisfactory analgesia minimizing opioid consumption.

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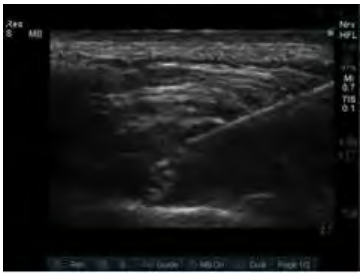
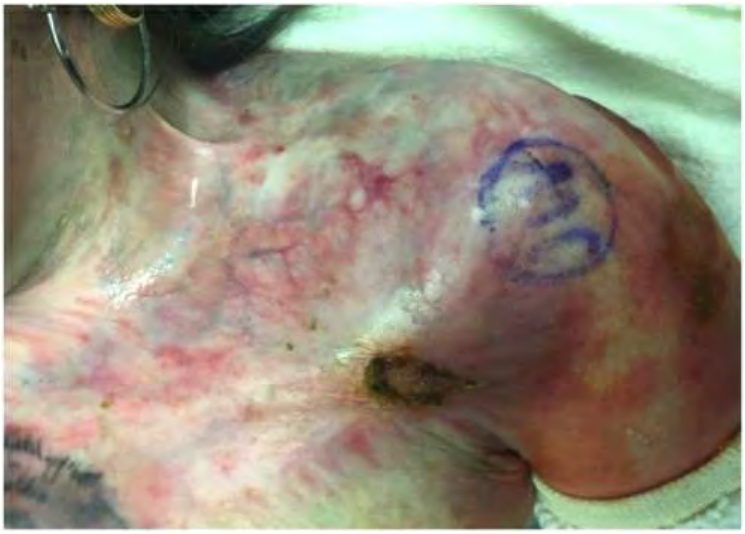
Tables/images





Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1672
Scientific abstract: Chronic pain

30 Day Readmission Rates Due to Pain at an Academic Inpatient Facility A retrospective study

Shawn Hughes, Rene Przkora
Univeristy of Florida

Introduction

30 day hospital readmission rates now serve as a metric to which quality of inpatient hospital care is measured.[1,2] It is therefore important to determine if certain subsets of patients are intrinsically at higher risk for readmission than other groups of patients. The purpose of this study is to determine the percentage of hospital readmissions at our institution which are due to pain and/or painful conditions. In particular, we would like to determine what percentage of readmissions are due to chronic pain.

Materials and methods (NA for case report)

30 day hospital readmission rates for all patients from April 2015 thru May 2015 was retrospectively collected from our institution's quality reporting database. The report was then queried for all patients whose admission descriptor listed pain and/or a painful condition (including "headache" and "ache").

Results/Case report

A total of 2016 patients were readmitted during the 3 month study period. Of those, 344 (17%) had pain or a painful condition listed as the admission reason. The specific admission reasons included chest/chest wall pain (159), abdominal pain (118), sickle cell crisis (14), back pain (9), chronic pain (3), flank pain (6), female pelvic pain (3), headache (4), generalized body ache (3) and musculoskeletal/joint pain (33).

Discussion

Pain accounted for 17% of our institution's 30 day hospital readmissions. Chest pain accounted for the majority (46%) of these patients. Back pain and chronic pain accounted for 3.4% of the readmissions during the study period. Chronic pain was not a significant portion of our institution's 30 day readmission patient population. However, further research is need to determine if chronic pain as a comorbidity has a significant impact on the likelihood of being admitted for other conditions.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1673
Scientific abstract: Regional anesthesia

Impact of preoperative versus postoperative femoral nerve blockade on recovery profile following hip arthroscopic surgery

Tamara Chambers, Kristropher Schroeder, Brittney Kohlnhofer
University of Wisconsin School of Medicine and Public Health

Introduction

The femoral nerve block has been well described in regional anesthesia literature and is frequently used for post-operative pain control for hip arthroscopy procedures. To our knowledge, the quantitative advantage of placing the block preoperatively compared to postoperatively has not been widely published. This study was conducted to test this popular hypothesis.

Materials and methods (NA for case report)

Following IRB exception, a retrospective chart review was performed of 190 patients presenting for a hip arthroscopy between 10/27/10 and 11/15/14. Three patient groups were compared: no femoral nerve block, preoperative femoral nerve block, and postoperative femoral nerve block. Groups were compared with respect to patient age, BMI; physical status classification according to the American Society of Anesthesiologists (ASA); total post-anesthesia care unit (PACU) and phase II time; self-reported pain scores collected during the PACU and phase II; presence of nausea or vomiting; total morphine-equivalent dose in the PACU and phase II; and fall rates.

Continuous variables are presented as means with standard deviations; categorical variables are presented as proportions with percentages. Univariate comparisons were performed by the Wilcoxon-Mann-Whitney test or Pearson's X^2 test as appropriate. Multivariable comparisons were made using logistic regression. A p value < 0.05 was considered statistically significant. All analyses were performed using SAS software (SAS 9.3, SAS institute, Cary, NC).

Results/Case report

Baseline characteristics of the study patients are presented in Tables 1a-c. There were 190 patients, 85 patients did not receive any block, 76 patients received a block preoperatively, and 29 received a block postoperatively. Patients receiving a preoperative block had higher ASA scores than those who did not receive a block. There were no significant baseline differences between patients who did not receive a block and patients who received a postoperative block. Patients who received a preoperative block had significantly lower pain scores in the PACU and in Phase 2, significantly lower opioid use in PACU and Phase 2, and spent significantly less time in PACU than those who did not receive a block. Patients who received a postoperative block had higher pain scores on arrival to the PACU, had higher peak pain scores postoperatively, spend more time in PACU, and had a higher opioid use in PACU and overall than either patients who received a preoperative block or patients who received no block. In a multivariable logistic model, preoperative block was significantly associated with lower postoperative pain in hospital and less time in PACU when controlling for baseline ASA score. There was no difference in Phase 2 time, antiemetic use, or fall rates.

Discussion

Femoral nerve blocks have been frequently utilized in hip arthroscopy surgeries, but the advantages of placing the block preoperatively compared to postoperatively have not been well contrasted against each other. This retrospective review validates that placing femoral nerve blocks preoperatively provides patients with better pain control, requires them to spend less time in the PACU, and use less opioids.

References

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Tables/images

Table 2c: Univariate outcomes among study patients receiving a preoperative block vs those receiving a postoperative block.

	Postoperative Block $n_i = 29$	No Block $n_i = 85$	p
Total postoperative time (hours)	4.2 ± 1.1	3.7 ± 1.0	0.022
PACU Time (hours)	1.5 ± 0.5	1.1 ± 0.4	< 0.001
Phase 2 Time (hours)	2.6 ± 1.0	2.6 ± 0.9	0.850
Peak postoperative pain	8.0 ± 2.0	6.5 ± 1.9	0.001
Pain on PACU Arrival	6.0 ± 3.2	3.8 ± 3.3	0.002
Peak PACU Pain	8.0 ± 2.0	6.1 ± 2.0	< 0.001
Pain on Phase 2 Arrival	3.9 ± 2.4	4.5 ± 1.9	0.142
Peak Phase 2 Pain	4.8 ± 5.2	5.1 ± 1.7	0.603
Postoperative Morphine Equivalents	26.1 ± 23.8	15.3 ± 11.2	0.015
PACU Morphine Equivalents	11.2 ± 12.0	5.2 ± 5.9	0.030
Phase 2 Morphine Equivalents	14.9 ± 17.7	10.1 ± 10.6	0.306
Any PACU Antiemetic	3 (10)	12 (14)	0.516*
Any Phase 2 Antiemetic	4 (13)	8 (9)	0.932*
Fall	3 (10)	1 (1)	0.207*

Variables are presented as mean ± SD or n (%) as appropriate.
P-values correspond to WMW test except as noted (*) for Pearson's χ^2 test

Univariate outcomes among study patients receiving a preoperative block vs those receiving a postoperative block.

Table 4: Baseline characteristics of patients

	Preoperative Block $n_i = 76$	Postoperative Block $n_i = 29$	No Block $n_i = 85$	p*
Age	42 ± 12	39 ± 11	39 ± 12	0.238
BMI	29 ± 11	29 ± 9	26 ± 5	0.102
ASA	1.9 ± 0.5	1.8 ± 0.7	1.6 ± 0.6	0.099

*Kruskal-Wallis Test

Baseline characteristics of patients

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1675
Medically Challenging Cases (report of up to 4 cases)

Spontaneous Intracranial Hypotension Successfully Treated with an Epidural Blood Patch

Justin Tsai, Aaron Darais, Jinesh Lachmansingh
Texas Tech University Health Sciences Center

Introduction

Intracranial hypotension predominantly presents subsequent to iatrogenic (e.g. intentional or unintentional lumbar puncture, neurosurgical procedures) and traumatic processes, but it can also present spontaneously. The incidence of spontaneous intracranial hypotension is estimated to be 1 per 20,000 per year, with a 3:1 female-to-male ratio, and a peak incidence in the 4th decade. We describe a case of spontaneous intracranial hypotension successfully treated with an epidural blood patch.

Results/Case report

A middle aged woman with a past medical history of metastatic breast cancer in remission, hypertension, and degenerative joint disease of the cervical spine presented with a 9 month history of a sudden onset positional headache. The headache was described as frontal pressure radiating to the occiput accompanied by diplopia, nausea, and debilitating malaise. The patient denied prior neuraxial procedures and provoking events prior to headache onset.

Clinical exam of the patient was unremarkable except for positional headache, and mild abducens nerve palsy. Contrast magnetic resonance imaging revealed diffuse meningeal enhancement, gross venous dilation, pituitary hyperemia, and mild sagging of the cerebellar tonsils.

The patient was placed in a seated position, and her left arm and lumbar back was sterilely prepped. A 17 gauge tuohy was inserted in the L3-L4 interspace, until loss of resistance by saline was detected. Thirty mL of sterile blood was obtained from the left cephalic vein, and slowly injected into the epidural space, terminating when the patient complained of discomfort in her lumbar spine. She was then instructed to remain flat for two hours.

Follow-up immediately after the procedure, 1 day, and 2 weeks post-procedure demonstrated that the patient had complete and sustained resolution of her headache and diplopia.

Discussion

Although intracranial hypotension is conventionally thought of as a process developing from CSF leak from iatrogenic or traumatic injury, it can also occur spontaneously, potentially due to congenital dural defects or acquired defects (e.g. metastatic disease, erosion from degenerative joint disease). Connective tissue disorders, although not present in this case, may also contribute in two-thirds of cases.

As the pathophysiology is thought to be similar, patients with spontaneous intracranial hypotension endorse the same clinical exam as patients with iatrogenic intracranial hypotension, demonstrating the characteristic positional headache, and potentially abducens palsy, photophobia, nausea, vomiting, auditory changes, and malaise.

MRI may reveal findings suggesting intracranial hypovolemia, namely subdural fluid collections, enhancement of the pachymeninges, engorgement of venous structures, pituitary hyperemia, and sagging of the brain.

Although it is counterintuitive, clinicians should not immediately rule out intracranial hypotension when a patient present with this constellation of post-dural puncture headache symptoms without an obvious mechanism for cerebral-spinal fluid leak, as this may lead to misdiagnosis and subsequent mismanagement of this underdiagnosed disease.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1676
Medically Challenging Cases (report of up to 4 cases)

A Case of Lumbar Epidural Anesthesia for Total Hip Arthroplasty Complicated by Apnea and Loss of Consciousness.

Christopher McLeod, Naveen Mehra, Benjamin Wallisch
University of Texas Health Science Center San Antonio

Introduction

Although with reported incidences as high as 11%, subdural catheter placement remains an underappreciated clinical consequence of neuraxial anesthesia. Presentation is often variable and recognition of the event is often retrospective. Classic features include an excessive sensory blockade, variable motor blockade, and sympatholysis not concordant with the administered local anesthetic dose.[1] As the subdural space extends intracranially, blockade of the brainstem causing apena and unconsciousness may occur.[2]

Results/Case report

We present the case of a 64 year-old female (152 cm, 84 kg) status post mechanical fall who presented for operative fixation of a left hip peri-prosthetic fracture. Her medical history included a childhood history of burns to the anterior neck, torso and lower back, insulin dependent diabetes mellitus, normocytic anemia, hypertension and dyslipidemia. Her past surgical history was significant for a left hip arthroplasty under spinal anesthesia at an outside facility. Per patient report, she was awoken after induction of general anesthesia and multiple failed intubation attempts. Her airway was a Mallampati 3 and she had limited neck range of motion due to significant scarring. A lumbar epidural was placed at the L4 level on the first attempt with a loss of resistance technique using saline. A test dose of 3 mL of 1.5% Lidocaine with epinephrine was negative for intrathecal or intravascular injection. An additional 10 mL of 2% Lidocaine was administered approximately three minutes later. Within ten minutes the patient achieved profound bilateral sensory block to the T4 level and the level continued to rise. She became hypotensive but responded appropriately to a small dose of ephedrine and phenylephrine. After twenty minutes the patient was still alert but dyspneic. Within another five minutes she became apneic and unresponsive. She was promptly intubated with a video laryngoscope. Her pupils were dilated bilaterally and unreactive to light. With concern for an intracranial process, a head computed tomography (CT) was performed and showed edema concerning for a left-sided middle cerebral artery ischemic stroke. Brain magnetic resonance imaging was then performed that showed no abnormalities. Approximately two hours after her epidural bolus the patient was regaining consciousness and met extubation criteria. The catheter was removed four hours post placement. She suffered no neurologic sequela and underwent an uneventful general anesthetic four days later following an extensive and un-revealing medical workup.

Discussion

Diagnosis of unintentional subdural injection requires a high index of suspicion. When it is suspected, continued use of the catheter is not favored. Diagnostic confirmation can be performed with live action fluoroscopy, CT epidurography or plain films.[3] In the current practice environment, clinical vigilance remains the most useful tool for prevention of unintended subdural anesthesia.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1677
Scientific abstract: Acute pain

Adductor Canal Catheter Improves Ambulation Following Total Knee Arthroplasty Compared to Local Infiltration Analgesia with Liposomal Bupivacaine

W. Michael Bullock, Stuart A. Grant, Mitchell R. Klement, Brian T. Nickel, Alexander Lampley, Joshua R. Dooley, Thorsten Seyler, Michael Bolognesi
Duke University Hospital

Introduction

Early functional recovery along with effective pain management are crucial for improving outcomes following total knee arthroplasty (TKA). A local infiltration analgesia (LIA) technique utilizing surgeon infiltrated liposomal bupivacaine was employed at our institution to minimize motor block and provide prolonged analgesia. Subsequently, an adductor canal (AC) catheter was used to provide analgesia while allowing for ambulation. Pain scores, ambulation, and length of stay (LOS) were reviewed from each of these distinct perioperative analgesic regimens.

Materials and methods (NA for case report)

A retrospective case series reviewing two continuous and subsequent analgesic protocols for TKA was approved by Duke University IRB. A base knee analgesia pathway was developed and used consisting of intraoperative spinal anesthesia and perioperative multimodal analgesia comprised of oral acetaminophen, pregabalin, celecoxib, and IV ketamine and dexamethasone. The initial patient cohort received LIA with liposomal bupivacaine accompanied by single shot femoral nerve block to allow for liposomal bupivacaine to take effect. The second cohort received preoperative ultrasound guided posterior capsule knee infiltration and AC catheter. Patients with the AC catheter were discharged home with an elastomeric disposable pump (OnQ, Halyard Inc.) to continue local anesthetic infusion at home.

Results/Case report

Retrospective analysis consisted of 58 patients in the LIA with liposomal bupivacaine group and 116 patients in the AC group. Both groups were comparable in age, gender, obesity, incidence of chronic pain and major co-morbidites. Patients with the AC catheter ambulated farther on both POD0 (median 16.5 vs 1.6 feet) and POD1 (median 165.6 ft vs 89.1 feet). Those in the AC group had a shorter length of stay (2.17 vs 2.87 days). Physical therapy follow-up was shorter in the AC cohort (7.6 vs 9.2 months). Lastly, fewer patients were discharged to rehab facilities (20.7% vs 33.3%).

Discussion

Regional anesthesia comprised of AC catheter and US guided posterior capsule infiltration improved post-operative ambulation and reduced LOS compared to LIA with liposomal bupivacaine. Utilization of the AC catheter reduced pain in PACU and on POD1 as compared to LIA, with supplementation of single shot femoral block, which hindered ambulation and provided worse analgesia. Furthermore, the AC catheter also reduced the number of patients requiring rehab without difference in adverse events. From data collected at our institution, AC catheter analgesia is preferred for better quality of analgesia, improvement of outcomes and reduction of health care costs compared to LIA using liposomal bupivacaine. A comprehensive analgesia pathway combining AC catheter and ultrasound guided posterior capsule infiltration and oral analgesic medications can improve both short and long term outcomes in patients after TKA.

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
Dr. Grant's institution has received funding for his research from SPR Therapeutics, Cara Therapeutics, and Durect Corp. Dr. Grant also acts as a consultant to BBraun Medical.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
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New Orleans LA

Abstract: 1678
Scientific abstract: Emerging technology

A PHASE 3 OPEN LABEL STUDY OF THE SUFENTANIL SUBLINGUAL 30MCG TABLET FOR TREATMENT OF ACUTE PAIN IN THE EMERGENCY DEPARTMENT

James Miner, Harold Minkowitz, Karen DiDonato, Pamela Palmer
Hennepin County Medical Center

Introduction

Pain is the most common reason people visit the Emergency Department (ED). Studies indicate however, that ED physicians often do not provide adequate analgesia to their patients as a result of gender and age bias, opiophobia and insufficient knowledge of and formal training in acute pain management. Novel classes of analgesics have recently been introduced, but many patients still suffer from acute pain in situations where immediate intravenous (IV) access may be unavailable. A sufentanil sublingual 30mcg tablet (ST30) is in Phase 3 development for treatment of moderate-to-severe pain in emergency medicine or battlefield trauma where there remains a clinical need for rapid-acting, potent analgesics that do not require an invasive route of delivery. ST30 is dispensed via single-dose applicator and appears well-suited for short duration acute pain management due to its early onset (plasma-CNS equilibration time of 6 minutes) and predictable off-set, resulting in part from a lack of active metabolites. The primary objective of this study was to evaluate the safety and efficacy of ST30 in the management of moderate-to-severe acute pain in patients presenting to the ED.

Materials and methods (NA for case report)

The study was multicenter and open-label, in patients 18 years and older, who presented to the ED with moderate-to-severe acute pain due to obvious trauma or injury evident on physical examination. Upon meeting all entrance criteria and providing IRB-approved informed consent, patients were administered a single dose of ST30 and remained in the study for 2 hours for safety and efficacy measurements. Efficacy was assessed by patient reports of pain intensity on an 11-point numerical rating scale (NRS), (0 = no pain, and 10 = worst possible pain). Safety was monitored via periodic measurement of vital signs and continuous monitoring of oxygen saturation, as well as assessment of adverse events (AEs) and the use of concomitant medications.

Results/Case report

Following enrollment of the first forty patients, an analysis was performed to assess top line safety and efficacy results. Significant reductions in pain intensity from baseline were observed in the first hour following ST30 treatment, with onset occurring within 15 minutes of dosing. Adverse events were few and mild to moderate in severity.

Discussion

The sufentanil sublingual 30 mcg tablet, while still investigational, has shown benefit as a non-invasive analgesic modality in this subgroup of patients in the ED where short-term treatment of acute moderate-to-severe pain is often needed.

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Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
Karen DiDonato and Pamela Palmer are employees of AcelRx Pharmaceuticals

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1679
Scientific abstract: Acute pain

Anesthetic Management of Incarcerated Umbilical Hernia Repair in a Patient with Child C Cirrhosis Utilizing Surgical Transversus Abdominis Plane Nerve Block

Shashank Saxena, David Yui, Catalin Ezaru
VA PITTSBURGH HEALTH CARE SYSTEM,UNIVERSITY DRIVE C

Introduction

Transversus Abdominis Plane (TAP) nerve blocks can provide post-operative analgesia for anterior abdominal surgery. There is limited literature on their use as surgical blocks or as primary anesthetics. This case will demonstrate the use of bilateral surgical TAP blocks in a male with end-stage liver disease (ESLD) undergoing an emergent incarcerated umbilical hernia repair.

Materials and methods (NA for case report)

A 58 year old male (69 inches /145lb/BMI 21.4) with a history of cirrhosis Child-Pugh Class C was admitted for an emergent incarcerated umbilical hernia repair. Comorbidities included hepatic encephalopathy, esophageal varices, type II diabetes, hypertension, and GERD. His vital signs in the pre op holding area were normal except blood pressure blood pressure (BP) of 80/51 mmHg. We were concerned about the adverse hemodynamic effects of general anesthesia in this patient. Since we wanted to avoid hypotension, use of vasoactive drugs which can all worsen hepatic function, we elected to proceed with a surgical bilateral TAP blocks . We performed bilateral TAP blocks using 20ml of 0.375% bupivacaine for each side. Propofol at 25mcg/kg/min, 100 mcg fentanyl and 25mg of IV ketamine was used intraoperatively. He required no airway manipulation and remained very comfortable during the entire procedure.

Results/Case report

Throughout the surgery, patient's vital signs remained stable with BP 84-98/53-69 mm Hg, without vasopressor support, O2 saturation 95-100% on 6 liters/minute O2 via face mask. The surgery time was 69 minutes. Patient was "extremely pleased" and required no postoperative pain medications for about 40 hours post procedure.

Discussion

The incidence of umbilical hernia in cirrhotic patients is about 20%[1].The morbidity and mortality of abdominal hernia repair in cirrhotic patient is higher than similar surgery in non cirrhotics, with a 7 fold increase in mortality with emergency surgery[2] in cirrhotics. Maniatis and Hunt reviewed the literature published between 1956 and 1995, reported that whereas elective surgery was associated with a mortality rate of 2%, emergency surgery showed a mortality rate of 14%. The incidence of morbidity and mortality after umbilical hernia repair in emergencies increases in advanced stages of liver cirrhosis with a study by Banu et al showing mortality of 22.7% with Child C Disease.

Jensen et al demonstrated the use of a bilateral TAP block for revision of abdominal wall defects without the use of sedation[5]. Our case presentation is to our knowledge the first time that a surgical TAP block has been used successfully in a patient with ESLD for incarcerated umbilical hernia repair. We avoided general anesthesia and provided good postoperative pain relief.

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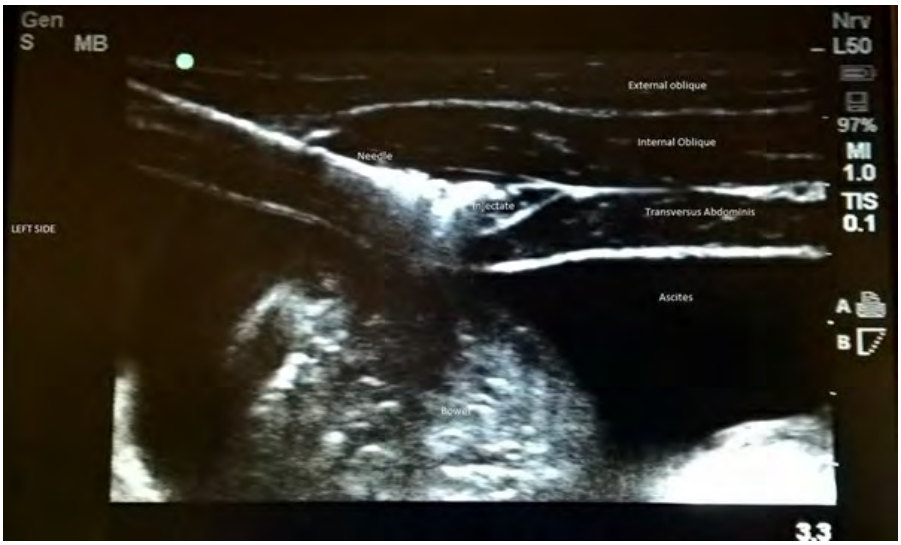

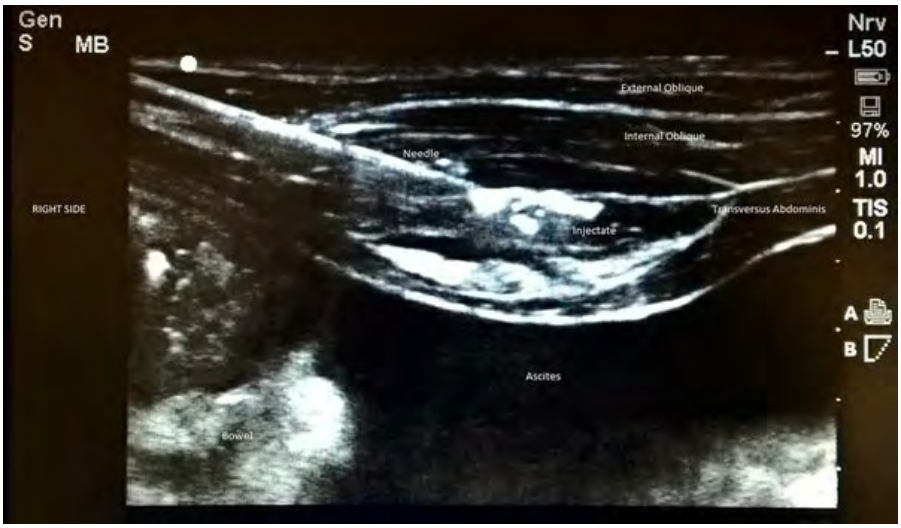

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1680
Scientific abstract: Emerging technology

Utilization of immersive 360 degree spherical videos for regional blocks: a novel and multi-dimensional way of learning

Shoeb Mohiuddin, Daniel Roshan, Rahul Guha, Christopher Chiang
University of Illinois at Chicago

Introduction

The current Millennial generation of medical residents more often use online and mobile devices to access informational resources compared to the use of textbook sources employed by the previous Gen X population. Many of these trainees have used online media for the majority of their education and are skillfully adept at employing electronic hardware and software. Currently, there is a second emergence for consumer virtual reality (VR) which has not generated this much interest since the 1990s. Compared to that time, huge technological advancements have been made to develop standards, convincing levels of immersion, and content. While not VR, 360 degree videos serve as an affordable and easily reproducible gateway to the immersive experience which VR poises to offer. Use of this new medium, creates a whole new opportunity to enhance the resident's educational experience that was not previously able to be achieved.

Materials and methods (NA for case report)

A 360 degree video spherical camera was utilized to record a brief video demonstration of a supraclavicular block and subsequently upload to popular video website, YouTube, which accepts and plays the 360 video format standard. Smartphones using both iOS and Android were placed in a Google Cardboard Version 2.0 approved cardboard box viewer. Testers loaded the video using the YouTube app on their smartphones, secured their phones in the cardboard box viewer, and either held the cardboard box viewer to their face or secured the viewer with a Velcro head strap. Testers were freely able to view the video in any 360 degree direction from the fixed standpoint of the camera by just turning their head.

Results/Case report

The initial trial to develop a basic 360 degree regional block video was successful. Testers displayed ease of use playing the 360 degree video using the YouTube app in both iOS and Android. Testers also reported satisfaction with viewing the 360 degree video on their smartphones without a cardboard box viewer. However, they acknowledged using a cardboard box viewer creates a more immersive environment which is not able to be accomplished just using a smartphone alone.

Discussion

A novel method for medical training was explored. The advantages of 360 degree videos over conventional 2D videos include the ability to view multiple apparatuses and events concurrently, improve situational awareness, and mimic the ability for the viewer to be physically present in the room. Future work will aim to optimize video quality and hardware to enhance the viewer's immersion. Further medical curriculum development will aim to provide instructional videos for all regional block procedures.

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Information technology and its role in anaesthesia training and continuing medical education
Chu, Larry F. et al.
Best Practice & Research Clinical Anaesthesiology , Volume 26 , Issue 1 , 33 - 53

Tables/images

Supraclavicular block being recorded in 360 degree video format.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1681
Medically Challenging Cases (report of up to 4 cases)

Treatment of Post-Dural Puncture Headache (PDPH) with Sphenopalatine Ganglion Block (SPGB) in a Pediatric Patient w/ Cervical Syringohydromyelia Presenting w/ Acute Altered Mental Status (AMS) s/p Vaccination Series vs Tic Bourne Infection

Preet Patel, Shruti Shah, Scott Mellender, Shaul Cohen
Robert Wood Johnson Medical School

Introduction

Post-Dural Puncture Headache (PDPH) is a debilitating complication of lumbar puncture (LP) characterized by a vicious cycle of immobility, weakness and depression [1]. Numerous treatments have been applied for the proper management of PDPH but their safety and efficacy still need improvement.

Results/Case report

A 17 y/o F w/ PMHx/o PCOD & IBS was admitted to PICU w/ AMS and h/o of clonic movements in UE/LE's. Two days prior to presentation, the patient complained of B/L extremity weakness while at work. Later that day, symptoms progressed as she developed confusion and began experiencing spontaneous, clonic movements in all extremities. Patient denied incontinence or post-ictal period. Patient's father took her to an ED where they suspected dystonic reaction and administered diphenhydramine and then lorazepam (1 mg) which broke the movements. Labs were normal and urine toxicology was negative. The next day, patient was seen by pediatric neurology and had normal EEG. They determined that the etiology was unlikely to be neurological in origin and recommended f/u w/ ID. The evening prior to admission, the patient's clonic movements persisted and she began experiencing new onset visual hallucinations. In addition, the patient's mother also found two ticks (embedded, not engorged) on the patient's posterior knee and abdomen just prior to presentation in our ED. The patient had been hiking earlier in the week. On PE, no fever or rashes were noted. No recent travel history. The patient received Yellow Fever vaccine (4 weeks prior), meningococcal conjugate booster (Menactra) and hepatitis A booster (10 days prior) and typhoid vaccine (PO 5 and 3 days prior). Patient reported feeling feverish for 3 days following her booster vaccines. LP, head CT w/o contrast, brain MRI w/ & w/o contrast and lumbar spine MRI w/ & w/o contrast were negative. During her stay in the PICU, patient developed a postural frontal headache suspected to be PDPH secondary to LP. Headache was effectively treated w/ SPGB.

Discussion

Therapeutic epidural blood patch (EBP) is currently the standard of care for post-LP cephalalgia with a success rate ranging from 68% - 90% [2]. Epidural blood patches are known to be associated with negative sequelae, including subdural and epidural hematoma, needle trauma, back pain, meningitis, and a possible second dural puncture [3, 4]. Thus, we are advocating the use of sphenopalatine ganglion block (SPGB) as a first-line treatment for PDPHs. SPGB is a noninvasive anesthetic intervention with minimal adverse effects and high efficacy [5, 6]. It can be performed by inserting a cotton-tipped applicator saturated with 5% water-soluble lidocaine ointment through each nares bilaterally and positioning the end of the applicator tip just superior to the middle turbinate and anterior to the pterygopalatine fossa and sphenopalatine ganglion for 10 minutes with the patient in supine position. Acute stimulation of the SPG with good anatomical and physiological placement leads to rapid termination of severe headache [7, 8].

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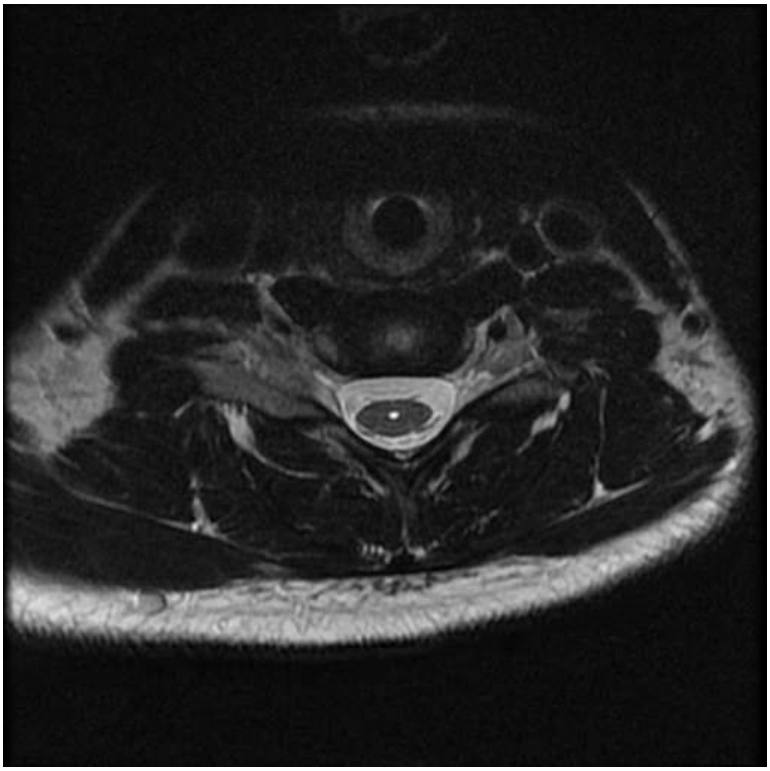
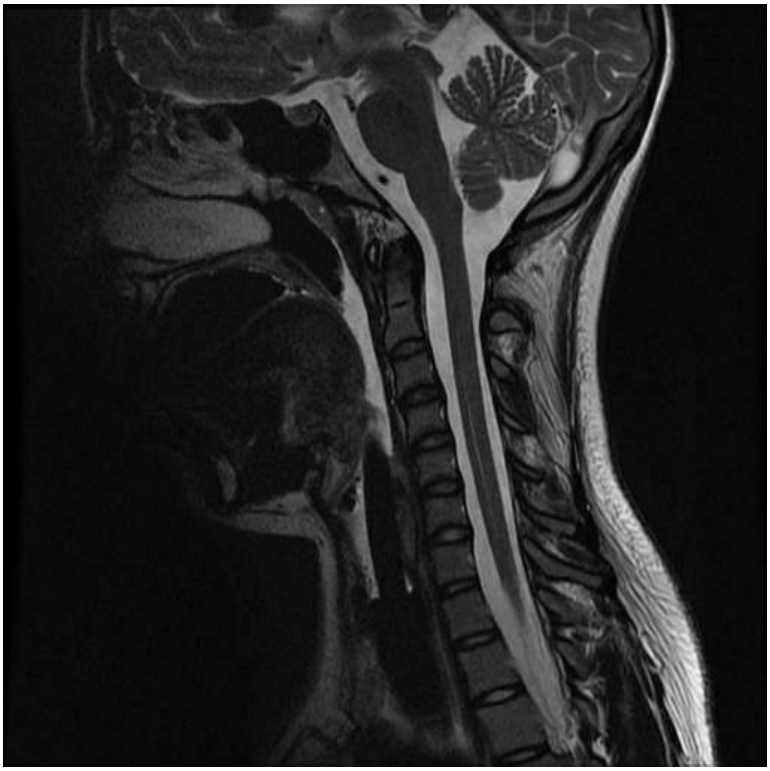
Tables/images



Cervical and thoracic spine MRI w/ & w/o contrast revealed syringohydromyelia of the cervical and upper thoracic spinal cord w/o associated enhancement or intraspinal lesion.



Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1682
Scientific abstract: Regional anesthesia

Adductor canal catheter displacement rates after total knee arthroplasty

Evan Sutton, Jeff C. Gadsden
Duke University

Introduction

Perineural catheters are an increasingly popular technique for providing long-lasting perioperative analgesia. However, catheter displacement rates have been reported to be as high as 25%.[1] The primary analgesic element in our total knee arthroplasty (TKA) program is an adductor canal catheter, which is simple to place, and has been shown in some studies to provide equivalent analgesia as femoral nerve blockade.[2] Despite this, we have noted that some patients continue to have pain scores >5/10 on postoperative day 1. We undertook a prospective, observational study to determine the rate of displacement of adductor canal catheters in this population.

Materials and methods (NA for case report)

22 patients undergoing TKA were recruited, and received the following preoperative regimen: spinal anesthesia with 12.5 mg bupivacaine, posterior capsule blockade with 0.25% ropivacaine, and an adductor canal catheter, bolused with 15 ml of 0.25% ropivacaine. The catheter was infused with 0.2% ropivacaine at 8 ml/hr postoperatively for 4 days. Three ultrasound videos were recorded of the catheter in the adductor canal using 10 ml of saline as a surrogate for catheter tip location: at placement preoperatively; on arrival to the PACU; and at POD#1. Sensory block at the medial malleolus, pain at rest/with movement, 24 hour opioid consumption, sleep disturbance and satisfaction were also recorded. If at any time the catheter was deemed to be displaced by the anesthesiologist performing the scan (defined as the absence of spread of injectate adjacent to the anterolateral aspect of the femoral artery), the catheter was replaced, and the patient's participation in the study concluded. A blinded investigator reviewed the videos and graded them as displaced or non-displaced.

Results/Case report

All catheters were placed successfully preoperatively. 2 catheters (9%) were displaced in the PACU, and 4 (18%) were displaced by POD#1. Pain scores, 24 hour opioid consumption, satisfaction and sleep quality were not significantly different at any time (Table 1).

Discussion

Our results suggest that adductor canal catheter displacement rates are high (27%) in the first 24 hours following TKA. Despite this, there was no difference in pain scores, and only a trend towards increased opioid use in the group who had their catheters displaced. The reason for this is unclear, but may relate to the passable, but not superb, effectiveness of the adductor canal block in the TKA population. Adductor canal blocks have been shown to preserve quadriceps power,[3] but there is some controversy as to their analgesic value. The mean pain scores in the *non-displaced* group (4.6-6.4) suggest that patients are not completely comfortable, despite round-the-clock multimodal analgesia with acetaminophen, pregabalin, celecoxib, oxycodone, and dexamethasone. Two patients stated their pain was posterior, whereas the remainder reported "anterior", "whole knee", "front" or "medial" pain, further suggesting an underperformance of the anterior block. It is unknown whether the tourniquet had an effect on the displacement rate, and a comparison with postoperatively placed catheters is probably indicated. In addition, alternative forms of long-lasting analgesia such as encapsulated local anesthetics may be of value in these cases.

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Tables/images

	All subjects	Subjects with intact catheters on POD#1 (n=16)	Subjects with displaced catheters on POD#1 (n=4)*	p-value
POD#0 (Recovery room)				
Sensation at medial malleolus (mode, range) (0=none, 1=partial, 2=full)	0 (0-1)	0 (0-1)	0 (0-1)	N/A
Worst pain at rest (mean±SD (range))	2.5±2.9 (0-8)	2.4±2.6 (0-7)	1.8±3.5 (0-7)	0.66
Worst pain with knee flexion (mean±SD (range))	3.1±3.6 (0-10)	3.1±3.2 (0-8)	2.0±4.0 (0-8)	0.55
POD#1				
Sensation at medial malleolus (mode, range) (0=none, 1=partial, 2=full)	0 (0-2)	0 (0-1)	2 (2-2)	N/A
Worst pain at rest (mean±SD (range))	4.9±2.5 (0-10)	4.6±2.6 (0-10)	6.0±2.0 (5-9)	0.34
Worst pain with knee flexion (mean±SD (range))	6.8±1.8 (2-10)	6.4±1.8 (2-10)	8.0±1.6 (6-10)	0.13
Opioid consumption over 24 hours, morphine equivalents (mean±SD)	53.3±17	50.0±17	66.25±13	0.08
Mean patient satisfaction (0-10)	8	7.7	8.8	0.52
Difficulty sleeping due to pain (n, %)	5 (25%)	4 (25%)	1 (25%)	1.0

Table 1. Descriptive and simple analytic statistics

Disclosures

I confirm that I am aware of conflicts of interest in my presentation.
Details:
GADSDEN: Consulting fees for Pacira Pharmaceuticals, consulting fees from B.Braun Medical; Speaker's bureau for Mallinckrodt Pharmaceuticals

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1683
Medically Challenging Cases (report of up to 4 cases)

The Use of an Intrathecal Catheter, Sphenopalatine Ganglion Block, and Blood Patch to Treat Accidental Dural Puncture with Post Dural Puncture Headache

Oren Ambalu, Preet Patel, Shaul Cohen
Rutgers - Robert Wood Johnson Medical School

Results/Case report

A 32 yo, 5'7", 86kg, G2P1 parturient presented at 39 weeks pregnant for a repeat C-section. She had a walking labor epidural for her first pregnancy, which was later converted for a c-section due to failure to progress. Her first pregnancy was complicated with a post partum headache, which improved after a blood patch was administered. The anesthetic plan for the repeat c-section was combined spinal-epidural analgesia. The patient was put in the sitting position, the skin was prepped with betadine, and a sterile drape was placed. The L4-L5 interspace was identified using a midline approach. Upon advancing the 17G epidural needle slowly using the LOR technique, dural puncture was expected when free-flowing clear fluid was noticed through the needle at 6cm. A 19G epidural catheter was immediately inserted intrathecally and secured to her back at 11cm. Pain relief for C-section was achieved with intrathecal 3ml 0.5% isobaric bupivicaine, fentanyl 20mcg, epinephrine 100mcg, and 2ml CSF. The patient had an uneventful, pain free c-section with delivery of a healthy baby. The intrathecal catheter was kept in place for 2 days for prophylactic treatment of post dural puncture headache[1], and used for continuous spinal analgesia.

On POD1 the patient complained of a positional headache worse in the sitting position, which subsided when supine. A bilateral sphenopalatine ganglion block[2] was then performed using 2 cotton tipped applicators with 5% lidocaine water soluble ointment inserted into each nostril, followed by 1ml 4% lidocaine solution in each nostril and her headache resolved. On POD2 the spinal catheter was removed without complications and a sterile dressing was placed. On POD3 she complained of fluid leaking from her back, likely CSF, with recurrence of her headache. A blood path was performed with the patient in the lateral position to decrease CSF pressure at that insertion point. The skin was prepped with betadine and a sterile drape was placed. The L4-L5 interspace was identified using a midline approach. A 17G epidural needle was used with LOR at 7.5cm. The epidural space was confirmed using the gravity technique[3]. 20ml of blood taken sterilely from the patient's dependent arm was administered into her epidural space and a sterile dressing was placed. The CSF leak and headache resolved. She was discharged home with no further complications.

Discussion

This case demonstrates a multimodal approach to treatment of an accidental dural puncture and post dural puncture headache, including an intrathecal catheter, sphenopalatine ganglion block, and blood patch.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1684
Medically Challenging Cases (report of up to 4 cases)

Combined Spinal Epidural in a Patient with Prior Lumbosacral Laminectomies and a Spinal Cord Stimulator

Oren Ambalu, Preet Patel, Shaul Cohen
Rutgers - Robert Wood Johnson Medical School

Results/Case report

A 31 yo, 5'9", 125kg, G2P1 parturient presented at 39 weeks pregnant for a repeat C-section and elective bilateral tubal ligation. Her medical history includes asthma and chronic back pain due to a herniated disc at L5-S1, for which she had 2 laminectomies at L5-S1 and a spinal cord stimulator placed in the thoracic spine. The anesthetic plan for this procedure was combined spinal epidural analgesia. The patient was put in the sitting position, the skin was prepped with betadine, and a sterile drape was placed. The L4-L5 interspace was identified using a midline approach. A 17G Tuohy epidural needle was used with LOR at 6cm. A 26G Gertie Marx spinal needle was then inserted through the epidural needle with CSF return. 2.5ml 0.5% isobaric bupivicaine, 20mcg fentanyl, 100mcg epinephrine, and 1ml CSF was then administered into the subarachnoid space. The spinal needle was withdrawn and a 19G epidural catheter was threaded into the epidural space and secured at 11.5cm at the skin, with a sterile dressing placed over it. The catheter was aspirated with no blood or CSF return and no complaints of paresethesias.

The anesthetic achieved a T1 level sensory block and the patient had a pain-free procedure, with stable vital signs, and delivery of a healthy baby. The patient did complain of intraoperative nausea and pruritis, which were treated effectively with 8mg ondansetron, 10mg metoclopramide, 50mg diphenhydramine, and 0.12mg naloxone. An epidural catheter test dose was given at the end of the procedure, consisting of 3ml 1.5% lidocaine with 5mcg/ml epinephrine, without signs of intravascular or intrathecal injection. The catheter was left in for 2 days for postoperative pain control via an epidural infusion with PCA of a ropivicaine 0.025% and fentanyl 3mcg/ml solution. The catheter was later removed and patient was discharged home with no further complications.

Discussion

This case demonstrates the successful use of combined spinal epidural analgesia for a C-section and bilateral tubal ligation in a patient with a history of chronic back pain, two lumbosacral laminectomies, and a spinal cord stimulator.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1685
Scientific abstract: Regional anesthesia

Is Bilateral Nei-Guan Point (P6) Stimulation More Effective than Unilateral P6 stimulation in Reducing Nausea and Vomiting (N/V) During and After Cesarean Section (C/S) with Combined Spinal Epidural (CSE) Anesthesia?

Shruti Shah, Rong Zhao, Shaul Cohen, Preet Patel, Scott Mellender
Rutgers - Robert Wood Johnson Medical School

Introduction

Many studies have demonstrated that Nei-Guan Point (P6) stimulation is effective in treating intra-operative and post-operative nausea and vomiting (N/V) during a variety of surgical procedures [1-3]. Nausea and vomiting is a common problem in parturients undergoing C/S with CSE anesthesia. In this study we compare bilateral versus unilateral P6 stimulation in order to determine if one is more effective in the prophylactic treatment of N/V for parturients undergoing C/S with CSE anesthesia.

Materials and methods (NA for case report)

This is a retrospective review of 199 anesthesia records for parturients (ASA I-II) undergoing induction of CSE for C/S. Three groups were identified: Group I (GI, n=72) received no prophylactic anti-emetics, Group II (GII, n=76) received unilateral intra-operative P6 stimulation, Group III (GIII, n=51) received bilateral intra-operative P6 stimulation. IV ondansetron 4 mg + metoclopramide 10 mg were administered upon c/o N/V. An investigator recorded each of the following parameters: height, weight, gestational age, Apfel score (1-4), hypertension (>140/90), hypotension (<90 systolic), hypoxia (O2 Sat <85%), blood loss >700mL, efficacy of sensory block for C/S, evidence of N/V (Phase I: after epidural initiation, Phase II: after eversion of uterus, Phase III: after replacement of uterus, Phase IV: upon arrival to PACU), N/V treatment satisfaction, and overall satisfaction. Student's t-test, Chi-squared test and Fisher's exact test were used for statistical analysis. A p-value of <0.05 was considered statistically significant. Data was presented as mean ± S.D.

Results/Case report

There were no statistically significant differences between the groups with respect to age, weight, height, gestational age, Apfel score, incidences of hypertension, hypotension, hypoxia, efficacy of sensory block, blood loss >700mL, N/V during Phase II, III & IV and overall satisfaction. In Phase I, N and V scores was higher in GI than in GII or GIII. Also, N/V satisfaction scores were lower in GI than in GII and GIII (Table 1).

Discussion

Nei-Guan Point (P6) Stimulation is highly effective in reducing the incidence of N/V in parturients undergoing C/S with CSE. However, bilateral P6 stimulation is not superior to unilateral P6 stimulation for the prevention of N/V.

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Tables/images

	GI Control N=72 (%)	GII Unilateral P6 Stimulation N=76 (%)	GIII Bilateral P6 Stimulation N=51 (%)	p-value
N score during Phase I (epidural initiation)	4.79 ± 0.54 ł	1.91 ± 0.40 ł	1.98 ± 0.47 ł	$4.00 X10^{-6}$ *
N score during Phase II (eversion of uterus)	0.61 ± 0.27	1.18 ± 0.34	1.09 ± 0.38	0.41
N score during Phase III (replacement of uterus)	1.43 ± 0.39	1.31 ± 0.36	2.07 ± 0.48	0.42
N score during Phase IV (upon arrival to PACU)	0.39 ± 0.23	0.26 ± 0.18	0.60 ± 0.32	0.58
V score during Phase I (epidural initiation)	39 (54.17) ł	20 (26.32) ł	7 (13.20) ł	$3.08 X10^{-7}$ *
V score during Phase II (eversion of uterus)	7 (9.72)	12 (15.79)	5 (9.43)	0.54
V score during Phase III (replacement of uterus)	13 (18.06)	12 (15.79)	5 (9.43)	0.33
V score during Phase IV (upon arrival to PACU)	3 (4.17)	2 (2.63)	2 (3.38)	0.33
Nausea during procedure	42 (58.3)	32 (42.1)	29 (56.9)	0.10
Vomiting during procedure	26 (36.1)	21 (27.6)	9 (17.6)	0.08
N/V Treatment Satisfaction score	7.21 ± 0.27 ł	8.19 ± 0.28 ł	9. 11 ± 0.28 ł	$3.90 X10^{-5}$ *

Table 1 ?: Significant differences were found between GI & GII and GI &GIII, but not between GII & GIII.

Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1686
Scientific abstract: Chronic pain

Treatment of CRPS type I of both feet in a 3 year old child

Maged M. Mina
Spine and Surgical Hospital of South Texas

Introduction

Complex regional pain syndrome in Pediatrics is increasing in prevalence and reporting possibly due to more awareness with increased involvement of Pediatric Pain Practitioners . We are seeing influx of referrals to our practice as we present here a 3 Year, eleven months old child with CRPS of both feet .

Results/Case report

Our youngest case was a 3 year 11 month old male that underwent several ankle and foot surgeries for correction of clubfoot diagnosed at birth referred to us with extreme sensitivity of both feet worse on the left , does not like walking on grass or having any sheets over his feet . This started by being in a cast for both feet since he was 10 days old until after he was one year old when the casts were removed he was very sensitive. On Exam the child was very bright ,intellectually smart manifesting signs of allodynia , hyperalgesia , color changes of both feet on the dorsal and plantar aspects worse on the left consistent with CRPS type I. We discussed with his parents the condition with treatment options including Topical medications , Physical therapy to involve desensitization but the child was severely sensitive to touch which prompted us for admitting the child to our hospital for a placement of a Continuous Caudal Epidural Catheter under sedation with fluoroscopy then taken to recovery for intermittent bolusing of 0.25 % Bupivacaine to achieve sensory blockade of both feet during which the child underwent desensitization therapy and physical therapy modalities applied for several hours in the recovery room with the parents and child actively participating with the therapy after which the catheter was discontinued and the child discharged the same evening with instructions to continue the therapy as outpatient and at home ,then followed in clinic after two weeks later with great resolution of his symptoms with ability to handle touching and walking almost normal on both feet .

Discussion

Early diagnosis of CRPS in children is essential to initiate treatment mostly relying on Physical therapy modalities but education and awareness is key amongst different pediatric specialists for early recognition and referral for appropriate treatment to avoid long term sequelae with loss of function of the extremity . For Pediatrics Physical therapy is the key yet Regional blocks , as well as continuous epidural infusions with local anesthetics to achieve a sympathetic and sensory blockade are sometimes necessary to facilitate participation in physical therapy .

In our practice children with severe pain that cannot participate with physical therapy are admitted with a continuous catheter placed to achieve sensory blockade for extensive desensitization where the family gets educated and comfortable to manage the catheter as outpatient and followed by frequent visits . The use of continuous catheters is preferred than repeated single blocks to minimize discomfort .

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1687
Medically Challenging Cases (report of up to 4 cases)

Novel use of Bier Block in the Treatment of Refractory CRPS

Matthew Corriveau, Brian Monroe, Steven Goldberg
Geisinger Medical Center

Introduction

Chronic Regional Pain Syndrome (CRPS) is a pain condition affecting thousands of Americans each year. Despite a multitude of treatments available, data behind these treatments are lacking and most of these treatments are inconsistently effective. This report presents a patient with CRPS refractory to conventional treatments who achieved definitive palliation with sequential Bier block in combination with wrist fusion.

Results/Case report

The patient is a 40 year old male with history of tobacco abuse who after a traumatic fall resulting in a left distal radial fracture underwent open reduction and internal fixation with fasciotomy and subsequent internal revision with external fixation. Despite surgery he continued to have chronic pain in his left wrist with radiation to the dorsal aspect of his left hand and all five digits. His chronic pain failed to improve with conventional treatments including analgesics and physical therapy. He was then referred to our pain clinic for evaluation of his persistent left upper extremity pain. Physical examination revealed his hand to be diaphoretic and cool with a reddish-purple appearance. A presumptive diagnosis of CRPS was made and the patient underwent pharmacotherapy as well as interventional procedures including stellate ganglion block and intraarticular steroid injection. These measures proved to be only temporizing, or were discontinued secondary to intolerance of the procedure or adverse effect of pharmacotherapy. Subsequently a Bier block was performed utilizing lidocaine and clonidine which provided over two weeks of pain relief. This procedure was repeated four times over the following six months, with the addition of dexamethasone, and resulted in complete resolution of CRPS symptoms. Throughout the course of treatment, the patient continued to have acute mechanical pain with flexion and extension of his wrist. Once his CRPS symptoms were controlled, he underwent a trial of fixation with an external device which proved beneficial, and thus surgical fixation was performed. On follow-up after the surgical procedure, our patient remained free of all CRPS symptoms.

Discussion

This patient with symptoms refractory to standard CRPS treatments responded positively to successive Bier block, which then allowed him to return to the operating room for surgical fixation of his left wrist. The performance of a Bier block has been supplanted by other procedures for many of its indications. However, we found sequential Bier block to be effective for treating this patient's CRPS, and with a limited risk profile and possible benefit, Bier block should be considered similar cases of refractory CRPS. This is a novel utilization with no long term outcome data available and further research is warranted.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1689
Scientific abstract: Acute pain

Patient satisfaction scores and their correlation to the dose of opioids administered in the Perioperative period

Vimal Desai, Vishal Khemlani, Tony Lo, Melinda Eshelman, Esther Banh, Padma Gulur
University of California

Introduction

Patient experience has been promoted as a measure of quality of care. The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) is a survey designed to provide a nationally standardized indicator of patients' hospital experiences. Pain management is one of six major response composite categories reported. The Centers for Medicare & Medicaid Services (CMS) have linked payments for each hospital based on how well hospitals perform on the HCAHPS; almost $1 billion in total payments. Caregivers continue to rely heavily on opioid medications for pain management. There is growing concern that this monetary incentive related to patient satisfaction with their pain management may result in higher doses of opioids being prescribed.

Materials and methods (NA for case report)

We conducted an exploratory prospective study from 2014 to 2015 in patients undergoing major joints or spinal fusion surgery at our medical center. All the patients received standardized care under the perioperative surgical home (PSH) pathway for their respective procedures.

Of the 240 patients who underwent major joint surgery, 65 completed the HCAHPS survey on pain management and were included in the analysis. For spine fusion surgery 106 of 356 patients completed the survey and were included. The data on opioid administration during the perioperative period for these patients was then obtained and oral morphine equivalents calculated. Patients within each surgery group were further divided into those that were administered less than 100mg oral morphine equivalence (OME) per day and those that were administered more than 100mg per day. Patients who answered 'always (4)' for the question, "How well was your pain controlled?" were determined for each group and a t test was performed between the two OME groups for each surgery. The same was done for those patients who did not answer 'always'. Our analysis looked for a correlation between the average daily oral morphine equivalents administered during their length of stay compared to their HCAHPS scores using a Pearson correlation coefficient.

Results/Case report

HCAHPS surveys were completed in 65 of the 240 patients for major joint surgery during our study period and 106 of 355 for spine surgery. For the major joint group 37 patients used less than 100mg of OME per day and 28 used more than 100mg per day. For the spine group 77 were at less than 100mg OME and 29 were at greater than 100mg OME. For the question, "Was your pain well controlled?" 58% ($p = 0.01$) answered always in the major joints group for those taking less than 100mg OME/day and in our spine group 77% ($p=0.0007$) answered always in less than 100mg OME/day group. (Table 1,2,3,4 and Image 1,2)

Discussion

With the financial incentives tied to patient satisfaction scores, pain management may be influenced with higher prescriptions of opioids. In essence, for both our surgery groups, we found no correlation between dose of opioid administered in the perioperative period and patient satisfaction scores. Limitations of our study include the single center and sample size. The results do support that prescribing higher doses of opioids does not lead to better pain control or patient satisfaction.

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Tables/images

TABLE 1 Major Joints			
Total	240	HCAHPS answered	65
Male	31	Female	34
Age range	25-87	Age Average	63
Hispanic	10	Non-Hispanic	55
Total used <100 OME/day	37	Total used >100 OME/day	28

TABLE 1. Major Joints (Knees and Hip replacements) patient data and demographics

TABLE 2 Major Joints	Was you Pain well controlled?		
PERCENT	Always	Less than Always	
TOTAL	36	29	
<100 OME daily average	21 (58%)	16 (55%)	
>100 OME daily average	15 (42%)	13 (45%)	
t Stat	-2.94	-4.76	
t Critical two-tail	2.13	2.14	
P(T<=t) two-tail	0.0101	0.0003	
Correlation HCAHPS with OME	0.14		

TABLE 2. Major Joints (knee and hip replacement) - Patients receiving <100 Oral Morphine Equivalence per day (OME) gave better HCAPHS scores than those receiving >100 OME per day with statistical significance.

TABLE 3 Spine			
Total	355	HCAHPS answered	106
Male	40	Female	66
Age range	20-84	Age Average	61
Hispanic	6	Non-Hispanic	97
Total used <100 OME/day	77	Total used >100 OME/day	29

TABLE 3. Spinal fusion surgery - patient data and demographics

TABLE 4 SPINE	Was you Pain well controlled?	
PERCENT	Always	Less than Always
TOTAL	57	49
<100 OME daily average	44 (77%)	33 (67%)
>100 OME daily average	13 (23%)	16 (33%)
t Stat	-4.55	-5.18
t Critical two-tail	2.18	2.11
P(T<=t) two-tail	0.00066	0.00008
Correlation HCAHPS with OME	0.09	

TABLE 4. Spinal fusion surgeries - Patients receiving <100 Oral Morphine Equivalence per day (OME) gave better HCAPHS scores than those receiving >100 OME per day with statistical significance.

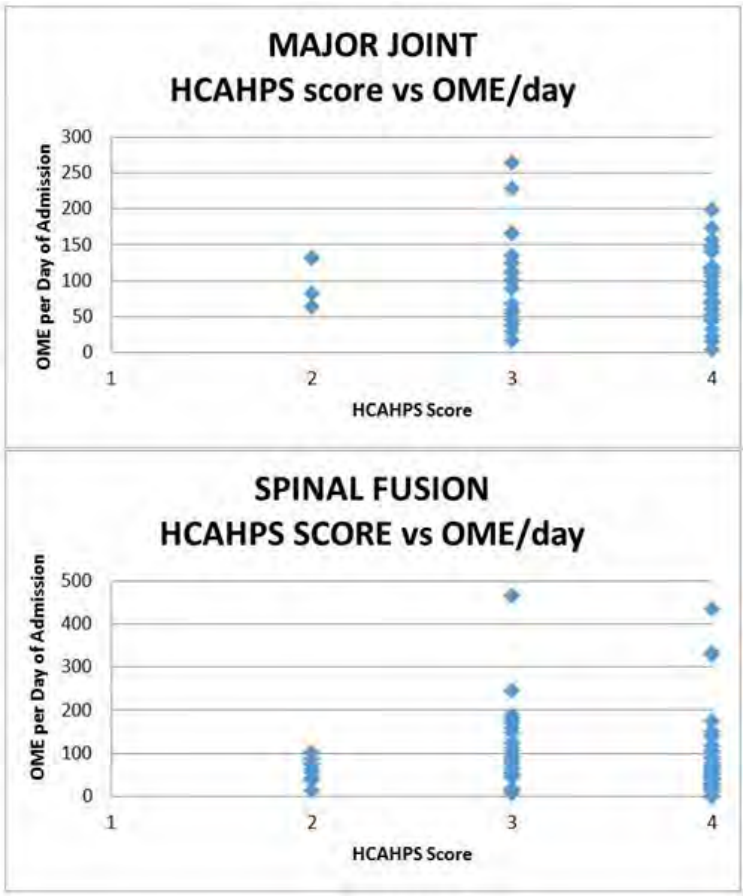

Image 1 & 2 - Scatter plots of HCAPHS score against total OME used on average per day of admission for the Major Joint group and the Spinal Fusion group

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1691
Medically Challenging Cases (report of up to 4 cases)

The Successful Use of Peripheral Neuromodulation in Focal Periscapular Pain

Shruti Patil, Steven Severyn
The Ohio State University Wexner Medical Center

Introduction

Peripheral nerve stimulation can benefit patients with chronic, focal neuropathic pain, complex regional pain syndromes, and post-herpetic neuralgia affecting 1 or 2 dermatomes[2]. We report the successful use of peripheral nerve stimulation in a patient with chronic, refractory, focal neuropathic pain.

Results/Case report

Patient is a 37-year-old male who presented with pain localized over the left inferior medial scapular border. He has a history significant for a desmoid tumor wrapped around his thoracic spinal cord and soft tissue. He subsequently underwent 3 resections in 1996, 1999, and 2001. Following his second surgery, he required a large muscle graft due to the significant amount of muscle previously removed. His medical history is further complicated by traumatic injury following a MVA in 2000. Patient followed with an interventional pain specialist in the community for several years and had tried epidural steroid injections, medial branch blocks, nerve root injections, and radiofrequency ablations unsuccessfully. He was referred to our service after it was determined that there were no additional injection treatments or neurosurgical interventions that were appropriate. We discussed neuromodulation therapy with the patient and proceeded with a peripheral neural stimulator trial. Two Medtronic left longitudinal 8 electrode periscapular leads were placed and trialed for 5 days. The patient was found to have >50% left scapular pain relief, and we proceeded to schedule the patient for permanent implantation of the peripheral nerve stimulator.

Discussion

The field of peripheral neuromodulation has evolved and proven efficacious over several years. It now includes occipital nerve stimulators for migraines, trigeminal branch stimulation for craniofacial neuropathic pain, and subcutaneous nerve stimulation for areas not treated with spinal cord stimulation[3]. However, several factors need to be considered when implanting peripheral nerve stimulators (PNS). The depth of electrode placement is a key aspect to the successful implantation of PNS. Electrodes are typically placed superficially in the subcutaneous layer of the painful area. If the electrodes are placed too superficial or deep, the stimulation will result in pain or ineffective stimulation respectively. It is recommended that the electrodes be placed 1 cm below the skin surface[1]. Per recommendations, we placed our electrodes superficially in the subcutaneous layer. Given that the patient's localized pain was improved with placement of the leads specifically in that area, we conclude that the patient had a successful trial and would benefit from permanent implantation.

Patient consent was obtained for presentation of this case report.

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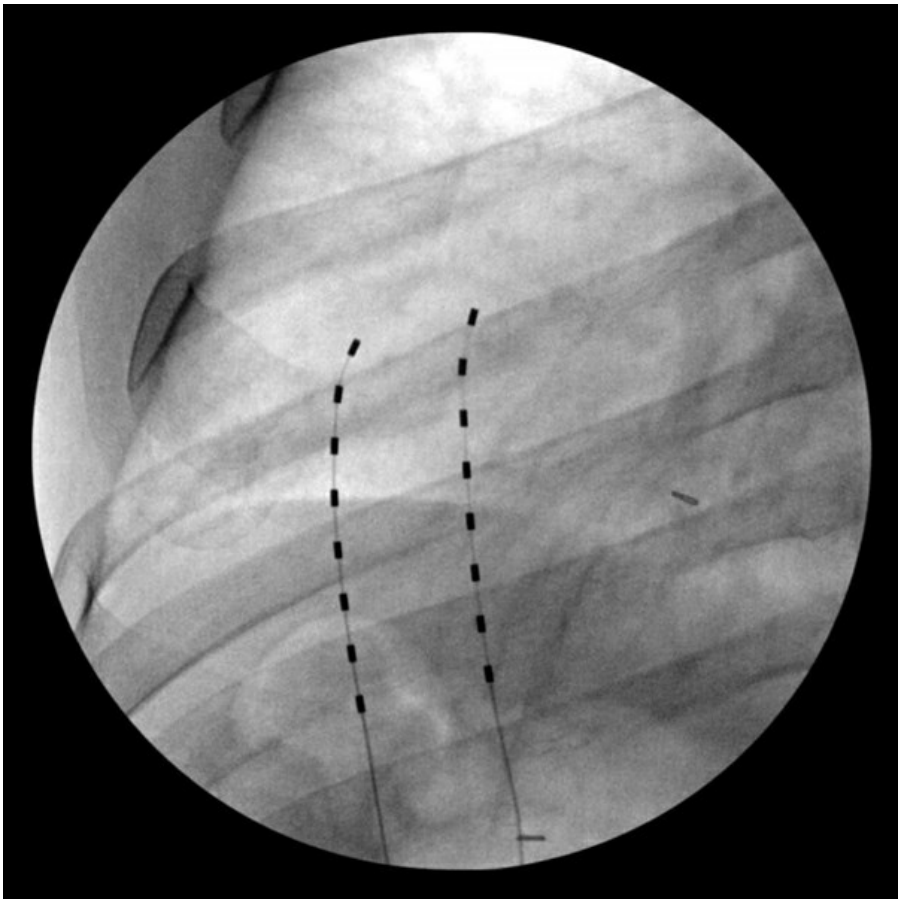
Tables/images



Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1696
Scientific abstract: Regional anesthesia

Comparison of efficacy and safety of perihamstring local anesthetic injection to obturator nerve block for graft donor site pain following Anterior Cruciate Ligament (ACL) repair. A randomized double blinded study.

Rakesh Sondekoppam Vijayashankar, David Johnston, Vishal Uppal, Robert Giffin, Robert Litchfield, Sugantha Ganapathy
Western University

Introduction

: Arthroscopic anterior cruciate ligament (ACL) repair with an ipsilateral hamstring-gracilis graft can result in significant pain both from the graft donor site and the knee joint itself. Isolated sensory block of the surgical and graft site without motor block is the Holy Grail in search for these ambulatory patients. Novel regional techniques of analgesia aimed at preserving motor power include adductor canal blocks (ACB), blocking the infrapatellar branch of saphenous nerve and graft site injections of local anesthetics through the arthroscopic sleeve. ACB has shown to provide adequate analgesia following knee arthroscopy but strategies to prevent graft donor site such as deposition of local anesthetics around the harvested muscle (Hamstrings block) or blockade of the nerve supplying the gracilis (Ant. division Obturator nerve block) have not been explored for this purpose in a randomized fashion. We hypothesized that the any of the above two techniques to control donor site pain not superior to ACB alone. The primary outcome was post-operative pain scores at 4 hour after arrival to PACU. The secondary outcome measures were first 24 and 48 hour pain scores, time to first rescue analgesic, site of pain, failure rate, motor weakness and 24 hour analgesic consumption

Materials and methods (NA for case report)

After institutional review board approval and written informed patient consent, 105 patients undergoing arthroscopic anterior cruciate ligament reconstruction with ipsilateral hamstring graft were randomised to one of the three study groups (Group1: Hamstrings block+ACB; Group2: Ant. Division obturator+ACB; Group3: ACB alone) using a computer generated random number table and sealed envelope technique. The quad strength on both legs were evaluated preoperatively and 30 minutes after the block. 15ml of either saline (Group 2 and 3) or 0.5% ropivacaine (Group 1) was injected for the hamstrings block and 10ml syringe containing either 0.5% ropivacaine (Group 2) or saline (Group 1 and 3) for the the obturator block and 20 ml of 0.5% ropivacaine for the saphenous nerve block (group 1, 2 and 3). A blinded investigator tested and followed up the patients. All patients were sent home with a pain diary to collect pain scores and narcotic consumption which they were asked to returned by mail.

Results/Case report

A total of 105 patients completed the study and a total of 61 patients returned the pain diary (Table 1). Pain scores and narcotic consumption at PACU discharge and 4 postoperative hours were comparable between the two groups (Figure 1 A and B). There was no significant difference between the groups regarding secondary parameters. The percentage of patients having back of the knee pain was significantly high at all time points and did not differ between the three groups while the percentage of patients with anterior knee pain was increased after the first 12 hours (Figure 2 A and B).

Discussion

Combination of hamstrings block with adductor canal block was not superior to the combination of anterior division of obturator nerve block with saphenous nerve block or the saphenous nerve block alone to control graft donor site pain following ACL reconstruction. None of the combination blocks significantly decreased motor power.

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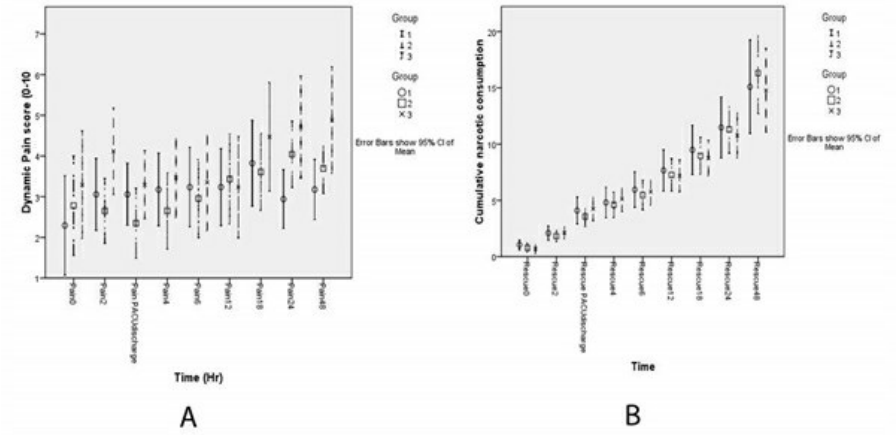
Tables/images

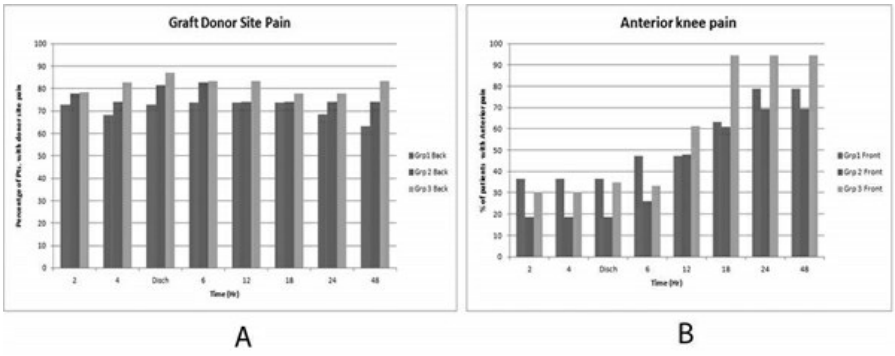
Table 1: Demographic data

Variable	Group1	Group2	Group3	P value (sig <0.05)
Age: Mean (SD)	28.69 (10.49)	32.31 (12.83)	30.06 (10.29)	0.276
Sex (M:F)	18/17	22/13	13/22	0.183
ASA (1/2/3)	18/8/9	17/11/7	18/10/7	0.706
Block duration (Min)	6.4(3.79)	7.11 (7.31)	7.23 (3.97)	0.172
% motor power change	-15.7 (30.25)	-8.42 (18.045)	-13.59 (20.70)	>0.05

Table1: Patient characteristics



Pain (A) and narcotic consumption (B) in the three groups at various time points



Percentage of back (a) and front (B) of the knee pain at various time points

Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1699
Medically Challenging Cases (report of up to 4 cases)

Late Onset PDPH after 90 days following Left Vestibular Schwanoma excision

Rengarajan Janakiraman, Lena Mullaly, York Jiao, Kevin Finkel, David Dycus
Hartford Hospital

Introduction

The incidence of CSF leaks after Left Vestibular Schwanoma(VS) surgery is 20-23%. The prophylactic lumbar drain placement reduces the incidence of CSF leaks.(1) We present a case of late onset PDPH after 90 days due intra operative lumbar drain placement.

Results/Case report

53/M had an uneventful Translabrynthine approach Left Vestibular Schwanoma removal. Intraoperative Lumbar drain(LD) placed to improve exposure and to decrease CSF leak. Post operative MRI showed no CSF leak at the surgical site and LD was removed on POD3. 90 days after he presented with classic postural bilateral throbbing occipital headache with photophobia and pain varying between 2 to 10.

Due to negative MRI earlier the PDPH was empirically treated as CSF leak from Lumbar drain. Epidural Blood patch was performed at L3/4 level with 20 ml of blood resulting in immediate resolution of pain and the pain relief is still zero at the 1 week followup.

Discussion

The late onset of PDPH after Labor epidural analgesia was reported in the literature after 12 days(2) and 52 days after Lumbar spinal surgery. (3) The increased CSF pressure from Valsalva manoeuvres, physical activity, increase intra abdominal pressure, sexual intercourse were postulated as plausible theories for the late onset. Our patient had increase in physical activity after 90 days. There was a diagnostic dilemma due to difficulty in determining the site of leakage. Intracranial leak will present more with otorrhea, dizziness and headache. In view of negative MRI and classic postural headache lumbar drain CSF was determined as the cause. The other complications of LD include dislodgement, nonfunctioning, over drainage, retained tip, positive cultures. Epidural Blood patch was successfully used before for the PDPH due to Lumbar drain CSF leakage.

Conclusion

Late onset PDPH after 90 days can happen after Lubar drain CSF leakage and can be successfully treated with Epidural Blood patch.

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.

41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1700
Scientific abstract: Acute pain

Nurse applied propofol decreases the need of opioids during gastrointestinal procedures

Francisco Ramirez, Neil Nedley
Nedley Clinic

Introduction

Propofol was used since 1994 in a GI lab in Ardmore, OK. Oklahoma was one of the few places in the world where previously trained nurses would apply propofol, with some opioids, under the direction of the physician doing the endoscopic procedure.

Materials and methods (NA for case report)

Nearly 50,000 gastroduodenoscopic procedures have been done at a GI lab in Ardmore, OK since 1994. We randomly sampled 1,016 case from the new database ranging from 2010 to 2012. 66 cases where eliminated due to unintelligible or missing saturation data. Information was gathered from the notes of the physicians and nurses.

Results/Case report

950 procedures were studied. Males were 37% and females were 63%. 352 gastroduodenoscopies, 469 colonoscopies, 125 both & 4 other procedures. Propofol was used in 99% of the patients, average dose was 102 mg (STDEV 58), the range was 10-500 mg, interquartile values 60 and 130 mg. Fentanyl was given to 26% of patients average dose was 54 mg (STDEV 23) range 4-100 mg. Meperidine was used in 31%, average dose was 37 mg (STDEV 15) range 2.5-125 mg and midazolam to applied to 94%, average dose was 3.1 (STDEV 1.4) range 1-10 mg, interquartile values 2 and 4 mg. Average procedure duration was 16 minutes. During the procedure oxygen saturation fell below 90%, 80 % and 70% in 95 (10%), 15 (1.5%) and 4 (.4%.). Two colon perforations were reported.

Discussion

Nurse administered propofol with opioids, resulted in less dosage of opioids. It was safe in 950 cases. Less than 2% of patients fell below 80% of saturation without immediate problems. It appears to be safe.

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Disclosures

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41st Annual Regional Anesthesiology and Acute Pain Medicine Meeting
Thursday, March 31, 2016–Saturday, April 2, 2016
New Orleans LA

Abstract: 1702
Medically Challenging Cases (report of up to 4 cases)

Total Hip, Femur and Knee Reconstruction in Maffucci Syndrome

Zachary Turnbull, Lauren Licina, Eric Brumberger, Minda Patt
Weill Cornell Medical College

Introduction

Maffucci Syndrome is a very rare, spontaneous embryonic disease characterized by echondromas with multiple angiomas that primarily affects the bones and skin, resulting in severe deformity.[1,2] Superficial and deep hemangiomas often protrude as soft benign tumors usually found on, but not limited to, the distal phalanges and long bones which often cause fractures and chronic pain syndromes.[2] Venous-lymphatic malformations and hemangioendotheliomas can occur but are much less common.[3] The pathophysiology provides serious concerns for the perioperative course when planning an appropriate anesthetic.

Materials and methods (NA for case report)

A 52 year-old female with a past medical history significant for anxiety, hypertension, hyperlipidemia, insulin pump dependent type-1 diabetes, anemia, hypothyroidism, and chronic hip pain secondary to tumor involvement from advanced Maffucci Syndrome, presented for total right hip, femur, and knee replacement. Prior to surgery, an interventional radiologist attempted to embolize vasculature of the tumor but failed secondary to arterial vasospasm. She denied history of angina equivalents and endorsed a strong exercise tolerance. Preoperative labs included a hematocrit of 30.7g/dL, platelets of 229 x 10^9/L, and an international normalized ratio of 1.1. An electrocardiogram was negative for signs of ischemia or an arrhythmia. A combined spinal-epidural was placed as the intraoperative anesthetic (3cc of 0.5% Bupivacaine) and for postoperative pain control. Peripheral intravenous access was obtained with one 14-Gauge and two 16-Gauge catheters. An arterial line was placed under sedation. Tranexamic acid was started preoperatively and continued intraoperatively. Upon initial incision, significant blood loss required immediate resuscitation of 4 units of red blood cells (PRBC). The team called for help and a rapid transfusion system. With ongoing, and uncontrolled blood loss once the femur bone was removed, conversion to general anesthesia and massive transfusion protocol was initiated. Infusions of phenylephrine, norepinephrine, and vasopression were initiated and femoral central access was established in emergent fashion. While an airway and access were secured, the patient became severely hypovolemic and eventually entered pulseless arrest. Alongside massive transfusion efforts, ACLS was immediately started, and there was a return of spontaneous circulation within six minutes. The ongoing blood loss required a total of 14.3L of red blood cells, 3.5L of Cell Saver, 5.5L of fresh frozen plasma, 900cc of platelets, 300cc of cryoprecipitate, 2234mg of fibrinogen and 2380U of 4 factor prothrombin complex concentrate. Serial thromboelastograms aided in transfusion during the course of resuscitation.

Results/Case report

Patient was stabilized on norepinephrine and vasopressin after correction of ongoing coagulopathy, surgical hemostasis and replacement of femur prosthesis. Given massive transfusion the patient was transported to the intensive care unit intubated and sedated. She was maintained on tranexamic acid postoperatively.

Discussion

The presented case illustrates a rare disease process with a significant adverse reaction. Given the extreme concern for uncontrollable blood loss, regional techniques for intraoperative anesthesia should be highly scrutinized and immense blood loss should be prepared for in patient's suffering from Marfucci Syndrome. Strong consideration should be given to obtaining central access early, availability of a rapid transfuser and an early conversation with the blood bank for intraoperative needs.

References

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Disclosures

I declare that there are no conflicts of interest or support that may cause bias in my presentation.