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Comings and Goings

In the May 2013 ASRA Newsletter, I reviewed recent changes to ASRA’s governance structure that have been designed to increase member opportunity for meaningful involvement in the Society, whether as a director, committee member, or part of the annual meeting faculty. Hopefully that missive was useful for those of you interested in becoming a contributing part of the ASRA family, and I applaud you for wading through it. In return, I am providing a much shorter communiqué this quarter, if for no other reason than I probably overdid the Newsletter editors’ page allocation last time around and am now trying to make up for it with brevity. I have two brief topics to share with you.

If you did not attend the annual spring meeting in Boston, I hope that you were aware of and perhaps took advantage of the constant stream of Twitter feeds from those in attendance. Despite the meeting’s temporal proximity to the Boston marathon bombings, attendance was just two folks shy of 900, a 12% increase from spring 2012. Session highlights included the second ASRA Practice Advisory on Infectious Complications of Regional Anesthesia and Pain Medicine, plus the second ASRA Evidence-Based Analysis of Ultrasound-Guided Regional Anesthesia. You should be able to read the proceedings of both these outstanding initiatives within the coming year. For the first time, we ventured into live simulation sessions; our initial experience suggests that these will become a meeting staple in the future. Wide-ranging parallel sessions included acute-to-chronic pain topics, regional anesthesia techniques in challenging patients, and packed programs for residents, fellows, and pain nurses. The scientific portion of the meeting was robust with the presentation of nearly 250 scientific abstracts and medically challenging cases. The meeting’s pinnacle was Dr. Admir Hadzic’s address to a standing room-only crowd as he accepted the 2013 Gaston Labat Award and then delivered a poignant and motivational speech. The Labat celebration was truly a family affair as Gaston Labat’s two great-nieces presented Admir’s commemoration while his entire family cheered from the audience. Finally, simple kudos are inadequate recognition for the fantastic leadership from program chair Dr. Ed Mariano and his committee, and to the superb meeting management of Dana Izraeli and Simone Labe. Plan now to join us for the spring 2014 meeting April 2nd through 5th in Chicago.

My second topic also involves thanks, plus a welcome. At the end of the spring 2013 meeting, three members completed their service to the ASRA Board of Directors. Dr. Chris Wu spent six years on the Board and his efforts especially with the website and communications group will be missed. Dr. Marc Huntoon resigned from the executive committee after eight years on the Board to focus full attention to his duties as Editor-in-Chief of *Regional Anesthesia and Pain Medicine*. During his period of service, Marc also led the CME Committee. Special thanks are extended to Dr. John Rowlingson, who completed a nine-month term as the Interim President-Elect, even though he has already served as ASRA President and would not in fact ascend to that office for a second time. But when the Board needed the sage advice and impeccable integrity of a former officer to fill a vacancy, we recognized that few could do the job better than John. With departures come new arrivals. Please join me in welcoming three new directors-at-large – Drs. John Butterworth, Colin McCartney, and Samer Narouze – along with the new ASRA Treasurer, Dr. Kumar Buvanendran.
It is my pleasure to invite you to the 12th Annual ASRA Pain Medicine Meeting in Phoenix. Named after the mythical bird that is cyclically reborn—analogue in some ways to this meeting—Phoenix is a modern metropolis with many things to offer, only one of which is this meeting. When I agreed to serve as Chair, I anticipated a theme centered around evidence-based pain medicine, and I believe this program has surpassed my high expectations.

The program commences on Thursday, November 14, with our traditional Refresher Course lectures featuring internationally-renowned speakers, including 2 former Bonica Award winners. Drs. James Eisenach, John Carrino, Asokumar Buvanendran, and Srinivasa Raja will provide in-depth lectures on fundamental issues surrounding ‘pain,’ including the role of genetics, why we feel pain, who’s at risk for developing chronic pain, and what role surgery plays in the treatment of back pain. For those who prefer hands-on training, a special workshop on ultrasound led by Dr. Samer Narouze will take place concurrently, in which enrollees will learn how to perform a spectrum of procedures.

The main program kicks off on Friday with discussion on the two most common procedures we perform: epidural steroid injections and facet joint interventions. The facet joint session will feature 3 speakers who have made significant contributions to our specialty: our international guest Dr. Jan Van Zundert, as well as Drs. David Provenzano and Chad Brummett. During this symposium, the main topics of discussion will be on how best to select patients for radiofrequency denervation and how to optimize outcomes. The epidural steroid injection symposium will focus on controversial issues such as whether the procedure provides long-term benefit and whether it is cost-effective. Afternoon parallel sessions will include a symposium on headache, and a session on “risk mitigation,” led by Dr. Eugene Viscusi. The special Friday workshop, which includes some of the pioneers in this area, such as neurosurgeon Dr. Richard North and Dr. Tim Deer, will focus on ‘neuromodulation in pain management.’

On Saturday, the morning session begins with two parallel sessions, one on implantable devices moderated by Dr. Richard Rauck, and the other led by Dr. Asokumar Buvanendran on “pain management in special populations.” We will also be adding a new addition to the workshops, a special session on complementary and alternative medicine led by Dr. Lucy Chen. By some metrics, the use of complementary and alternative medicine has surpassed the use of procedural interventions. The highlight of the meeting is the session on Saturday, which is dedicated to how changes in healthcare will affect our specialty. This special session starts with Dr. Richard Rosenquist discussing how the Affordable Care Act is expected to influence pain medicine, while the culmination is a head-to-head debate on whether pain interventions provide long-term benefit and are cost-effective between Dr. Richard Deyo, Professor of Family Medicine at Oregon Health & Science University, and Dr. James Rathmell, Professor at Harvard Medical School. We anticipate this to be very exciting, as it involves 2 thought-leaders who will present diametrically opposing views on a topic that affects us all. After this debate, conference participants will divide up into 2 parallel sessions: one on sacroiliac joint pain, and the other coordinated by Dr. Marc Huntoon, Editor-in-Chief of *Regional Anesthesia and Pain Medicine*, on pain research. The day ends with another session featuring heavyweights in pain medicine pitted against each other on controversial topics: whether opioids are over-utilized for non-cancer pain and whether ketamine infusions work for refractory pain conditions. I am particularly looking forward to hearing the arguments Drs. Oscar De Leon Casasola and David Provenzano put forth on the opioid question, which is currently at the forefront in medicine. And don’t miss the special radiofrequency workshop on Saturday morning overseen by Dr. Carlos Pino.

Sunday is a light day, but we hope to maintain interest with the sessions planned. The ASRA anticoagulation panel, featuring Drs. Honorio Benzon, John Rowlingson, Samer Narouze, Asokumar Buvanendran and David Provenzano, will take place in the morning. This will include relevant topics on which there is no clear consensus, such as how to manage anticoagulation for non-neuraxial interventions and implantable devices. To close the program, there will be 2 parallel sessions we hope will afford attendees ample opportunity to participate in close-knit group discussions: one on pain management during trauma, and another on cancer pain. Among the faculty in this session are two individuals widely acknowledged to be leaders in the fields: Dr. Mac Gallagher, Editor-in-Chief of *Pain Medicine*, and Dr. Charles Berde, Professor at Harvard Medical School.

In addition to the main program, we once again have an outstanding resident and fellow program that takes place on Friday and Saturday (see article by Dr. Julie Huang). The 2013 ASRA Fall Pain Meeting will also host a physician’s assistant and nurse practitioner parallel program, which will run on Friday and Saturday. Symposia in this program will include an overview of
On behalf of the ASRA Board of Directors, this year’s Fall 2013 Scientific and Education Planning Committee Chair, Dr. Steven Cohen, and the ASRA Resident Section Committee, we welcome and encourage all residents and fellows to attend the 12th Annual ASRA Pain Medicine Meeting. This year’s meeting will be held November 21-24, 2013, in Phoenix, Arizona, and will feature several exciting interactive discussions, hands-on workshops led by many of the leading experts in the field of Pain Medicine, and unique networking opportunities for anyone considering fellowship training as well as potential job opportunities afterwards.

Our Resident and Fellow Educational Program will commence on Friday afternoon and will include a “debate” on the virtues of pursuing a career in either private or academic practice in which Drs. Chad Brummett and Riccardo Vallejo will discuss the pros and cons of each path, and a panel on the anticipated changes in fellowship training, led by Dr. Gary Brenner, Program Director at Massachusetts General Hospital. During this session, we will present the Resident Abstract Awards and conclude the evening with our always highly-attended wine and cheese reception, which will provide current residents and fellows the opportunity to meet with fellowship program directors for chronic pain as well as regional anesthesia and acute pain medicine.

The program will continue through Saturday with a continental breakfast and interactive lectures featuring ABA-style exam questions on topics related to pain mechanisms, acute pain and regional anesthesia, treatment options, and neurologic complications. We are in the planning stages for our inaugural job fair for all residents and fellows during this meeting, with the aim of promoting academic and private practice employment opportunities in chronic pain, regional anesthesia and acute pain medicine to our ASRA members.

Perhaps the main attraction is one that cannot be described in a newsletter: the chance for participants to network and interact closely with leaders in all aspects of Pain Medicine. In between conference events, you can relax at The Biltmore Hotel, arguably the premier hotel in Phoenix. But enough of me “selling” a meeting that needs no salesman. Instead, we can talk more about it in Phoenix in November.

Expert speakers will be featured in a practice management panel discussing billing and reimbursement. Our program will conclude with our hands-on interactive workshops with live models, directed by pain medicine experts. This is a unique opportunity for our residents and fellows to learn both fluoroscopic and ultrasound guidance and discuss various ways of performing pain procedures from leaders in the field!

In addition to the Resident and Fellow Educational Program, Dr. Cohen and the Scientific and Education Planning Committee have also planned a remarkable conference, which you are all highly encouraged to attend. The program offerings we have planned aim to guide your future paths in the field with crucial information that is not typically provided during your training and provide the opportunity to interface with several well-recognized experts. Help spread the details of our meeting date and program details to your Department’s residents and fellows, and we look forward to seeing you all in Phoenix!
With the 38th Annual Regional Anesthesiology and Acute Pain Medicine Meeting behind us, I’ve had some time to reflect on everything that happened. I want to offer my sincere thanks to the attendees, committee members, ASRA leaders, and Kenes partners who made this meeting a success. While there are always areas for improvement (and addressing them will enhance our future educational products for members), there were a number of ASRA “firsts” that took place at this meeting that I would like to highlight.

We introduced two new simulation-based workshops: Crisis Management for the Regional Anesthesiologist and Ultrasound-Guided Continuous Peripheral Nerve Blocks (CPNB). The Crisis Management workshop employed mannequin-based simulation with realistic scenarios and was masterfully coordinated by our new ASRA simulation team of experts led by Dr. Steve Howard. The CPNB workshop was led by Dr. Colin McCartney and featured side-by-side live models with part-task training simulators to provide participants with a comprehensive approach to performing these techniques. We also increased the number of faculty for the Ask the Experts demonstrations to give participants more access to leaders in the field.

All abstracts were presented as e-posters—a first for the Spring meeting. In general, this format was well-received as it allowed attendees to call up specific posters at any of the viewers throughout the meeting rather than being confined to one short viewing interval. Also, we added two extra moderated poster discussion sessions (5 total) which were at times as well-attended as some of our lecture sessions. Attendees can continue to access the e-posters after the meeting and hold their own “Best of ASRA” sessions for their colleagues who could not make it out to Boston.

On Sunday, we incorporated the audience response system to our general session on practice management. This continues to be a hot topic in anesthesiology (and medicine in general). I was so impressed by the number of attendees for this session. There were very few seats open in the hall, and nearly everyone stayed until the very end!

Throughout the meeting, there was also a huge social media presence for the first time. Using Twitter, ASRA (@ASRA_Society) was able to bring attention to special events and sessions as well as keep attendees informed about open workshops and prize drawings. Many of our attendees and faculty joined Twitter during the meeting and shared their collective experience. You have probably already received an email from Dr. Raj Gupta (@Raj_ASRA) on behalf of the ASRA Communications Committee asking you to join Twitter to stay connected with ASRA and colleagues worldwide. Make sure you tag your conversations with #ASRA so others can follow along. As a former staunch opponent of social media and recent convert, I encourage you to try it; and yes, you can follow me @EMARIANOMD!

I want to thank our host Department at the Massachusetts General Hospital for treating our faculty, associate faculty, and VIP guests to a wonderful pre-ASRA evening reception and history lesson at Belfinch’s Ether Dome http://en.wikipedia.org/wiki/Ether_Dome and the Russell Museum of Medical History and Innovation http://www.massgeneral.org/history/russellmuseum/. If you are ever in the Boston area, I highly recommend a visit.

Now we look forward to the 12th Annual ASRA Pain Medicine Meeting which will be held November 21-24, 2013, in Phoenix, Arizona. This issue of ASRA News features articles by Dr. Steve Cohen, Chair of the Scientific and Education Planning Committee, and Dr. Julie Huang, Chair of the ASRA Resident Section Committee, showcasing some of the upcoming meeting’s events. As usual, there will be something for everyone, so we hope you will plan to attend!
A Systems-Based Approach to Establish Regional Anesthesia in the Ambulatory Surgery Setting

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Many anesthesia departments are looking at ways to provide additional regional anesthesia services, particularly in ambulatory settings. Their priorities are to improve patient care and outcomes, yet remain efficient. In this article we describe several practical and logistical issues for implementation of regional anesthesia services in an ambulatory surgery center. We highlight the importance of providing education to facility management, surgeons, anesthesiology practice, and patients. To illustrate these points, we provide relevant examples from two different ambulatory surgery centers; the Northwest Ambulatory Surgery Center (NASC) and the Center for Health and Healing (CHH).

Surgeons and Facility Management

One key to implementing a new regional anesthesia service is to ensure that the anesthesiologists, surgeons and facility management have shared expectations of what the program can accomplish. Appropriate use of regional techniques has been shown to reduce post-op pain, the immediate need for opioid medication, post-op nausea and vomiting, and time to discharge; as well as improve patient satisfaction scores compared to patients who do not receive regional anesthesia.1-12 The impact of the assessment of patient satisfaction should not be underestimated. Patient satisfaction scores are currently part of many value-based purchasing arrangements and linked to provider payments.13,14 Despite the benefits, regional anesthesia may also increase resource requirements and costs, introduce potential side effects or complications, and adversely impact room turnovers. The anesthesia staff should lead an evidence-based discussion with the surgeons and facility management to reach consensus on shared goals and objectives, and to develop protocols for optimal postoperative pain management.

Anesthesiology Department or Practice

A major impediment to a successful regional anesthesia program is variability in anesthesia staff proficiency with regional anesthesia. This can make staffing a challenge in ambulatory surgery centers. Many are staffed by a core group of anesthesiologists; however, due to variable case volumes, additional coverage may be provided from a larger pool of anesthesiologists. Education and training for the anesthesiology staff may be necessary to establish a minimum level of proficiency with core regional anesthesia procedures. At NASC, the medical director provides the necessary training to the anesthesiology staff to meet this requirement. In our experience, a simple half-day hands-on course is not sufficient for many anesthesiology staff to reach proficiency with regional anesthesia techniques; continued training, practice sessions, and mentoring are usually required.

Preoperative Patient Preparation

Patient education during the preoperative visit can help patients move more smoothly through the entire perioperative process. Preoperative education may begin with the surgeon. While the surgeon may offer a brief discussion with patients regarding regional anesthesia, the surgeon’s office staff can provide educational materials to patients to review before they meet their anesthesiologist including information about risks and benefits of the block, how the block is performed, what to expect after surgery, when they should contact the surgeon or anesthesiologist, and when to seek emergency care. Patients and family members can refer to this information before and after surgery to answer some of the most frequently asked questions about peripheral nerve blocks. The use of peripheral nerve block catheters in ambulatory patients introduces an additional layer of complexity for patients. Patients with catheters may have problems such as fluid leaking from the catheter, catheter dislodgements, disconnects, pump problems, concerns about catheter removal, and pain control problems, all of which may result in postoperative phone calls or visits.15 Patient education may improve the ability for patients and family to handle these problems without physician intervention.

The receipt of preoperative educational materials will significantly improve patient satisfaction scores and reduce the number of postoperative phone calls or visits. Preoperative education should be a priority for all ambulatory surgery centers that provide regional anesthesia services.
facilitate the preoperative interview. This can be an important factor in ambulatory surgery settings where efficient preoperative interviews are necessary to accomplish rapid turnovers between cases. During the interview, the anesthesiologist will review and reinforce the preoperative educational materials including risks and benefits, what to expect, when to call, etc. It is crucial to discuss what the patients should expect with regards to the block and management of perioperative pain, as these are common patient concerns perioperatively. Patients should be informed as to what parts of their body will/will not be affected by the block, what activities they are/are not allowed to do, what to expect in terms of postoperative pain and how to manage it, and how to transition to other analgesics as the block wears off. Furthermore, patients with catheters may need education on how a block will transition from the effects of a bolus dose to a basal infusion and/or bolus doses that may be delivered by the pump. All of these concepts should also be covered in the preoperative educational materials and discharge instructions. This information is designed to help patients handle routine issues surrounding regional anesthesia and understand what will be happening to them in the perioperative period. One theory of patient satisfaction is that dissatisfaction occurs when there is a difference between patient expectations and outcomes.16

How patient educational information should optimally be delivered has not been determined.16 Multi-media approaches may overcome issues with patient literacy or learning preferences. Information pamphlets, videos, internet presentations, and group information sessions have all been used to supplement the information given during the preoperative visit with the anesthesiologist. Many centers also use separate consent forms or special discharge instructions for patients receiving regional anesthesia. Studies on patient satisfaction consistently underscore the importance of information and communication and how they affect patient experience and subsequent satisfaction ratings.16-18 In addition, patient education has also been demonstrated to reduce anxiety and decrease postoperative pain scores.16,19

At CHH, the surgeon briefly discusses the block with patients during the preoperative visit, provides an informative pamphlet, and directs them to a comprehensive on-line educational program that includes information on peripheral nerve block catheters. The final anesthetic plan will be addressed by the anesthesiologist when the patients arrive for surgery. The majority of patients are referred by the surgeons to a preoperative clinic for assessment and education. The surgical staff communicates with OR scheduling to post the block request on the surgery schedule.

At NASC, the preop nursing staff has been trained to provide the same support. In addition, they insert intravenous catheters, administer local anesthetics under physician direction during the block, and monitor patients after a block for potential complications.

At CHH, the block team, consisting of anesthesia technician, a resident, and an attending physician, proactively prepares equipment and medications. The anesthesia technician has been trained to prepare equipment and oxygen, to help with patient positioning and monitoring, and to assist with ultrasound machine controls. At NASC, the preop nursing staff has been trained to provide the same support. In addition, they insert intravenous catheters, administer local anesthetics under physician direction during the block, and monitor patients after a block for potential complications.

Post-anesthesia care unit (PACU) nurses must also be trained on what to expect from peripheral nerve blocks and how to care for anesthetized extremities. They serve as the front line in communicating with patients and family prior to discharge and play an important role in reinforcing patient education.

Many anesthesiologists are concerned that placing nerve blocks, particularly continuous catheters, will significantly increase the time required for postoperative follow-up.15 The vast majority of postoperative phone calls from patients do not require physician
intervention. Many anesthesiologists choose to contact all patients postoperatively. This patient contact also serves as another opportunity to reinforce patient education. At CHH, patients receive a follow-up call from the anesthesiologist on postoperative day (POD) 1. Management of pain and instructions on when and how to remove a peripheral nerve block catheter are reviewed. The patient is instructed to call if he/she has questions or difficulty removing the catheter. At NASC, the patients receive a postoperative call from the anesthesiologist who placed the block the evening of surgery or on POD 1. Patients with catheters receive a daily phone call until the catheter removal.

CONCLUSION
The implementation of advanced regional anesthesia services in the ambulatory setting can provide many benefits including a decrease in post-operative pain and opioid requirements and a lower incidence of post-operative nausea and vomiting. Successful implementation starts with setting appropriate goals and expectations with the surgeons, facility staff, patients, and anesthesiologists. Education of all parties involved, including surgeons, nurses, anesthesiologists, administrators, and patients, as well as well-defined clinical processes and educational material, are critical to a successful and efficient program.

References
Spinal Cord Stimulation for Central Poststroke Pain: A Case Report

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A 60-year-old man, who had suffered two pontine lacunar infarcts approximately two years prior, had gone on to develop diffuse left-sided weakness, scattered sensory deficits, and pain that enveloped the entire left side of his body. Specifically, he described a throbbing pain focused in his knee which was associated with tingling, numbness, and tightness and radiated down to his foot. Interestingly, tactile stimulation of his affected knee referred pain to his ipsilateral shoulder.

His physical exam was significant for weakness in the distal aspect of his left leg, as evidenced by an antalgic gait with foot drop and decreased dorsi- and plantar-flexion of the ankle. Skin appearance, sensation, and temperature were all normal and symmetric.

He participated actively in physical therapy while numerous interventions were attempted in systematic fashion. Oral pharmacologic agents ranging from long-acting opioids, TCAs, gabapentinoids, SNRIs, and tramadol were also tried, many of which provided small improvements in his pain but failed to produce a significant impact in his quality of life. He underwent a series of procedures, including periarticular botulinum toxin A injections around the knee, intra-articular steroid injections in his shoulder, a series of lumbar sympathetic blocks, and an intrathecal medication trial with lidocaine 40 mg, dexamethasone 1 mg, 1 and clonidine 10 mcg.

He experienced partial relief with the latter intervention, suggesting a possible central pain component which could be responsive to spinal cord stimulation (SCS). After careful consideration, the patient consented to a SCS trial; two octrode leads were placed at the base of T9 to the left of midline. Over the following week, he experienced a 60% reduction in his knee and leg pain, improved ambulation, and a decrease in his medication requirements. As a result, the decision was made to undergo a second trial in the cervical region to address his shoulder and upper body pain. Once again, he demonstrated a robust 75% improvement and soon after elected to proceed with permanent implantation. The cervical paddle spanned mid-C2 to C5, and the thoracic paddle was positioned from T9-T10. These were connected to pulse generators located in right and left flanks, respectively. At three-month follow-up, he was continuing to do well.

Central Poststroke Pain (CPSP) can be a debilitating complication in stroke patients. CPSP due to thalamic stroke was first defined in 1906 by Dejerine and Roussy, who coined the term “thalamic syndrome” to describe pain on the contralateral side following a thalamic stroke. 2 Although historically CPSP has been associated with thalamic lesions, we now know that it can occur with lesions anywhere along the spinothalamic tract and its cortical projections. The pathophysiology of CPSP is poorly understood, but research suggests that central disinhibition leading to central sensitization may be contributory. Central disinhibition proposes that an insult to the lateral thalamus leads to loss of control of the medial thalamus. Alternately, lesions elsewhere along the spinothalamic tract lead to increased activity in the lateral thalamus. Thalamic GABAergic interneurons that normally produce local inhibition are then capable of intrinsic bursting activity when deafferented. This disinhibition creates a cycle of central sensitization, leading to the allodynia and hyperalgesia often observed. 3

Given the variations in presentation and diagnostic criteria used in diagnosing CPSP, the exact incidence is unknown, with studies reporting between 8% and 35%. 4, 5 The majority of cases present within 1-2 months of the initial insult; however, onset may be delayed for months to years. Commonly, certain presentations are associated with certain lesions. For example, lesions with the ventroposterolateral thalamic nucleus are the lesions most associated with hemi-body pain; whereas supratentorial lesions...
more classically produce pain in an extremity, and infratentorial lesions are associated with facial pain.

Neuromodulatory techniques employed for the treatment of refractory CPSP include deep brain stimulation (DBS), motor cortex stimulation (MCS), and spinal cord stimulation (SCS). While DBS has produced inconsistent but favorable results, and MCS provides pain relief in around half of treated patients, they remain relatively invasive procedures whose performance is limited to select centers. Easily the most widely applied of these modalities is SCS. It owes its safety and applicability in part to its relative non-invasiveness and accepted use for a wide array of other neuropathic pain syndromes. However, the usefulness of SCS in the treatment of CPSP has been a subject of controversy. Early retrospective studies have demonstrated long-term efficacy in the range of 7-30%, with Simpson et al reported 3/10 patients with a positive response, followed by 3 of 45 patients by Katayama et al a few years later.

Recent research supports the notion that SCS should be considered for CPSP. In 2010, Aly et al published a case series of 30 patients with medically-refractory CPSP in which 15/30 patients experienced ≥ 30% reduction in Visual Analog Scale (VAS), with 9/30 reporting ≥ 50%. Ten patients underwent permanent implantation and were followed for an average of 28 months; mean VAS in this group fell to 4.5 from 8.6 (range 3.0-8.0; P=0.008), and 70% of these patients described improvement on the Patient Global Impression of Change scale. Another case series from Japan in 2012 presented 8 patients with CPSP in which 6/8 reported ≥ 50% pain relief during the trial period and elected for a permanent SCS system. Five of these six patients continued to report similar levels of improvement at 12 months. The question of how SCS comes to produce pain relief of central origin remains largely unanswered. Proposed mechanisms include the activation of supraspinal processing centers where nociceptive input is abnormally interpreted. This has been demonstrated with fMRI and PET imaging studies that have detected brain activity in the somatosensory cortex, as well as the prefrontal and cingulate cortices. Cervical SCS has produced demonstrable increases in blood flow and cerebral metabolism which may combat low-flow states seen with stroke syndromes.

Obvious limitations exist on both sides of the argument. Small sample sizes can diminish the generalizability, particularly when taking into account the different stroke locations and syndromes. Additionally, the differences in trial threshold (30% vs. 60% improvement in VAS scores) may have played a role in whether observed outcomes are deemed success or failure. The lack of control groups can introduce the possibility of placebo effect; however, randomized MCS studies have failed to produce >30% pain relief in placebo responders.

Ultimately, the success of SCS for the treatment of CPSP depends largely on the same criteria already utilized for its other indications, including careful patient selection, technically sound trial, and close patient follow-up. For those with intractable CPSP, even a modest response may represent a significant improvement in pain scores and quality of life for a patient population lacking therapeutic alternatives. Further research is warranted on the use of SCS for CPSP.

References
Does Technical Expertise Equal Competence?

Patient safety “is a mix of proper training, reliable monitors, good judgement, and plain old common sense.” By implication, then, technical proficiency in regional anesthesia uncoupled from good clinical judgment may compromise patient safety. Unfortunately, there are many examples of this: a patient with severe obstructive pulmonary disease who receives an interscalene blockade for shoulder arthroplasty winds up in the intensive care unit requiring prolonged mechanical ventilation; a patient receiving a femoral nerve block following carboplatin for osteosarcoma suffers a double-crush scenario and debilitating postoperative neuropathy.

In other words, technical excellence (aka procedural proficiency) is not enough to ensure patient safety. Such failures in patient management are avoidable only through the application of appropriate clinical reasoning and judgment.

It is therefore concerning that in the era of ultrasound-guided nerve blockade, emphasis on technical competency and proficiency may have begun to overshadow comprehensive regional anesthesia training. This issue may in part be associated with the rapid emergence and fascination with ultrasound imaging for nerve localization. In the past decade, the use of ultrasound by anesthesiologists has dramatically increased as evidenced by the exponential growth in ultrasound-associated publications beginning in 2004-05 (Fig. 1). During the wave of experimentation and acquisition of ultrasound equipment by many anesthesiology departments, it became obvious that the use of this novel technology required the development of entirely new knowledge and skill sets.

Similarly, it was recognized that appropriate methods of training for both practicing anesthesiologists as well as residents would be needed. To develop appropriate training curricula, educators first sought to understand the process and technical challenge of acquiring procedural proficiency. Appreciation of the psychomotor and visuospatial skills required during UGRA led to a previously-unanticipated investigative effort to objectify and quantify the learning process. Illumination of the integral elements used during bimanual image-based regional procedures has led to a number of objective guidelines and assessments for defining technical performance. Although these tools may provide some insight into learner’s technical abilities, they cannot yet correlate procedural proficiency with comprehensive and competent patient management. Moreover, there is no direct evidence that educational interventions and learner aptitudes manifest in improved patient safety. Thus the question inevitably arises as to whether recent educational concentration on the development of technical skills is at the expense of training in clinical judgement, professionalism, patient care and safety. As a parallel, both written and oral board examinations are considered necessary for thorough evaluation of resident competency before awarding status as a diplomate of the American Board of Anesthesiology (ABA). While the ABA written board exam measures specific knowledge and comprehension, the oral board exam evaluates

Figure 1: PubMed keyword search of “ultrasound-guided regional anesthesia” 2000-12.
is the overall assessment of procedural proficiency easier to measure the technical skills of anesthesia residents, it
Where Should We be heading With regard to regional well-trained physician.
reasoning that defines competent patient management and the anesthesia education?
The cultivation of wise clinical judgement among resident physicians necessarily includes procedural instruction, but must
not stop there. Regional anesthesia training must incorporate a broader educational scope if it aspires to engender critical thinking and sound judgement. And while simulation may play a role in developing the desired skill sets, there is no substitute for clinical responsibility and experience during resident training. Regional rotation design emphasizing advanced levels of responsibility and complete patient management are essential to the development of sound judgement with regard to the practice of regional anesthesia. For example, a resident assigned to an operating room may successfully perform peripheral nerve blocks for patients brought to that location, but this style of education suffers from two important limitations. First, although the resident may develop technical proficiency, they miss the formative experiences of evaluating patients preoperatively, determining appropriate peripheral and/or neuraxial techniques, discussing risks and benefits, and the recognition of possible contraindications to regional blockade. As experienced anesthesiologists are aware, the decision to perform a nerve block is frequently the most challenging and critical element of care. A second limitation is that residents limited to the intraoperative procedures inevitably place undue importance on technical expertise and the procedural aspects of regional blockade. Subsequently, they fail to appreciate the regional risk-benefit analysis and patient care decision-making already completed by the attending physician. In many respects, anesthesiologist’s value lies in the intellectual work put into developing the anesthetic plan before the patient is brought to the operating room. Moreover, regional complications such as local anesthetic toxicity, nerve injury and others require additional resident training to facilitate recognition and appropriate management. A patient will not die from a failed regional anesthetic, but they might succumb to unrecognized or inappropriately managed local anesthetic toxicity.

Procedural competence itself is multifactorial, consisting of both technical and non-technical skills. The non-technical skills include elements of cognitive (knowledge, situational awareness, error detection, and decision making) and interpersonal skills (communication, teamwork, and leadership). And while these non-technical skills are more difficult to objectively measure, they are no less important. The ACGME requires that physician trainees complete a minimum number of regional anesthetic procedures to enable the development of technical skills, but has no mechanism or requirement for the development of non-technical skills. In addition, the ACGME requirement of 40 peripheral nerve blocks means that resident experiences at different institutions will vary widely. For example, residents at larger institutions routinely perform more than 200 peripheral blocks, many at an advanced level, while residents from other institutions may find it difficult to achieve minimum numbers. And yet the absolute number or level of regional procedures does not necessarily translate to wise clinical judgement, especially if these procedures are divorced from patient care contexts. Simulation-based education can level the playing field by providing technical and non-technical training in regional anesthesia. A well-designed simulation scenario incorporates methods to teach and assess both procedural and non-technical skills including clinical decision making, situational awareness, and interpersonal communication. Br uppacher et al. demonstrated that residents who were randomized to simulation-based training performed better than a control group.
who had a case-based tutorial related to weaning of patients from cardiopulmonary bypass. Performance in non-technical (cognitive and interpersonal) skills was also superior in the simulation group. Historically, simulation models have provided tools that educate learners on using specific equipment, \(^\text{10}\) and placing a block. \(^\text{11}\) Yet simulation rarely, if ever, begins with scenarios that assess the learners ability to determine whether to perform a regional technique and if so, which technique. It is more intellectually demanding and formative to evaluate a patient’s comorbidities, weigh the relative risks and benefits of a particular procedure, and discuss these with the patient, than it is to perform the nerve block.

In our medical center, regional rotations are completed during the latter half of residency, with expectations that the resident physician will learn to function as a sub-consultant/sub-attending. \(^\text{12}\) In conjunction with the attending physician, residents are responsible for the complete perioperative care of orthopedic surgical patients in two operating rooms. Responsibilities include preoperative assessment, development of anesthetic plan, administration of premedications, completion of regional techniques in the block room, intraoperative induction and troubleshooting, and recovery room care. In addition, residents are expected to periodically round with the acute pain service to assess the quality of postoperative analgesia and overall patient care.

Learner-centered structural elements of the regional rotation include scheduled didactic/problem-based learning sessions, regional journal club presentations, and cadaveric anatomic dissections led by the regional fellow. \(^\text{13}\) Ultrasound training during the two-month rotation includes three scheduled didactics, including hands-on scanning and phantom needle practice, as well as pre- and post-didactic ultrasound knowledge assessments using a bank of questions administered via the Blackboard Vista virtual classroom software. Upon successful completion of the written ultrasound knowledge exam, residents complete a demonstration of proficiency with a faculty member. This competency testing is based upon a checklist requiring residents to demonstrate practical understanding of the ultrasound equipment and fundamental concepts, clinical sonoanatomy and scanning techniques, and procedural proficiency with both in-plane and out-of-plane phantom nerve blockade. Patient management performance is also assessed in the simulation center using scenarios featuring local anesthetic toxicity, high spinal, and other clinical situations seldom encountered during residency. At the conclusion of the two month rotation, a comprehensive regional anesthesia knowledge exam is administered, again using Blackboard Vista courseware.

The combination of clinical responsibility and learner-centered structural education represents a rotation format which provides trainees with supervised opportunities to balance the pros and cons of regional anesthesia in the broader scope of patient care, while facilitating the development of basic and then applied proficiency with a variety of regional techniques. The challenge for future regional educators will be to construct objective and reproducible measures of rotational design that can assess whether the development of critical thinking and “good judgment” occurs and if this translates into improved patient safety and satisfaction. Until evidence supports such outcome-based measures of regional instruction, it is prudent to pursue resident education with the goal of developing clinically experienced physicians well versed in the role of regional anesthesia in managing surgical patients, as opposed to a new generation of regional anesthesia technicians.

References
Does Technical Expertise Equal Competence? continued...


As we send out the call for proposals for the 2014 Carl Koller Memorial Research Grant, one wonders whether or not any of it would have been possible without Koller’s innovation of using cocaine for local anesthesia.1 An ophthalmologist and pioneer in anesthesia, Koller is credited with the demonstration of the anesthetic and analgesic properties of cocaine, paving the way for the introduction of cocaine into surgical care across the world. Looking back on the milestones in the history of regional anesthesia following Koller’s discovery, from the development of spinal anesthesia by Bier, to the first peripheral nerve blocks performed by Halsted with the further development of modern-day local anesthetics, to the use of ultrasound, ASRA members have continued this tradition of innovation in their pursuit of improved patient care.2

The developments in regional anesthesia that followed Koller’s breakthrough highlight the ingenuity that is shared by ASRA clinicians and scientists alike. This history is central to the mission of the American Society of Regional Anesthesia and Pain Medicine, an organization formed by leaders in the field. In honour of the leadership and innovation exemplified by Koller and central to the values of ASRA today, the Carl Koller Memorial Research Grant was established to support the generations of innovators that have followed in his footsteps.

Since its inception in 1986, 38 Koller grants have been awarded to scientists and clinicians in the United States and Canada. The funded projects have resulted in many peer-reviewed publications, abstracts, posters, editorials, and, most importantly, improvements to patient care.

Throughout its 27-year history, the Carl Koller Memorial Research Grant has funded novel investigations that have improved patient care and safety, spanning laboratory research and animal models of pain relief to translational implementation of new science in humans. Great examples of high quality research abound. After animal models had shown that transplanted chromaffin cells provided pain relief due to the release of catecholamines and opioid peptides into the cerebrospinal fluid of rats,3,4 Winnie and colleagues (Koller Grant 1991) pioneered the first subarachnoid transplant of these cells in humans to alleviate intractable pain in terminal cancer patients.5 Over the years, this method has been extended to other human applications of antinociceptive therapy including rheumatoid arthritis6 and perhaps others yet to be discovered.


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American Society of Regional Anesthesia and Pain Medicine

2013

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The Koller Grant has also supported clinicians and scientists who recognize the limitations of commonly-used equipment for regional anesthesia and the subsequent effect on patient care. Hadzic and colleagues (Koller Grant 1999) were one such group. Focusing on the testing of nerve stimulators, they found significant variability at low voltages, which increased risk of both failed blocks and intraneural injection. Ultimately, they helped achieve an important milestone in patient safety and outcomes: standardization in the production of nerve stimulators. This research group has gone on to produce several landmark papers on the localization of peripheral nerves, factors that may lead to nerve injury prevention and methods to increase safety of peripheral nerve blocks.

The importance of patient safety and improved clinical outcomes continues to be reflected in more recent award recipients. Weinberg and colleagues (Koller Grant 2004) investigated the role of lipid infusion in asystolic rats caused by bupivacaine, demonstrating that lipid emulsion not only accelerates removal of bupivacaine from cardiac tissue but also enables recovery following bupivacaine-induced cardiotoxicity. This investigation complemented ongoing research that validated the use of lipid emulsion as a resuscitation technique for cardiotoxicity caused by local anesthetic and other lipophilic drugs.

To continue this legacy of research and discovery, the Carl Koller Memorial Research Fund is now calling for grant applications for up to $75,000. This award supports clinical and laboratory investigations in regional anesthesia and analgesia, or acute pain medicine, related to surgery in order to foster research and innovation. Priority is given to applications focusing on patient safety and outcomes. The deadline for applications is 30 November, 2013, and award recipients will be announced at the ASRA meeting in Spring 2014. Please visit http://www.asra.com/research-carl-koller-memorial-research-grant.php for more information.

The Koller Memorial Research Grant would not exist without the generosity of ASRA members and donors and their commitment to fostering excellence in the field of regional anesthesia and pain medicine. The majority of funds for this award have been donated from the Society’s operational profits, which are a direct product of ASRA member involvement in the Society through dues and annual meeting revenues. Further donations can be made through the website: https://asra.megahosters.com/asra-donation-all.php.

References
Philip R. Bromage, MB, BS, FFARCS, FFARCA, died peacefully in his home on June 7, 2013. His name ranks as one of the greatest and most prominent scientists and teachers in Anesthesiology. He was a man of sophisticated culture, charming personality, and great humor.

Phil, as he preferred to be called, was born on October 28, 1920, in London, England. He received his medical training at St Thomas’s Hospital in London, qualifying as a physician, in 1943. He then joined the Merchant Navy as a ship’s doctor on the HMS Salween, a troop ship. He served in the Burma landings during the last year of World War II.

His formal post-graduate training began at Southend under the tutelage of Dr. Alfred J. Lee, a well-known anaesthetist in Britain at the time, whereas his senior years were spent at St. Thomas’s in London. He then joined a busy anesthesia practice as a consultant in West Sussex. Encouraged by Dr. Lee, Phil directed his deep interest and newly-acquired experience in epidural analgesia to the writing of his first book, Spinal Epidural Analgesia, in 1954. The following year he was invited to lecture about the subject at many medical centers in North America and subsequently was offered a faculty position as an assistant professor under Dr. Harold Griffiths at McGill in 1956.

Phil’s career took him to many places, including Duke University in North Carolina, the University of Colorado (where he served as Chair), King Khaled University Hospital in Saudi Arabia, the Medical Center of Delaware, and Thomas Jefferson University Medical School in Pennsylvania. His academic career was highlighted by assuming the chairmanship of McGill Department of Anaesthesia in 1970, succeeding Professor Richard Gilbert, which he enjoyed for seven years.

During his years at the busy Royal Victoria Hospital in Montreal, he ardently pursued his interest in neuraxial analgesia. He was prolific in studying the basic physiology and clinical applications of epidural analgesia, both during childbirth and during surgery. While most centers in North America were utilizing caudal epidural blocks, he was a great proponent of the lumbar approach, which to this day remains a universally-preferred neural block modality in obstetrics. These academic pursuits led to many publications, numerous international lectureships, and ultimately the publication of a masterpiece text entitled Epidural Analgesia in 1978.

He was a master with the needle, and watching him perform and teach the art of regional blocks was a treat enjoyed by many who were fortunate enough to train at the “Royal Vic.” I am honored to consider myself one of them.

Phil received many awards during his career including the Hickman Medal from the Royal College of Medicine for meritorious service and a Gold Medal in 1995 from the Canadian Anesthetists Society in recognition of his national and international acclaim in the field of regional anesthesia. In addition, he earned an honorary doctorate from the University of Louvain in Belgium, and an annual research day is named after him at the Department of Anaesthesia at McGill University.

Our condolences for the loss of this warm and far-reaching man go to his son Richard, his daughter Susan, and four grandchildren: Julian, Maria, James and Laura.

Generations of anesthesiologists and patients will benefit from his pioneering techniques, relentless research, and gracious teaching.

Phil, you will be sorely missed….
Cervical medial branch blocks (CMBBs) and third occipital nerve blocks (TONBs) are commonly used in the diagnosis and treatment of chronic neck pain and headaches. Although fluoroscopy constitutes the imaging standard for CMBB and TONB, ultrasonography (US) is particularly well-suited for these procedures as the articular pillars (APs) are situated well within the visual range of high frequency probes. Moreover, unlike fluoroscopy, US may enable the operator to identify (and circumvent) critical soft tissue structures such as blood vessels. Although the larger third occipital nerve can be visualized with US in most patients, the smaller medial branches at other levels are often difficult to identify in clinical practice. Therefore, the landmark-based technique described below does not rely solely on neural identification, but instead targets a point on the bony contour of the cervical spine corresponding to the centroid of the AP. A posterolateral in-plane approach is used, with placement of the needle tip between the periosteum and the semispinalis capitis muscle, allowing small volumes of injectate to cover the lateral surface of the AP and block the medial branch.

SONOANATOMY

Coronal (long axis) scan. This view is used for level confirmation in both the upper and lower cervical spines. In the long axis, the APs appear as a series of peaks (zygapophyseal joints lines) and valleys (convex shapes of the APs). Above the C2-C3 joint, the slope of the inferior articular process of C2 creates a characteristic drop off with the vertebral artery visible immediately cephalad to it (Fig 1). In the lower cervical spine, the transverse process (TP) of C7, which can be found anterior to the AP, provides a reference for needle positioning. The medial branches can often be imaged in the coronal plane as they cross the APs, in close proximity to the periosteal contour.1

Transverse (short axis) scan. This view is used for needle placement. The targets are the C2-C3 zygapophyseal joint (TON) and the centroid aspect of the AP (C3-C6 medial branches). The latter appears as a distinctive flat hyperechoic line that can be appreciated when moving the probe in a cephalo-caudal direction (Video 1; http://www.asra.com/publications-newsletters.php). It can be easily differentiated from the joint line, which is rounded and less echogenic. The tendinous insertions of the semispinalis capitis muscle (SSC) can be identified just above the AP; their insertions are often difficult to identify in clinical practice. Therefore, the landmark-based technique described below does not rely solely on neural identification, but instead targets a point on the bony contour of the cervical spine corresponding to the centroid of the AP.

**Figure 1**
Coronal scan of the upper cervical spine along the anterior edge of the articular pillars with color power doppler mode engaged. The drop off at the C2/C3 level is confirmed by imaging the vertebral artery cephalad. Vertebral artery (VA); inferior articular process of C2 (C2); articular pillars (C3, C4); zygapophyseal joints (C2/C3, C3/C4).

**Figure 2**
Transverse scan of the C4 articular pillar (AP) showing a needle in position after injection of 0.3 mL of local anesthetic. The injectate has spread along the anteroposterior aspect of the AP, lifting up the semispinalis capitis muscle (SSC). Posterior tubercle of transverse process (PT); needle (N); lamina (Lam).
importance lies in the fact that they restrict the injectate to the periosteal plane, thus ensuring a successful block with small volumes of local anesthetic (Fig 2). A useful landmark in the lower cervical spine is the narrow TP of C7, which has no anterior tubercle: this permits its differentiation from the TPs of other cervical levels and the wider square shape of the T1 TP (Video 1; http://www.asra.com/publications-newsletters.php).

**BLOCK TECHNIQUE**

Patients are placed in the lateral decubitus position with the head supported in a neutral position. An L14-5 MHz linear array probe and a 2.5 inch, 22- or 25-gauge block needle are commonly employed. I have found that a reduction in the dynamic range (increase in the image contrast) facilitates visualization of the targets on the APs.

**TON, C3, C4 medial branch.** The neck is first scanned in the coronal plane along the posterior edge of the AP in order to identify the drop-off at the C2-C3 level. Further confirmation is sought by imaging the vertebral artery (cephalad and anterior). The probe is then rotated to a transverse plane, and for the third occipital nerve block the C2-C3 zygapophyseal joint is identified. From this point, the probe is moved caudally to the target points on the C3 and C4 APs.

**C5, C6 medial branch.** The base of the neck is scanned in the transverse plane and the TP of C7 identified. As the probe is moved cephalad from this point, the TP of C7 is localized, followed by the targets on the AP of C6 and C5. The superior articular process of C7 can be occasionally imaged cephalad to the TP of C7: if prominent, it could be mistaken for the C6 AP (Video 1; http://www.asra.com/publications-newsletters.php).

**Needle placement after target level has been identified.**

Once the target has been identified in the transverse plane, pressure on the probe is reduced and the color doppler mode engaged to detect potential blood vessels in the needle path (Fig 3). A posterolateral in-plane approach is used. The needle is advanced until contact with the periosteum. The probe is then rotated to obtain a coronal scan, and the needle confirmed to be in the middle of the targeted AP. Returning to a transverse view, LA is then injected under real time visualization; if necessary, the position of the needle tip is adjusted to obtain a sub-SSC LA spread that covers the anteroposterior diameter of the AP or joint for TONB (Figs. 4a & 4b & Video 2; http://www.asra.com/publications-newsletters.php). The extent of cephalocaudal spread can be documented in the coronal plane. When performing a TONB, needle placement can be further refined by placing the tip next to the nerve as it can often be imaged near the C2-C3 joint in the coronal plane.

**SAFETY**

Major complications are rare after CMBBs. However, in a recent study examining 7482 fluoroscopy-guided facet nerve blocks, adverse events such as vascular breach and hematoma were found to occur most frequently at the cervical level, with incidences of 20% and 2.3% respectively. Ultrasonography provides a two-dimensional view of the AP, as well as real time visualization of the needle tip as it advances towards the target. In turn, this may allow the operator to avoid blood vessels and other critical structures. In contrast, fluoroscopy provides only intermittent visualization and relies on small interrupted needle movements with the maintenance of a true lateral view to avoid misdirection. In addition, the posterolateral approach (US) may offer additional safety advantages in comparison to the lateral fluoroscopy approach since critical structures are shielded by the APs and TPs. Further studies are required to confirm these theoretical advantages and determine the level of experience required to safely perform US guided CMBBs.

**SUPPORTING EVIDENCE**

In a 2-part study involving 53 patients and 209 CMBBs, we first examined the ability of US to provide accurate needle placement next to the nerve as it can often be imaged near the C2-C3 joint in the coronal plane.
on the AP using an in-plane approach. Fluoroscopic control demonstrated that the needles were adequately positioned in the middle 2 quarters of the AP 80.1% of the time; in the remaining 19.9% of cases, they were positioned in the outer quarter. In the second phase, 0.3 mL of a LA-iodinated contrast mixture was injected under US using a posterolateral approach and the spread verified on anteroposterior and lateral X-ray views. Our results showed that accuracy varied by level: TON (100%), C3 (100%), C4 (97.7%), C5 (91.4%), C6 (84.9%). Contrast spread leading to complete coverage of an adjacent non-targeted level was seen in 13.5% of blocks. Since the completion of this study, we have observed that the additional step of confirming the level in the coronal plane increases accuracy at the C5 and C6 levels (Video 3; http://www.asra.com/publications-newsletters.php). In a recent randomized trial (n = 40),\(^4\) we compared US and fluoroscopy for TONB and found similar success rates, contrast distribution and sensory block. However, the performance time and number of needle passes were significantly decreased with US. In both of our studies, no complications were noted. Blood vessels overlying the target were recorded on US scan in 8% to 10% of blocks. Because of the variable position of the C7 medial branch, the recommended fluoroscopic approach involves multiple injections;\(^5\) to date, an equivalent US technique has yet to be validated.

References

Figure 4
Images documenting successful needle placement for a C3 medial branch block in a 73 years old patient with degenerative changes altering the bony contours of the articular pillars (AP). Figure 4a: transverse scan of the C3 AP demonstrating a needle (N) in position on the sonographic target representing the centroid of the AP (arrows). Figure 4b: coronal scan of the upper cervical spine confirming appropriate needle positioning. The APs of C3 and C4 can be seen, however the contours of the zygapophysial joints have been distorted by osteophytes. Inferior articular process of C2 (C2); C1 transverse process (C1 TP).
Where does low-dose intrathecal opioid therapy fit into the current intrathecal drug delivery paradigm?

While intrathecal drug delivery (IDD) has been a viable treatment option for chronic benign pain (CBP) for over two decades, many issues related to the application of the therapy remain unanswered. Two recent editorials point out several areas of concern with regard to the therapy. Harden and colleagues highlight the urgent need for randomized controlled trials regarding IDD, while Deer has eloquently challenged the pain community to critically evaluate the role of IDD from a patient safety standpoint.1,2 The recent Polyanalgesic Consensus Guidelines have moved beyond basic drug dosing recommendations and are beginning to speak to the need for standards with regard to how patients for IDD therapy are identified, trialed, and managed.3 While the use of systemic opioids for CBP has become more ubiquitous over the past decade, there has been a concomitant increase in the issues directly related to those medications.4 A recent movement by a group of leaders within the pain community to reevaluate the role of systemic opioid therapy has also received much attention.5 Given the controversy surrounding the efficacy of systemic opioid therapy, there is renewed interest in intrathecal analgesia as a means of achieving analgesic goals while avoiding many of the issues that result in treatment failure with oral and transdermal opioids. Despite this renewed interest in IDD, many questions remain unanswered. For example, should patients continue to receive systemic and intrathecal analgesia concurrently? What is the best trialing method to select candidates for IDD? How does one determine the appropriate starting dose? Is there an optimal management method for dose titration after implantation?

A review by Wallace and Yaksh in 2000 recapped the first 10–15 years of the published literature on IDD.6 That review revealed that trialing methods, starting doses of opioids, and steady state dosing for IDD were highly varied among the centers doing IDD at that time.6 Many of the studies reviewed reported patients on greater than 20–50 mg per day of intrathecal morphine or equivalent. The starting dose was often determined by a ‘down and dirty’ conversion method and applied to the pump therapy with ongoing continuation of oral opioids. Anecdotally, over time many practitioners have begun to move away from IDD for a variety of reasons: 1) many patients remained on oral opioids, resulting in the practitioner managing the liability of both the IDD system and oral medications; 2) risk of granuloma; 3) reports of mortality in the first days of therapy; and 4) lack of data on long-term efficacy.2,6 In the early 2000’s, clinicians began exploring use of lower initial dosing of intrathecal opioids coupled with cessation of oral opioids. These concepts were first proposed by Dr. William O. Witt and soon thereafter by Dr. David Caraway.7 The concepts articulated by these early thought leaders began attracting attention as a way of solving many of the problems that complicate IDD. For instance microdosing, as it came to be called, was really a protocol-driven trialing technique which required: 1) discontinuing oral opioids prior to the intrathecal trial (though the length of time varied among practitioners), and 2) trialing patients with doses of intrathecal morphine (or equivalent) significantly less than 1 mg/day; often in the 100–300 mcg range. Patients who presented on ‘high-dose’ opioids under the Witt model were gradually tapered off oral medications prior to trialing, while other physicians had significant dose reduction prior to trialing as a goal. This was usually accepted by the patient since the perception of diminished opioid effect was typically the reason for the initial referral. Though these practices were discussed frequently at meetings and roundtable discussions, there was no formal peer review publication on the topic until the late 2000’s.8,9 In those manuscripts, a protocol for low-dose opioid trialing and patient selection was described (Table 1; reprinted with permission from Pain Medicine). This protocol, coupled with detailed functional and psychological data obtained during the candidate selection and trialing, represented the first peer-reviewed discussion on this controversial topic.9 With these publications, the discussion of microdosing as an increasingly recognized concept began to accelerate. Recently a three year prospective study involving 61 consecutive patients maintained on a ‘low-dose protocol’ was published. In this report, patients had improved analgesic response with starting doses at 0.5 mg/day at three years the average daily dose had titrated to 1.4 mg/day of morphine or morphine equivalents. Additionally, subjects were gradually weaned from opioid therapy after implantation.10
Where does low-dose intrathecal opioid therapy fit into the current intrathecal drug delivery paradigm? continued...

Much of the enthusiasm for the low-dose concept surrounds the fact that this approach speaks to several issues in IDD that impact patient safety. For instance, it has been suggested that drug concentration is a significant contributor to formation of intrathecal inflammatory masses known as a granuloma. The low-dose approach limits this concern since the literature at present reports granuloma formation in those subjects receiving higher concentrations of intrathecal opioids. From a respiratory depression and post-implant mortality standpoint, Coffey et al. have highlighted the safety concerns surrounding the first post-operative hours following IDD implantation. In this report the complications occurred with intrathecal doses above the microdose/low-dose range; often with concomitant oral opioid therapy. In the low-dose publications to date, the starting doses have all been significantly less the doses that resulted in complications in the Coffey reports.

Perhaps most significantly, in the low-dose publications, patients have been successfully transitioned from oral opioid therapy to IDD alone, possibly lessening the risks of tolerance, diversion/addiction, and possibly opioid-induced hyperalgesia. Admittedly, while IDD has risks and complications itself, the ability to offer analgesia without the issues associated with oral opioid therapy can be significant. Since most practitioners see IDD as having a place in the treatment algorithm after oral opioid treatment has been determined unsatisfactory or unsuccessful, a direct comparison of risk is often difficult. An oral opioid taper and opioid-free interval is part of at least one published protocol. It has been argued that resumption of oral opioid therapy, albeit at lower doses, after the ‘drug holiday’ may have restored efficacy of oral opioid therapy in these subjects, rendering the IDD system unnecessary. This is a valid criticism of the microdosing protocol that must be addressed by future studies to determine whether transition to the IDD system presents advantages in the previously opioid-tolerant patient.

The opioid free interval reveals surprising information. Subjects reported their pre-taper visual analog pain score (VAS) as 7.3.

Table 1. Reprinted with permission from Pain Physician.
while six weeks after opioid discontinuation the VAS was reported as 7.1. This finding suggests that patients may not have been deriving as much benefit from oral opioids as they might initially have thought.9 In our experience, many subjects choose IDD because of intolerable side effects from oral opioids. In fact over 40% of patients who are prescribed oral opioids discontinue their use due to side effects early in the treatment paradigm.4 Many of these oral opioid-related side effects such as nausea, constipation and sedation/somnolence are lessened or eliminated by the combination of IDD and a low-dose approach. This anecdotally, is especially true in the elderly, who often cannot tolerate oral opioid therapy and experience the pain relief with IDD without the side effects of oral therapy. Other side effects such as pruritus, urinary retention and edema still occasionally occur even with low-dose approaches and as such are a function of IDD therapy itself. It however remains to be determined of the incidence of these side effects is less with low-dose approaches in comparison to traditional IDD dosing.

The issue of long-term dose stabilization and the rate of intrathecal dose escalation once the IDD system is in place is also unknown. From a conceptual standpoint it would be of little benefit to go through the opioid-taper process prior to IDD initiation if, by year 2 for instance, the therapeutic opioid dose in the traditional pump management population vs. the low-dose population were identical. While clearly the data are preliminary, there is evidence that once the low-dose approach is initiated, there is little dose titration. At 36 months, Hamza reports a stabilized daily opioid dose of 1.4 mg/day (increased from the trial dose of 0.5 mg/day).10 Likewise, we have recently reported data from both the retrospective group initially reported on in 2010 and a small prospective observational cohort that suggests that doses and analgesia are stable at 30 and 18 months respectively with intrathecal doses in the 300 mcg/day range on average.13 These very preliminary observations are in agreement with the findings of Anderson and Burchiel who reported that after 1 year on the therapy, intrathecal doses remain relatively stable.14

The conceptualization of low-dose therapy as trialing and maintenance philosophy for patients is clearly still in the early stages of development. The occurrence of granuloma formation and respiratory events with traditional intrathecal therapy suggests that future studies are needed to determine if microdosing will decrease the occurrence of these adverse events. The ability to maintain analgesia at low-doses without supplemental oral opioid therapy must also be considered an advantage given the impact of oral opioid diversion/abuse on society. Creation of clinical practice cannot be built on anecdote and must be validated through the scientific process. Though preliminary in nature the low-dose/microdose concept has much to offer as a trialing and maintenance practice for patients with CBP treated with IDD.

References
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