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President's Message

ASRA: A Year in Review

ASRA had yet another momentous year in 2010. The Society continues to enjoy sound financial health, and there are three major accomplishments in the last year that I consider most significant. First, our Society's parent journal, *Regional Anesthesia and Pain Medicine*, achieved an impact factor of 4.16, the highest value ever in history and is now ranked third among all pain and anesthesia journals. This is a remarkable achievement, thanks to the concerted efforts of our Editor-in-Chief, Dr. Joseph Neal, and the editorial board. Second, a new ASRA pain research grant has been established to promote quality research in pain medicine, with an initial offering of \$50,000 to be awarded in November 2011 (grant application details are on the ASRA website). This is distinct from the Carl Koller grant, which primarily funds regional anesthesia and acute pain research. Third, the ASRA website now has a new face, and the revamping effort is almost 80 percent complete. The comprehensive Pain Resource Center contains educational materials developed by our members for chronic pain, cancer pain, acute pain, regional anesthesia and ultrasound for pain procedures. ASRA is truly blessed to have so many talented and willing volunteer members to take on such a major undertaking. I urge you to explore these new features online and provide feedback.

Guided by its mission, ASRA continues to strive to be your trusted source of information in regional anesthesia and pain medicine. The ASRA leadership is committed to offering member services, educational activities and research programs that meet and hopefully exceed your expectations. To help the ASRA leadership understand its members' needs and satisfaction with the Society, an electronic survey was sent out to 4,000 members. We thank those who responded (> 1,100 responses) for their valuable input into the future development of educational products and research goals.

The findings are encouraging. More than 90 percent of the respondents indicated that they are satisfied with their membership in ASRA and with ASRA's performance in continuing education, that they consider subscription to *Regional Anesthesia and Pain Medicine* an important member benefit, and they are likely to retain their ASRA membership over the next five years. It is also very encouraging to learn that more than 50 percent of the members who responded wish to be more involved in the Society's activities, such as teaching and committee participation. More than 300 respondents have explicitly identified themselves by providing their e-mail addresses for future contact. However, almost 60 percent of the respondents feel that ASRA may not have provided them with enough opportunities to participate. This is an important message to the ASRA leadership. We understand that there is a perceived lack of transparency for committee member selection and committee functions. Last year we took a first step forward in getting more members

involved in teaching by introducing Associate Faculty into the annual meetings, and this will continue to expand. This year, we shall take action to clearly articulate the functions and mandates of each committee, and we will allow members to self nominate to join a particular committee/task force.

The survey results also highlight other issues that require attention. For example, new and attractive features offered on the journal website (e.g., creating your own list of favorite articles, receiving an electronic table of contents notification and downloading articles to your mobile internet device) are not familiar to many members. In response, a special information session provided by our publisher, Lippincott Williams and Wilkins, will highlight these features during the upcoming spring meeting. Other worthwhile projects requested by our members are the provision of more online educational products and information about advocacy and reimbursement. Presently, ASRA is working on a peer-validated set of questions related to ultrasound-guided regional anesthesia, which will be available online as a part of evaluative CME later on this year. The January e-news contains a section on 2011 Regional Anesthesia Billing Update, written by Dr. Edward Kim, addressing some of the reimbursement issues.

Noteworthy News

ASRA cannot grow without the dedicated team of member volunteers who work tirelessly for the Society. At this time, I wish to thank members of the Newsletter Committee, Drs. Richard Brull, Samer Narouze, Chris Spevak and Rebecca Johnson, all of whom will be finishing their term in February. Incoming members are Drs. Ed Mariano (Associate Editor), Michael Barrington, Derek Dillane, Jeff Gadsden, Steve Orebaugh, Elizabeth Huntoon, David Provenzano, Rob Hurley and Artemus Flagg.

Beginning in May 2011, Drs. Eugene Viscusi and Santhanam Suresh will be joining the Board of Directors to begin their two-year term. On behalf of the Society, I would like to thank Drs. Michael Ferrante and Richard Rosenquist, who will be departing after many years of faithful service.



Vincent W.S. Chan, M.D., F.R.C.P.C.

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Prescribing Opioids to Patients With a History of Addiction



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Recently I had the opportunity to rotate in the Johns Hopkins Hospital Blaustein Interventional Pain Clinic at the CA-2 level. It was truly a great experience, just like my previous rotation here one year ago. However, during this experience I focused more of my time on new patient consults because they were more challenging than a routine follow-up and I could facilitate clinic operations by interviewing, examining and questioning these patient's prior to my attending seeing them. The patient's that I found most challenging, yet most

rewarding to treat, were those with a history of addiction.

Patients with a history of alcohol or drug addiction may present to physicians with complaints of acute or chronic pain. The use of opioids and other controlled substances in these patients presents numerous challenges to health care professionals. There are no consistent criteria in the literature regarding the treatment of pain in patients with a history of addiction. The result is confusion and inconsistent terms utilized to define addiction.

There are clear differences between addiction, pseudo addiction, and physical dependence. Addiction is a primary, chronic, neurobiologic disease with genetic, psychosocial and environmental factors influencing its development and manifestations. It is characterized by behaviors that include one or more of the following: impaired control over drug use, compulsive use, and continued use despite harm and craving. Pseudo-addiction is a syndrome that causes patients to seek additional medications due to inadequate pharmacotherapy being prescribed. Physical dependence is a state of adaptation that is manifested by a drug-class-specific withdrawal syndrome that can be produced by abrupt cessation, rapid dose reduction, decreasing blood level of the drug or administration of an antagonist.^{1,2,3}

Three percent to 16 percent of the American population may have the disease of addiction.⁵ Approximately 27 million Americans either use illicit drugs regularly or are "heavy drinkers." Of these, almost 16 million are estimated to need immediate treatment. Approximately 70 percent of illegal drug users are employed and contribute significantly to workplace absenteeism, accidents and injuries, decreased productivity, increased insurance expenses, employee turnover costs and on-the-job violence. The estimated annual direct cost to our society resulting from substance abuse is more than \$250 billion.⁶

Approximately 16 to 23 percent (50 to 70 million) of the population suffers from pain, which is under-treated or not treated at all.⁴ Chronic pain — commonly defined as pain persisting longer than six months — is a tragically overlooked public health problem.⁷ The financial and social burden of chronic pain is greater than that of diabetes, heart disease and cancer combined.^{8,9} A 1998 National Institutes of Health (NIH) report concluded that just the economic toll of chronic pain may be estimated at \$100 billion a year in the United States.¹⁰

When addressing pain control to the 5 to 17 percent of the American population with a substance abuse disorder of some type, the magnitude of this financial and social burden broadens greatly.¹¹ Patients with substance abuse disorders are less likely to receive adequate pain management than individuals in the general population.¹² The treatment modalities are unique and specific for patients with acute, chronic and end-of-life pain. Acute pain is treated in a similar fashion for all patients regardless of addiction history. However, follow-up is important to prevent relapse. Patients who are at the end of their life need to receive aggressive management of pain regardless of addiction history.¹⁰

The goal of chronic pain treatment in addicted patients is the same as individuals without addictive disorders—to maximize functional level while providing pain relief. Physicians should ask all patients receiving opioid therapy about current, past and family history of addiction. Physicians should take "universal precautions" that include careful prescribing and ongoing vigilance for signs of misuse. Patients suspected of opioid misuse can be treated with a time-limited trial of structured opioid therapy if they are not acquiring opioids from other sources. The trial should consist of daily to weekly dispensing, regular urine testing and tapering of doses of opioids. If the trial fails or is not indicated, patients should be referred for methadone or buprenorphine treatment.¹³

Patients who are prescribed opioids often display one or more aberrant prescription use behaviors (e.g. requesting early refills, doctor shopping, losing prescriptions, frequent attendance, early requests for repeat prescriptions and borrowing medication from family), which raise concern among health care professionals.¹⁴ Providers should attempt to assess and understand aberrant drug-taking behaviors in patients who are undergoing treatment for chronic pain, especially if opioid therapy is involved.¹⁵ Research has demonstrated that questions about abuse history and legal problems can be useful in predicting aberrant drug-related behavior with opioid use in persons with chronic noncancer pain.¹⁶ Patients who admit to a family history of substance abuse, a history of legal problems, and drug or alcohol abuse were prone to more aberrant drug-related behaviors, including a higher incidence of lost or stolen prescriptions and the presence of illicit substances in their urine.¹⁶ Patients classified as high risk also had a significantly higher frequency of reported mental health problems and motor vehicle accidents.

More of these patient smoked cigarettes, tended to need a cigarette within the first hour of the day, took higher doses of opioids, and reported fewer adverse effects from the medications than did those without such a history.¹⁶ Optimal medical management of chronic pain in patients with a history of addiction involves careful, continuous assessment by the clinician as well as a patient-specific management approach. This approach should use multiple structures, including contracts, prudent drug selection, frequent follow-ups to treatment, including the use of urine toxicology screening, and detailed documentation of every patient visit, to maximize the likelihood of a good outcome.¹⁵

In conclusion, prescribing opioids to patients with a history of addiction presents numerous challenges to clinicians. The same principles that have guided the use of opioids to the general population apply to those patients with a history of addiction. Patients in acute or end-of-life pain need aggressive management of pain regardless of their addiction history. In 2000, JCAHO mandated changes in how organizations prioritize pain and how clinicians assess and manage pain. One important standard that applies to acute, chronic and end-of-life pain is reducing pain to a comfortable level that will not interfere with the patient's optimal level of function or rehabilitation.

Many physicians have a fear of using opioids in adequate amounts to relieve pain ("opiophobia").¹⁷ This is in part due to fear of legal repercussions for overprescribing narcotics. Through the Uniform Controlled Substances Act of 1970, federal law regulates the use of narcotics only when used for purposes of opioid detoxification and/or maintenance; it does not regulate the use of narcotics for pain relief. The Psychotropic Substances Act, a 1978 amendment to the Controlled Substances Act, specifically prohibits restrictions on opioid prescription for pain relief.¹⁷ Chronic pain management with opioids for patients with a history of addiction should include a pretreatment agreement for random witnessed drug screens, frequent follow-up visits and detailed documentation. Although a universally agreed upon treatment paradigm for this patient population does not exist yet, the responsibility of

prescribing opioids to patients with a history of addiction rests solely in the hands of individual clinicians. It is with great expectation that we, the next generation of pain management clinicians, accept this responsibility by utilizing all current and emerging knowledge to meet the challenge of treating patients within this unique population group.

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President's Message ASRA: A Year in Review

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Two Carl Koller award recipients were selected for 2010 by the Research Committee. Congratulations to Dr. Sheila Riazi (University of Toronto) for her study titled "Can Ultrasound Predict Nerve Injury Following Posterior Tibial Nerve Block in Diabetic Patients with Peripheral Neuropathy?" and Dr. Andrew Gray (University of California, San Francisco) for his study titled "Intravascular Contrast for Regional Anesthesia."

Finally, I urge you to attend the upcoming spring meeting in Las Vegas (May 5-8, 2011). The full, exciting program can be viewed online (<http://www.asra.com/spring-meeting-2011/>), and the abstract submission deadline is March 1.

If you have new ideas that can further improve our Society, please write to me at president@asra.com.

A New Web-Based Tool at www.sonography.anaesthesia.org.au to Teach Sonoanatomy



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Ultrasound-guided regional anesthesia (UGRA) requires integration of knowledge and motor skills that are not commonly taught in undergraduate medical curriculums. Traditionally, comparable skills have been learned through apprenticeship. Learning procedural skills in a busy clinical environment can be demanding and dependent on the volume and type of clinical material available. A conflict can arise between providing clinical services in a timely manner and the educational needs of trainees, with the former usually predominating.¹

The ASRA/ESRA recommendations for education and training UGRA, provide clear guidelines regarding the scope of practice and teaching curriculum for UGRA.² Innovative regional anesthesia training programs at the Mayo Clinic³ and Duke University⁴ have been described in the contemporary literature. Acquiring core knowledge and developing basic motor skills (through simulation) prior to clinical exposure are emphasized in both these guidelines and in other educational literature.

A core skill in UGRA is interpretation of sonoanatomy. In fact, an understanding of sonoanatomy is inherent in the first four of the 10 common tasks used when performing an ultrasound-guided nerve block.² Learning sonoanatomy in the clinical environment can be limited by production pressure in the operating room, and therefore, one approach is for trainees to be familiar with sonoanatomy before they commence performing UGRA.

This may allow trainees to concentrate more effectively on the broad range of technical and non-technical skills required to successfully perform regional anesthesia.

A wide range of resources exist to illustrate anatomical concepts and relationships relevant to ultrasound imaging. In books and articles, static labelled images are commonly used. Videos of ultrasound can be found on You Tube and specialist UGRA websites, including www.usra.ca and www.nysora.com. Static images and even video lack the dynamic of real-time scanning; for example, dynamic scanning along the course of a nerve can help in its identification. The radial nerve is often difficult to identify in a static scan of the axilla; scanning distally reveals the characteristic course of the radial nerve as it passes posterior to the humerus.

One method to increase familiarity with sonoanatomy is to spend time scanning volunteers or to self scan. Despite the increased availability and portability of ultrasound machines, they still remain a valuable clinical resource in many departments. Access to ultrasound machines for educational purposes may be limited by clinical demands.

We have produced an educational tool to teach sonoanatomy relevant to regional anesthesia that simulates dynamic scanning, and being web-based (www.sonography.anaesthesia.org.au) is accessible to trainees. Our goal was to produce simultaneous video of a linear ultrasound scan demonstrating specific anatomical concepts and an external video that could demonstrate probe position at any given time. The simultaneous videos would be linked and controlled within a web-based interface. A similar interface used to describe bronchoscopic anatomy, developed at Toronto General Hospital, can be found at www.Thoracic-anesthesia.com.

"An understanding of sonoanatomy is inherent in the first four of the 10 common tasks used when performing an ultrasound-guided nerve block."

Method

The project was commenced at Massachusetts General Hospital, Boston. The initial goal was to produce a package to illustrate the sonoanatomy

of the neck pertinent to internal jugular central lines, interscalene and supraclavicular nerve block.

A GE LogiQ E ultrasound machine was connected to a DVD recorder (Sony VRD-MC5), via S-video output, allowing the ultrasound image to be captured. An external video camera (Sony DCR-TRV 480 Hi8) was used to capture images of the ultrasound probe during the scanning.

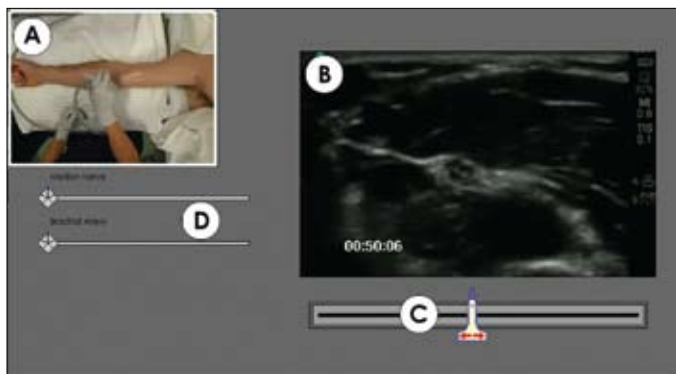
The volunteer was carefully positioned and the scan to be undertaken was rehearsed. The key features of the scan were that it adequately illustrated the key anatomy and that the probe was moved along the defined path

at a constant velocity. A series of scans were then made whilst the ultrasound image and probe position were simultaneously recorded.

The best video combination was chosen and the two synchronous videos were imported to a personal computer (MacBook Pro). The videos were converted so that their frame rates were equivalent. These videos were then incorporated into an Adobe Flash file. Flash is a program that allows production of web-based video and animation. Manipulations were performed within Flash to allow scanning backward and forward through the videos using a sliding bar. Translucent overlays were developed to illustrate important anatomical points at key video frames. After proving the concept was viable in the neck, a second package was produced to illustrate the course of the sciatic nerve in the thigh.

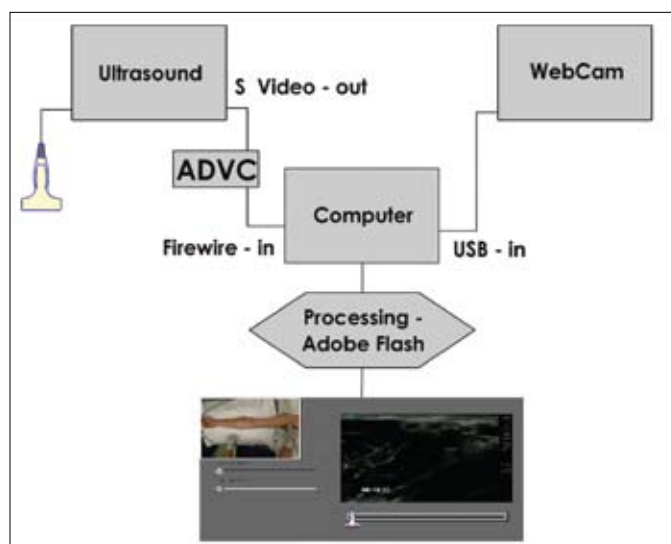
The technique has been refined further at St. Vincent's Hospital in Melbourne, Australia. One of the main issues identified in the initial work was ensuring that videos were synchronous. This problem was overcome by directly recording both streams of video data onto a computer. Liteplo et al.⁵ described the use of an analogue digital video converter (ADVC) to transmit ultrasound images directly to a PC and then on to an iPhone. Taking inspiration from this, we imported the ultrasound images using an ADVC via a firewire port, and external images from a web-cam using a USB2 port. The images were then simultaneously displayed and recorded from the computer screen. This single video was then imported to Flash and manipulated.

Figure 1: Summary of Information Gathering Process



In order to prove the refined technique, it was used to map the major nerves of the forearm from the axilla to the wrist. All of the videos mentioned in this article, and supporting animations illustrating anatomy, can be viewed online at www.sonography.anaesthesia.org.au.

Figure 2: Final Product



A - Video showing ultrasound probe position, B - Video showing ultrasound image, C - "Slider" used to control videos, D - Sliders used to control translucent overlays.

Discussion

We have demonstrated that this educational tool can dynamically illustrate the sonoanatomy relevant to regional anesthesia. We hope that the presented package will facilitate learning sonoanatomy and skill development in UGRA. Our goal is to use this technology to produce an online, interactive atlas of sonoanatomy. The atlas should allow trainees to have a solid understanding of the fundamental principles before undertaking clinical work.

The technology described here has other possible applications; for example, the use of the ADVC alone provides a simple way to archive ultrasound images obtained during a procedure directly to a personal computer. Simultaneous recording of external video of trainees placing nerve blocks and corresponding sonograms could be used for performance review and potentially accelerate skill development.

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Square Peg in a Round Hole: Why Don't We Have Specific Connectors for Peripheral Nerve Block and Epidural Infusions Yet?



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The administration of epidural fluids through an I.V. line was recently implicated in the death of a 16-year-old girl.¹ Because misconnections appear to be common,² calls for regional analgesia/analgesia (RA) specific connectors have been made with each occurrence described in the literature.³⁻¹² In 2006, The Joint Commission (previously known as JCAHO) issued a Sentinel Event recommendation that hospitals “do not purchase non-intravenous equipment that is equipped with connectors that can physically mate with a female luer I.V. line connector.”¹³ So why don't we have RA specific connectors yet?

Before I wrote this opinion, I stopped at the Krispy Kreme donut shop here in Winston-Salem and noted that even in my doughy-glazed postprandial stupor I could not accidentally dispose of my plastic tray—*because a square peg does not fit in a round hole* (Figure 1). Next door to this shop, at the Kangaroo Gas Station, my VW GTI was spared from emitting embarrassingly blue exhaust by a brightly marked diesel pump, situated on a physically separate island. The pump was fitted with a large nozzle surrounded by a spiral of wire that would not enter the standard inlet for my regular gas tank (Figure 2). These businesses employ the principle of “safety under single fault condition” — that is to say, donut trays and gas nozzles are engineered so a single human error does not result in unacceptable risk. So why is hooking our patients to systemically toxic local anesthetic afforded less consideration? Luckily, I believe there are only four obstacles to having RA-specific connectors.

Obstacle One: The Un-Simple Problem

Design of a new RA specific connector is not as simple a problem as that of a donut tray. Can an RA connector be equally well designed to prevent misconnections of I.V. medicines that have no place near nerves? Would specific syringes to bolus be required? Or would adaptors be needed for standard syringes? Won't anesthesia providers simply use the adaptors to avoid dealing with these connectors? What if a new connector or adaptor winds up mating with something else — like a feeding tube? What if

one company makes the connector but another makes the tubing? Members of ASRA can help by becoming involved in assisting agencies that develop design standards. One such organization is the Association for the Advancement of Medical Instrumentation www.aami.org.

Obstacle Two: The Money at Stake

One of my mentors once told me, “If something in medicine does not make sense, it is because of money.” As applies to connectors, it is indeed a fact that considerable expense is involved when a company re-tools a factory to accomplish a re-design. However, much, much more money is at stake if the first company to introduce RA-specific connectors does so at the expense of their own market share. What can members of ASRA do about this one? I recommend we all spend a little less time drooling over sexy ultrasound machines at the next ASRA exhibit hall. Instead spend a little time talking to every equipment rep you meet about what we *really* need — a re-design of that routine, low-tech little piece of plastic known as an RA-specific connector.

Figure 1



Obstacle Three: The Success for the Traditional Luer Lock

Patented in 1925, the Luer lock was named after the 19th century German medical instrument maker Hermann Wülfig Luer, who originated 6 percent taper fittings for glass bottle stoppers.¹⁴ As a connector, the addition of the lock to the Luer has become a tradition that has withstood the test of time, but that has also led to our dependence on the same interchangeable connector for each and every purpose. My personal solution is to serve notice to any industry-type reading this article: my institution is ready to break with tradition.

Figure 2



Obstacle Four: The Anesthesiologists

A reviewer of one of my submissions on this topic once wrote “The motto of the ASA is vigilance not equipment.” While the US Resident Review Committee has added “systems-based approaches” and “professionalism” to the core competencies for training anesthesiologists, it is still too easy for anesthesiologists to practice with the mistaken belief that our vigilance in the O.R. (without getting too involved in perioperative patient care) will save our patients. In addition to the above, I also recommend anesthesiologists become directly involved in the following:

Revise your hospital’s educational efforts and policies: Stress the importance of tracing RA tubing to its source before connecting any new RA infusion and as part of an established process of anesthesia and nursing transfer of care.

Ensure purchase of RA specific tubing: Your hospital should purchase tubing for epidurals and PNBs that can be easily distinguished from I.V. tubing by color, shape or texture.

Ensure purchase of RA-specific infusion pumps: Your hospital should purchase one type of pump to deliver RA-specific infusions. This unique pump should have an appearance obviously different than whatever type(s) your institution uses for I.V. infusions.

Encourage your hospital’s pharmacy to revise procedures for preparing RA infusions: The same pharmacy personnel who prepare the solutions should attach infusion tubing to infusion bags and dispense these as a unit. A label applied in the pharmacy on the distal end of the tubing should indicate “Not for I.V. Use.”

Be pro-active when discontinuing infusions: After removing an epidural or nerve block catheter, cut the Luer connector off the end of the pump’s RA infusion tubing to prevent re-mating with an I.V. connector that may remain.

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How We Do It:

Integrating Regional Anesthesia Into a Freestanding Outpatient Surgery Center



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"When I visited the University of New Mexico (UNM) outpatient surgery center recently, I discovered the Southwest's best-kept regional anesthesia secret..."

When Firoz Vagh, James Dunagan, and I were recruited to open a freestanding outpatient surgery center (FOSC) center at UNM, our vision was to develop a practice that would maximize the use of regional anesthesia. Dr. Vagh and I were in private practice together at a community hospital in Albuquerque for over 20 years. When I became medical director of the center, I recruited Dr. Vagh because of his regional anesthesia expertise. Together, we have created a system that is extremely efficient, has high patient and surgeon satisfaction, and can perform complex cases in the outpatient setting that previously required hospitalization.

Our FOSC opened in May 2003 and is located about half a mile from our teaching hospital. The modern center has six operating rooms, 10 fully monitored pre-anesthesia rooms, (four of which are designated for performing regional anesthesia), and 12 post-anesthesia recovery bays. We utilize an anesthesia care team, including three attending anesthesiologists, four mid-level providers (CRNAs and anesthesiologist assistants) and two residents, ranging from CA1 to CA3, per day. Each resident in our program rotates through our FOSC for three to four months during their residency. During each one-month rotation, a resident performs 80-100 peripheral nerve blocks.



The interior of the outpatient surgical center.

We perform the full gamut of outpatient subspecialty surgical procedures at our center, including orthopedics, plastics, head and neck surgery, general surgery, ophthalmology, gynecology, and urology. Currently 5,400 cases are performed per year with over 50 percent being orthopedic, and the pain associated with these procedures is well known.¹ Regional anesthesia techniques can decrease postoperative pain and discharge times and increase patient satisfaction.² Ultrasound-guided peripheral nerve blocks (PNB) have grown in popularity and facilitate the safe performance of complicated procedures on sicker patients in our practice.³ At the FOSC, 60 percent of the cases are performed with regional anesthesia (3,300 cases last year), the majority involving ultrasound-guided peripheral nerve blocks: thoracic and lumbar paravertebral, transverse abdominis plane, brachial plexus, femoral, obturator, sciatic, and saphenous. The majority of blocks currently performed are single injection, but our volume of continuous peripheral nerve blocks is increasing.

The preoperative process starts in the surgical clinics located on site at the FOSC. UNM surgeons talk to prospective block patients in their clinics and advise them they are candidates for regional anesthesia. A preoperative nurse from the FOSC contacts all patients



Dr. Ed Mariano and Dr. Firoz Vagh.

by telephone before surgery to perform a preanesthetic assessment, screen patients for outpatient eligibility, and discuss regional anesthesia options if applicable.

On the day of surgery, first cases need to be expedited so that patients are brought in and are ready for physician care at 6:45 a.m. All adult patients are given celecoxib 400 mg by mouth unless contraindicated in the preoperative holding area soon after admission. Regional anesthesia patients are admitted to the FOSC and brought to the preoperative area where they are positioned on gurneys in one of the four block bays. One nurse each day (i.e., "block nurse") is assigned to assist with the care of regional anesthesia patients. These duties include preparing the patient, inserting an intravenous catheter, monitoring the patients, and performing the pre-procedural checklist. Patients are sedated with fentanyl and midazolam prior to the administration of regional anesthesia. Once the peripheral nerve blocks are placed, the block nurse monitors and documents patient vital signs until the patient is transported to the O.R. If the work load becomes too great for the one block nurse, other nurses are available to assist in patient care.



Dr. Vagh teaching.

There is no dedicated regional anesthesia block team at UNM, as attending anesthesiologists also supervise two rooms. The anesthesiology attending physician is responsible for making sure the blocks are placed in a timely fashion. A core group of UNM anesthesiologists supported by the department visited other institutions and attended regional anesthesia conferences to develop a reliable skillset and educational curriculum in ultrasound-guided PNB with or without concurrent electrical nerve stimulation. After the PNB is performed, the patient is

evaluated and if the block is not complete, a rescue block is performed before going to the O.R. Following surgery, patients are evaluated again in PACU, and rescue blocks may be performed prior to discharge if necessary.

PACU nurses routinely telephone patients the day following surgery. They utilize a standardized checklist of questions to ask the patients. If complications arise, one of our attending anesthesiologists will contact the patient and provide indicated treatment. We are currently developing a quality improvement process with our surgeons to work up the rare patient with a complication following a PNB. We have developed a protocol involving neurology specialist consultation, MRI, nerve conduction studies, and electromyelograms.

Like many other outpatient surgery centers, we continue to see a higher prevalence of patients with morbid obesity, sleep apnea, GERD, and other serious medical problems each year presenting for ambulatory surgery. A regional anesthesia program including peripheral nerve blocks makes taking care of these patients possible in our practice. Objective measures of success have included our Press Ganey Patient Satisfaction Score changing from 80 percent to 98 percent since initiation of the program, increasing numbers of formerly-inpatient admit cases performed at the FOSC, and a more active clinical research program. Subjectively, UNM surgeons regularly state their preference to operate at the FOSC over the main hospital, and the reputation of our regional anesthesia program is mentioned by medical students applying to residency at UNM with increasing frequency.

In conclusion, developing a highly successful regional anesthesia program in a freestanding outpatient surgery center is feasible. Factors critical to our success have included a common passion among the anesthesiology staff for regional anesthesia, an outpatient surgical system conducive to the performance of regional anesthesia, streamlined patient flow, motivated nursing leadership, and surgeons who advocate for their patients by supporting regional anesthesia.

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Renewed Interest in the Pterygopalatine Fossa: What Makes the Pterygopalatine Fossa Unique?



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Location, location, location!

The pterygopalatine fossa (PPF) contains several different neural structures (parasympathetic, sympathetic and trigeminal sensory) that are compacted in a small well-defined area. This makes the PPF an attractive target for neuromodulatory interventions of these neural structures. More important, this fossa is easily accessible with minimally invasive approaches, in contrast to deep brain or hypothalamic interventions.

Recent research over the past year has shed light on the important role of the sphenoplatine ganglion (SPG), which is located within the PPF, in cerebrovascular autonomic physiology as well as the pathophysiology of different headache disorders (cluster headache, migraine and trigeminal autonomic cephalalgias). Accordingly, neuromodulation of the autonomic fibers (parasympathetic and sympathetic) may play a key role in the management of such disorders as headaches and stroke or cerebral vasospasm. Another important structure within the PPF is the maxillary nerve (V2), which passes through the roof of the fossa. Here, the trigeminal system is accessible for reliable neuromodulation by targeting its second branch - the maxillary nerve - and this could be utilized in various painful conditions of the head and face [Table 1].

SPG Neuroanatomy

Although the SPG is considered predominantly a parasympathetic ganglion, it has rich parasympathetic (preganglionic axons and postganglionic cell bodies and axons) and sympathetic (postganglionic axons) components. The parasympathetic preganglionic cell bodies projecting to the SPG originate in the superior salivatory nucleus (SSN) of the facial nerve in the pons.

The efferent fibers of the SSN travel in the nervus intermedius and divide at the geniculate ganglion to become the greater petrosal nerve and chorda tympani nerve, respectively. The first-order parasympathetic neurons in the greater petrosal nerve are joined by the postganglionic sympathetic fibers from the deep petrosal nerve, forming the nerve to the pterygoid canal (vidian nerve). The preganglionic parasympathetic neurons then synapse with the second-order parasympathetic neuronal

Table 1

PPF		
Parasympathetic fibers Pre and Postganglionic	Sympathetic fibers Postganglionic	Trigeminal Sensory fibers Maxillary branches
I) Autonomic features associated with: 1-Cluster headache 2-Trigeminal Autonomic Cephalalgias (TAC) 3- Other headaches e.g. Migraine... II) Cerebrovascular regulation 1-Stroke 2-Cerebral vasospasm	I) Sympathetically mediated pain: 1- Postherpetic neuralgia 2- Atypical facial pain II) Cerebrovascular regulation 1-Stroke 2-Cerebral vasospasm	Somatosensory pain: 1- Headaches 2- Trigeminal neuralgia 3- Orofacial pain

Potential applications for neuromodulation in the PPF

cell bodies located in the SPG. Therefore, *the only cell bodies located within the SPG are those of the second-order postganglionic parasympathetic neurons*, which may explain the clinical observation that patients after radiofrequency ablation (RFA) or electric neurostimulation of the SPG may notice improvement of the autonomic parasympathetic symptoms either earlier or even without improvement of the headache pain.

The sympathetic cell bodies projecting to the SPG originate in the upper thoracic spinal cord (T1–T2). The preganglionic sympathetic neurons then synapse in the cervical sympathetic ganglia, mainly the superior cervical ganglion. The postganglionic second-order sympathetic neurons form the carotid sympathetic plexus and reach the pterygoid canal through the deep petrosal nerve, where it joins the first-order parasympathetic neurons in the greater petrosal nerve, forming the nerve to the pterygoid canal (vidian nerve). Postganglionic sympathetic fibers pass through the SPG without synapsing and innervate mainly blood vessels.

PPF Anatomy

The pterygopalatine fossa is a small, upside-down pyramidal space 2 cm high and 1 cm wide. It is located behind the posterior wall of the maxillary sinus [Figure 1].

Pterygopalatine Fossa (PPF) Contents:

1. Maxillary artery and its branches.
2. Maxillary nerve (V2).
3. SPG and its afferent and efferent branches.

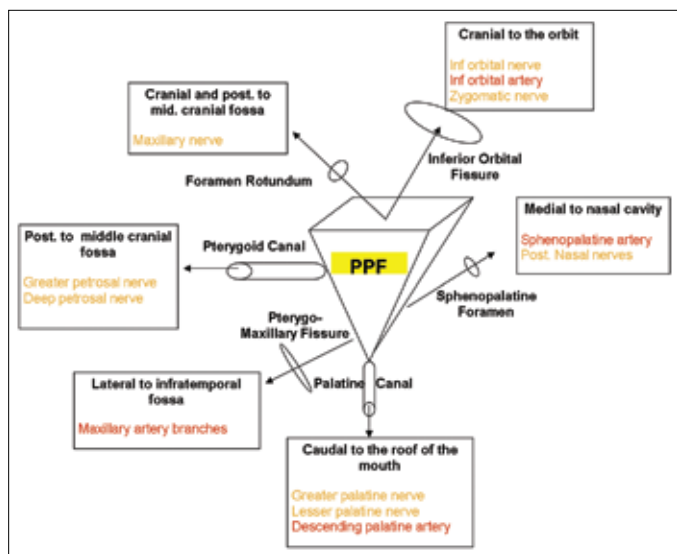
Pterygopalatine Fossa (PPF) Boundaries:

- *Anterior:* superomedial part of the infratemporal surface of maxilla.
- *Posterior:* root of the pterygoid process and adjoining anterior surface of the greater wing of sphenoid bone.
- *Medial:* perpendicular plate of the palatine bone and its orbital sphenoidal processes.
- *Lateral:* pterygomaxillary fissure.
- *Superior:* Sphenoid sinus.
- *Inferior:* part of the floor is formed by the pyramidal process of the palatine bone.

PPF Openings:

- Foramen rotundum (posterior wall, roof).
- Pterygoid canal (posterior wall, medial).
- Palatovaginal canal (posterior wall).
- Palatine canal (inferior).
- Sphenopalatine foramen (medial wall).
- Inferior orbital fissure (anterior wall, roof).
- Pterygomaxillary fissure (lateral).

Figure 1



Anatomy of the PPF showing the rich innervation within the fossa.

Approaches to the PPF

As the PPF has seven openings, theoretically the fossa can be accessed through any of these foramina. However, the clinically feasible (non-invasive) approaches are:

Transnasal approach:

As the SPG is located a couple millimeters deep to the lateral nasal mucosa, topical application of local anesthetic solution to the posterior wall of the nasopharynx in the region of the middle turbinate can diffuse across the nasal mucosa and the sphenopalatine foramen to block the SPG.

Transnasal blockade of the SPG was first reported using topical cocaine; however, lidocaine 4 percent is usually used currently.¹

Transnasal endoscopic approach:

This technique allows a needle to be inserted transnasally under vision through the sphenopalatine foramen into the PPF.²

Transoral approach:

The PPF can also be accessed transorally by placing a 27 G needle inside the greater palatine foramen. This approach is usually utilized by dentists to block the palatine nerves.³

Infrazygomatic approach:

Neuroablation techniques are only feasible with this infrazygomatic approach. Needle placement is usually guided by fluoroscopy; however, CT guidance is reported as well.⁴ The infrazygomatic approach could be either anterior to or through the coronoid notch of the mandible.⁵

A. Anterior approach:

The needle entry is inferior to the zygomatic arch, just anterior to the mandible, between the mandibular ramus and the posterior border of the zygomatic bone. We prefer this approach as the needle can be advanced in a target view toward the PPF without the need to walk the needle off the lateral pterygoid plate (which is usually very painful). Also it is much easier to steer the needle (cephalad-caudad or anterior-posterior) within the fossa to selectively target different structures within the fossa.⁵

B. Coronoid approach:

The needle entry is through the coronoid notch of the mandible. The needle is usually advanced to target the lateral pterygoid plate first and then walked off the bone anteriorly to enter the PPF. However, it is often hard to manipulate the needle once it is inside the fossa.

Interventions at the PPF

Augmentation of cerebral blood flow in the treatment of acute ischemic events:

SPG stimulation has been shown to increase regional cerebral blood flow and to reverse cerebral vasospasm in animal models.⁶⁻⁸

The animal studies were encouraging and we have now started to see early human data evaluating the safety and effectiveness of SPG stimulation in the treatment of acute ischemic stroke.⁹

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Renewed Interest in the Pterygopalatine Fossa: What Makes the Pterygopalatine Fossa Unique?

Continued from page 13

Sphenopalatine ganglion radiofrequency ablation:

Radiofrequency ablation of the sphenopalatine ganglion is usually performed with the percutaneous infrazygomatic approach. Once the pterygopalatine fossa is accessed with a radiofrequency needle, sensory stimulation is performed to produce deep paresthesias behind the nose and then two radiofrequency lesions are carried out at 80°C for 60 seconds each.¹⁰

Narouze et al. reported favorable outcomes in the treatment of intractable chronic cluster headache. They reported significant improvement in both mean attack intensity and mean attack frequency for up to 18 months in 15 patients. However, 46.7 percent of the patients (7/15) reported change in the headache pattern with return to the episodic form of cluster headache at a mean follow-up period of 18 months.¹⁰

Sphenopalatine ganglion stereotactic radiosurgery:

Stereotactic radiosurgery is another minimally invasive approach for SPG ablation. CT imaging delineates the walls of the pterygopalatine fossa while the contents of the fossa are better visualized on MRI. It was shown to be helpful in the treatment of medically refractory cluster headaches (60 percent). Radiosurgical doses to the SPG ranges from 75Gy to 80Gy.^{11,12}

Sphenopalatine ganglion neurostimulation

This technique employed transient neurostimulation with a temporary electrode using the standard lateral infrazygomatic approach described by Narouze et al.⁵

Tepper et al. recently demonstrated the effectiveness of electrical stimulation of the SPG for acute treatment of intractable migraine. In 10 migraine headache trials, acute SPG stimulation resulted in complete relief in two, partial in two and no relief in six instances.¹³

Ansarina et al., on the other hand, reported SPG stimulation for cluster headaches. In 18 distinct cluster headache attacks, acute SPG stimulation resulted in complete resolution of the headache in¹¹, partial resolution in three and no relief in four instances. SPG stimulation was noted to result in complete resolution of the associated autonomic features of cluster and migraine headaches such as nasal congestion and periorbital swelling in all cases presented with autonomic features.¹⁴

Questions remaining to be answered:

- The key question to answer is: Can we selectively stimulate the parasympathetic, sympathetic or sensory trigeminal neurons within the PPF? Is there a specific set of stimulation parameters that can modulate one fiber more than the other?

- What are the stimulation parameters to augment versus blocking the signals in those different fibers?? This is essential to modulate/shift the balance between the sympathetic and parasympathetic innervations of the cerebral vasculature.

Since the only cell bodies located in the SPG are the postganglionic parasympathetic neurons, can we presume that we are always stimulating the parasympathetic system *first*?

We need more animal and human data to address those questions and to revive the interest in the PPF and SPG.

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36th Annual Regional Anesthesia Meeting & Workshops

Welcome to Las Vegas and the 36th Annual Regional Anesthesia Meeting & Workshops! The 2011 Spring Meeting Program Committee has planned an outstanding educational event for our meeting attendees. In addition to our highly successful programs from the past, this year attendees will see several new and exciting learning opportunities.

Plan to attend the Refresher Course lectures that highlight basic science and the clinical applications of topics. General Sessions will provide updates on practice advisories and consensus statements, discuss the future of ultrasound in regional anesthesia, and present an update on acute pain management. Friday morning's session will feature a presentation that will highlight all the REALLY COOL things ASRA members can do on the journal website.

Based on attendee feedback, new and innovative sessions have been included in this year's programming:

Demonstration-Focused Workshops are designed to cover specific blocks. Generally, two blocks will be discussed and faculty will review indications for blocks and relevant anatomy, surface anatomy, traditional techniques employing nerve stimulation, strategies to avoid, sonoanatomy and ultrasound-guided techniques.

Hands-On Ultrasound Workshops provide learners with an opportunity to practice their skills and to further develop ultrasound-guided/assisted techniques for regional blocks. Faculty will address sonoanatomy and sonographic landmarks, scanning techniques to optimize target imaging, and strategies to identify common artifacts and avoid complications.

Greetings everyone!

ASRA's 36th Annual Regional Anesthesia meeting and workshops will take place from May 5-8 at Caesars Palace in Las Vegas, Nevada. This year's program director is Dr. Christopher L. Wu from the Johns Hopkins University, Baltimore, Maryland. Dr. Wu is an Associate Professor in the Department of Anesthesiology and Critical Care Medicine and Division Chief of Obstetric & Regional Anesthesia and Acute Pain.

The resident and fellow's program kicks off with the regional jeopardy session. Here you can test your knowledge in a friendly competition among others in the area of regional anesthesia and acute pain. Besides providing a relaxed and exciting review format, this session also provides an excellent networking opportunity among your peers and the next generation of leaders in regional anesthesia.

There is also the regional anesthesia boot camp, which will consist of multiple sessions focused on anatomy in combination with a basic review of ultrasound techniques. The rotating workshop sessions, which will follow, reviews numerous blockade techniques that are commonly used in everyday practice. Our program will conclude with a resident forum. Here we will highlight a wide

Intensive Hands-On Workshops are four-hour sessions that provide a comprehensive overview of a general area of regional anesthesia. Sessions will include didactic overviews and small-group, hands-on sessions with internationally recognized faculty.

Master Classes are two-hour discussions on various aspects of Peripheral Nerve Catheters and feature experts in the field. The small-group format allows plenty of time for questions and answers.

Don't think that we forgot about the FUN. "Whoever said one nightclub can't be all things to all people, never envisioned PURE." Join Dr. Chan as he welcomes ASRA's very own Admir Hadzic, M.D., Ph.D. and his BIG APPLE BLUES band on Saturday evening. Enjoy an evening of networking, great music, excellent food and fun at Caesars Palace's own PURE night club. It's a DO NOT MISS event.

Finally, as you encounter the substantial assortment of new and traditional educational offerings, remember to take time to experience some of the unique activities that Las Vegas has to offer, including fine dining, live shows and lively nightlife. We look forward to seeing you in Las Vegas.

array of topics, including: fellowship training options, finding the right practice in private practice and academics, and opportunities for those who are fellowship trained in regional anesthesia.

As with year's past, the Resident Section Committee will host the wine & cheese reception with regional and pain medicine fellowship directors, which is included in the discounted resident registration fee.

The 36th Annual Regional Anesthesia Meeting and Workshops will definitely be an exciting event. Please come and expand your knowledge, skills, and confidence in the area of regional anesthesia with the renowned leaders in the field.



Christopher L. Wu, MD
2011 Spring Meeting Program Chair



Artemus Flagg II, M.D., M.P.H.
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Perineural Adjuvants and Potential Added Value to Patient Care: Introductory Bench Science Findings



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After 12 years of focused clinical research (1995-2007), first addressing single-injection nerve blocks and fast-tracking/hospital economics¹, then addressing continuous outpatient perineural infusions²⁻⁴ and the psychometrics of patient outcomes^{5,6}, I found that the ultrasound-guided regional anesthesia (UGRA) revolution had already come and gone, for the most part.

What compelled my research interest starting in late 2006 was the concept of perineural adjuvants extending the duration of single-injection nerve blocks.⁷ This is necessary because plain ropivacaine has an insufficient duration of analgesia after a single-injection block.^{8,9} Short block

durations lead to many unhappy middle-of-the-night awakenings for our surgical outpatients. We started a lab to evaluate the “no confidence” sentiment propagated by some thought leaders regarding perineural adjuvant safety; this statement is only partially true (e.g., midazolam is worrisome), but is otherwise largely unfounded.

Local anesthetics are known neurotoxins,¹⁰ yet their safety in patients is considered “standard.” Fact is, local anesthetics have been “grandfathered¹¹” into our patient care milieu; there are no meaningful alternatives to produce a motor-sensory conduction block. For the most part, “safe doses” that have been formally defined relate to central nervous system and cardiovascular toxicity (i.e., seizures and dysrhythmias). To my knowledge, no known “safe dose” exists when it comes to perineural safety. It is impossible at present to minimize the risk of “nuisance numbness” that can trouble patients for weeks-to-months, let alone the 1-3: 10,000 patients who are reported to have long-term sequelae. This is **not** a low incidence when compared to other anesthetic complications such a malignant hyperthermia.

To approach this dilemma, my team and basic science mentors were funded to start a rodent laboratory to determine the effects of perineural drugs on the cytotoxicity of neurons using the trypan blue exclusion assay. We harvested primary sensory neurons from the dorsal root ganglia (DRG) of male Sprague-Dawley rats, cultured the cells using conventional techniques, and exposed them to many drugs and drug combinations for times ranging

from 30 min to 24 hr. For a frame of reference, we used ropivacaine 0.25 percent as the “active control” treatment, and choline chloride as the “inert control” treatment (i.e., placebo if this were a human trial). We presented these data at the 2010 Annual Meeting of the American Society of Anesthesiologists in San Diego.

In high concentrations as single drugs, clonidine (50-67 µg/mL), buprenorphine (30 µg/mL), and dexamethasone (666.7 µg/mL) were non-toxic after 24 hr exposure; but midazolam (66.7 µg/mL) and ropivacaine were cytotoxic (Figure 1). When using lower “clinical equivalent” concentrations for clonidine (1 µg/mL) and buprenorphine (3 µg/mL), along with dexamethasone (66.7 µg/mL), all combined with ropivacaine 0.25%, the 3 adjuvants together did not influence cytotoxicity created by ropivacaine as a single-drug (Figure 2a). When excluding ropivacaine, and combining listed lower concentrations of clonidine-buprenorphine-dexamethasone, along with midazolam 16.7 µg/mL, there was no difference in cytotoxicity at 24 hr of exposure when compared with choline control (Figure 2b). For our abstract, we tested 1 animal per drug treatment. We have since performed confirmatory experiments with n=4 animals per drug treatment, and our group’s manuscript has been accepted for publication in an upcoming issue of *Regional Anesthesia and Pain Medicine*. Stay tuned.

Clonidine and buprenorphine are “textbook^{12,13}” perineural adjuvants. In my practice, I use about 0.5-0.75 µg/kg/patient of clonidine, and 1.5 – 3 µg/kg/patient of buprenorphine (3 µg/kg is reserved for patients who require chronic opioids at home). The doses listed are “per patient” since commonly 2 nerve blocks are needed (e.g., femoral and sciatic). These combinations with ropivacaine for surgical blocks (e.g. interscalene for shoulder surgery) and bupivacaine 0.25% for analgesic blocks (e.g., femoral block for allograft reconstruction of the anterior cruciate ligament) yield mean durations of about 22 hr and 26 hr, respectively, in my practice.

I am hesitant to (i.e., I don’t) use the commonly-reported 8 mg dose of perineural dexamethasone¹⁴⁻¹⁶ due to safety concerns either with the nerve itself or with the immunosuppressant and infection risks that are inherent with corticosteroid use. Our 24-hr cell culture data with 66.7 µg/mL extrapolates to a 2 mg dexamethasone patient-dose equivalent (**over 24 hr**). It is my opinion that next steps in clinical research should evaluate low doses of perineural dexamethasone with combined low-dose clonidine-buprenorphine. These perineural doses of dexamethasone should not exceed 1-2 mg as a start point. Absence of infectious complications after dexamethasone 8 mg iv¹⁷ should not be equated with a lack of infectious risks (let alone nerve damage risks) when dexamethasone 8 mg is given perineurally!

For ropivacaine and midazolam, our cell culture and drug exposure study indeed verified concerns not only

about some adjuvants (i.e., midazolam) but also our “standard of care” local anesthetics. I find it very difficult to believe that perineural clonidine, buprenorphine, and dexamethasone in clinical doses would pose any patient safety risks (esp. in the context of accidental sub-epineurial injection) when compared with local anesthetics with or without epinephrine and the “intraneural” catastrophes that are possible.

Implied in this monologue is the potential for perineural infusions that do not contain local anesthetics. Clinical research addressing this topic will need to carefully re-define “block success,” since most “block success” research to date has involved blocks that are successful for surgical anesthesia, or in which the patients subjectively report limb heaviness consistent with motor block.

As an illustration, for perineural analgesia with adjuvants only, if a chronic pain patient for a knee replacement lives with a baseline pain score of 5, and if perineural femoral-sciatic infusions of clonidine-buprenorphine-dexamethasone lead to patient pain scores that are equal to or minimally higher than patient baselines (say, pain scores of 5-7 out of 10), and if the patient is satisfied and has good pain control with the absence of motor block, would this be considered a treatment success?

Recalibrating “pain score success,” while accurately assessing nerve block duration in the light of “rebound pain⁴” is important, especially in the context of fall risks¹⁸ and potential for motor block inhibiting postoperative rehabilitation objectives following local anesthetic perineural infusions.

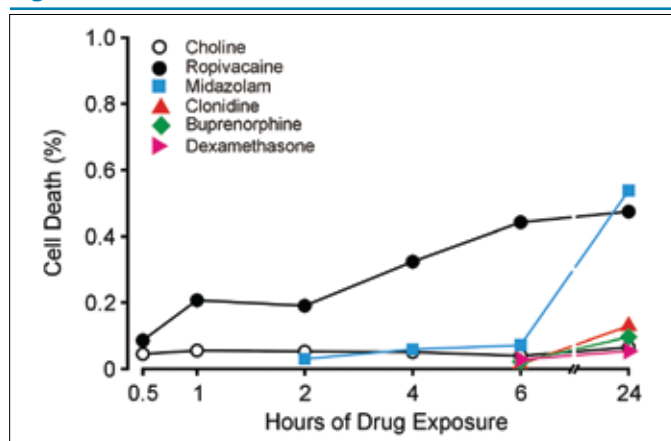
In summary, my research interest lies in moving away from local anesthetics as the centerpiece of postoperative continuous perineural analgesia but instead using rational combinations of FDA-approved preservative-free adjuvants in an off-label fashion. My interests also lie in the potential elimination of perineural catheters for same-day surgery patients, by combining “rational” and “safe” combinations of such adjuvants with the lowest-achievable local anesthetic dose and concentration needed to achieve a surgical block, while aiming for perhaps up to 30 hr of postoperative analgesia at home. Our laboratory is currently funded to address these questions in a rat model, and we hope to bring you good news in the not-too-distant future.

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Figure 1



Cell death (Y axis) as a function of treatment and time (X axis) for ropivacaine (RPV) monotherapy and high-concentration (see text) perineural adjuvant monotherapies. Sample size was n=1 rat per time-treatment, with confirmatory experiments pending.

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New Feature in Newsletter: *'Ask the Experts'*



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In order to better serve the regional anesthesiology and pain medicine audience, several new columns will be forthcoming in *ASRA News*. These will reflect changes in the membership of the Newsletter Committee as well as attempts to address aspects of the subspecialty that may not have been presented in prior issues.

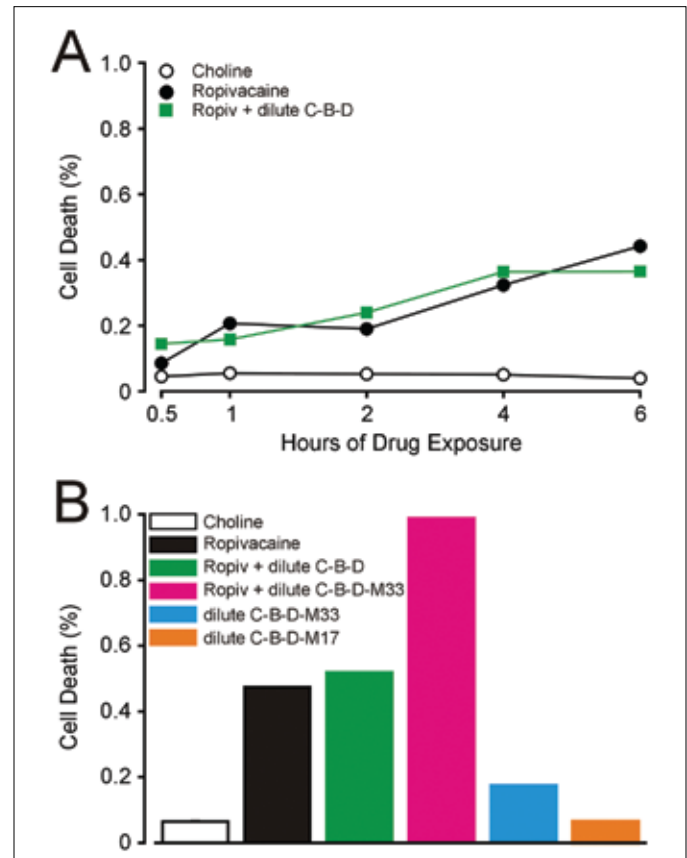
One new aspect of the newsletter will be a question/answer feature that will allow readers to direct questions to accomplished, well-known regionalists and pain management specialists. Sometimes it is difficult to ask questions to speakers, presenters and instructors, whether at a conference (in which case time and

access are limited) or when reading an article. Questions on all aspects of regional anesthesia and pain are welcome for this feature, including those that pertain to techniques, drug dosages or combinations, confounding factors, side effects, patient populations or anatomy. Practical advice on conducting blocks or other aspects of regional anesthetic practice may prove useful to a much larger audience than simply the one who asked the question. We therefore introduce this feature in order to improve communication and interchange among practitioners of regional anesthesia. Questions should be designated for a particular expert in an area of regional anesthesia or pain management, known through publication in one of the anesthesiology journals, or through instruction at an ASA- or ASRA-sponsored event. Short answers to questions that are particularly instructive for the wider audience will be published in this column. Topics that lend themselves to more extensive review may be utilized for articles in the newsletter as well, albeit in a different context. Finally, highly specific questions likely to be of interest only to one person (such as a fine point of research methodology) will likely be answered through a one-on-one interchange rather than through publication. Please send any questions to my attention at the e-mail above or newsletter@asra.com.

Perineural Adjuvants and Potential Added Value to Patient Care: Introductory Bench Science Findings

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Figure 2



Cell death as a function of treatment and time for plain ropivacaine, and clonidine (C) – buprenorphine (B) – dexamethasone (D) – midazolam (M) adjuvant combinations (in clinical concentrations, see text) without and with RPV. Concentrations of midazolam are listed in the figure as 16.6 $\mu\text{g}/\text{mL}$ (M17) and as 33.3 $\mu\text{g}/\text{mL}$ (M33). Figure 2a shows exploratory findings ($n=1$ rat per treatment) of no pattern of either apparent cytoprotection or cytotoxicity with ropivacaine-C-B-D with exposure times of 30 min to 6 hr. Confirmatory experiments ($n=4$) are pending for 2 hr drug exposure times. Figure 2b shows the cytotoxicity outcomes after 24 hr exposure time ($n=1$ rat per treatment) for the listed adjuvant combinations in “clinical” concentrations (see text), without and with ropivacaine 2.5 mg/mL. M33 combined with C-B-D was not cytotoxic; and C-B-D did not worsen the cytotoxicity of RPV. However, M33 combined with RPV-C-B-D was profoundly cytotoxic ($n=1$). Confirmatory experiments ($n=4$) are pending for 24 hr drug exposure times with the se drug mixtures.

Code Status Confusion: What We're All Dying to Know



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Introduction

Many pain physicians find that caring for terminal cancer patients is one of the most rewarding experiences of their careers.

While it is gratifying to provide both procedural and pharmacological management to improve quality of life, it is important to understand the medico-legal aspects of, and how to competently explain to our patients the realistic expectations of, resuscitative efforts in the context of their terminal disease. The following article underscores the poignant reality of "hopeful misconceptions" of our patients regarding

the ability of the medical profession to restore meaningful life. Unless these factors are addressed candidly within the first few visits with the patient, we as providers may be faced with a difficult situation not only with the patient but also with the surviving family members. As the author eloquently states, "we are committed to offering and educating our patients on treatments that are effective" and should not avoid discussing the subject of resuscitation in this population of patients.

Determining a patient's preference for cardiopulmonary resuscitation (CPR) allows health care providers to provide care patient's want, avoid unwanted interventions, and promotes patient autonomy and dignity. Unfortunately, the knowledge of what CPR actually is and its estimation of success differs widely between providers and patients. Most recently, new Medicare regulations are allowing doctors to get reimbursed for holding voluntary end-of-life discussions with patients during annual check-ups. Not so long ago, such end-of-life discussions were denounced by some politicians as a precursor to death panels. I suspect we have gotten beyond all that and hope that one result of this new legislation will allow us to fix the information asymmetry that exists on actual success rates of CPR.

There is an understanding among health care providers, who have taken part or witnessed cardiac arrest, of the often futility associated with CPR, with the data pointing to poor outcomes. The largest and most comprehensive source of in-hospital CPR outcomes data is the National Registry of Cardiopulmonary Resuscitation, reporting

14,720 resuscitation attempts (2000-02) in adults from 207 U.S. hospitals.¹ The data showed that survival 20 minutes after CPR was 44 percent, but more telling is that only 17 percent of all CPR patients survived to discharge. Among those survivors discharged only half went home, with the remainder being discharged to another hospital, a rehabilitation facility, nursing home or hospice. CPR was also found to have inherent risk; of those survivors, 14 percent had neurological decline and 25 percent had overall functional decline.

These are grim statistics that would make anyone question the utility of CPR, yet patients make their decision based on their knowledge of CPR. When asked, patients estimate survival after CPR as 70 percent, while 26 percent can't identify any features of this treatment.² This information asymmetry leads them to undergo resuscitation in situations in which survival is extremely unlikely. One study looked at patients' preferences when educated about the benefits and risks of CPR. Originally, 41 percent of those studied opted for CPR, but when hearing the probability of survival (they used 10-17 percent), only 22 percent opted for this treatment, showing that education, as in most medical situations, can sway a patient's preferences.³

So why such a large information gap, and who is at fault? Some say that we as providers have inadequate training or lack of comfort with these conversations.



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Others say that time and productivity constraints interfere, especially in an era where we are financially rewarded more for quantity rather than quality care. Surveys of patients show that they are more willing to discuss this with their family

physician or internist because of established relationships, but are more likely to want to have these discussions as inpatients. The lack of family physicians/internists doing inpatient medicine and the advent of hospitalists has had some impact on this discussion not being performed.

"There is an understanding among health care providers, who have taken part or witnessed cardiac arrest, of the often futility associated with CPR, with the data pointing to poor outcomes."

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Code Status Confusion: What We're All Dying to Know

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So if health care providers are not disseminating information on CPR, where is the general public obtaining its information? It turns out that most obtain information from the media, and the vast majority from television. One study examined three health care-based television shows (“ER,” “Chicago Hope” and “Rescue 911”) and found 60 occurrences of CPR. In the majority of these cases cardiac arrest was caused by trauma (gunshot wound or motor vehicle accident), with 65 percent being in children, teenagers, or young adults. In all cases, 75 percent survived the immediate arrest, and 67 percent appeared to survive to hospital discharge. The outcomes of CPR were portrayed as either full recovery or death.⁴

These portrayals are not quite what we see in reality, and one could argue that these television programs be more accurate with their medicine. But the reality is they are attempting to create an interesting show and sell advertisements. Of more importance is the fact the general public will continue to obtain and be influenced by decisions for CPR from other sources if health care providers continue to fail to address this important subject.

As health care providers, we are committed to offering and educating our patients on effective treatments. We understand the often futility of CPR in our patients, yet continue to avoid discussing the subject for many of the above reasons. I am hopeful that this newly passed legislation will help fix the information asymmetry that exists on CPR and allow for an educated discussion and decision-making process.

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