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Dr. Joseph R. Tobin took over the SPA presidency from Dr. Jayant Deshpande at the society's Annual Meeting in October.

SPA Annual Meeting Sessions Reviewed

First Morning Sessions

Reviewed by **Ira Landsman, MD**

Vanderbilt University

The first half of the morning fall SPA session was dedicated to molecular explanations for phenotypic polymorphism in health and disease. The session was moderated by **Dr. Valerie Armstead** (Thomas Jefferson University). The invited speakers, **Dr. Myron Yaster** (Johns Hopkins Hospital), **Dr. Laurie Demmer** (Tufts Medical Center) and **Dr. Jeffrey Galinkin** (University of Colorado) humbled the audience with their understanding of proteomics, molecular genetics and pharmacogenetics and their potential impact on future patient care.

Dr. Myron Yaster began the morning session with "Primer on Proteomics", an overview of

proteomics. The proteome is the entire complement of proteins expressed by a genome, cell, tissue or organism. More specifically, it is the set of expressed proteins at a given time under defined conditions. Proteomics is the large-scale study of proteins, particularly their structures and functions in health and disease. The genome is static, while the proteome changes depending on the host's medical condition.

An organism produces an infinite number of proteins. Global proteomics is the study of all proteons. The advanced tools required to study this sizeable data is presently not available. Targeted proteomics is the technique used to study a small number of proteons. Dr. Yaster discussed protein research in cystic fibrosis cell lines as an example of targeted proteomics. In his example, protein from two cell lines, one with the cystic

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PRESIDENT'S MESSAGE

It is my great pleasure to address members of our Society as the new President of our organization! As a member of many Society committees, program director for two of our annual meetings and service as a Director of the Board, I have grown personally and professionally with the Society. I also want to thank our Immediate Past President, Dr. Jay Deshpande for his perspicacious leadership over the last many years. The great energy and dedication of Society members propels us to be the voice of advocacy for children in the perioperative period.

As the Society has grown, we have been a leading advocate for the designation of pediatric anesthesia as a recognized subspecialty to deal with critically ill infants and children in the operating room. The Accreditation Council for Graduate Medical Education (ACGME) now accredits 45 training programs in pediatric anesthesiology, and the SPA has sponsored the application for Subspecialty Certification in Advanced Pediatric Anesthesiology to the American Board of Anesthesiology (ABA). The ABA will consider the application in early 2009. This proposal has been well crafted and has received support from many academic department Chairs and other subspecialty organizations. Nonetheless, the American Society of Anesthesiologists (ASA) is not in favor of this application at this time. We will await the decision of the ABA and continue to advance the concept of recognition of the subspecialty of pediatric anesthesia and the excellent work performed daily by the mem-

bers of our professional organization and the ASA. Dr. Frank McGowan is to be congratulated on his herculean efforts in this process. From the entire Board of Directors, kudos to Frank!

The leadership of the Society is mindful of its fiduciary responsibility to the membership and carefully evaluates the budget on a yearly basis. With recent economic challenges, the leadership is specifically evaluating our short

and long term financial prospects. We have been pleased with the financial performance and diversification of our endowment, and we thank each of you for contributing your talents, time and financial resources to the Society. Our annual educational offerings in the spring (Jacksonville, 2009) and autumn meetings (New Orleans, 2009) consume revenue from investment dividends as we



Joseph R. Tobin, MD, FAAP, FCCM
Wake Forest University
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FROM THE EDITOR

Do we really know what to do during a resuscitation?

By Allison Kinder Ross, MD
SPA News Editor

Instead of my usual blurb, I wanted to share with you an article that was published in *Resuscitation* by Dr. Genie Heitmiller and her colleagues at Johns Hopkins.(1)

I received this article from Dr. Myron Yaster after the SPA meeting and found it to be of great interest. Many of us may have been invited to participate in this questionnaire and it would be interesting to see what the results may have been if there had been a 100% response rate. I treated the questionnaire like an open book test... that I never finished. Kudos to those respondents who completed the survey so that there could be an accurate depiction of what we truly know with regards to protocol during the act of resuscitation. The operating room provides a unique scenario that is typically an exercise in cause and effect when resuscitative measures are needed, but it is important to be able to recite the guidelines in critical situations or to have them at hand so that it can either be second nature or, as I mentioned previously, "open book".

The results directly taken from the abstract of Dr. Heitmiller's article are as follows:

"Overall response rate was 51% (389/768 members). Eighty-five percent of respondents had pediatric anesthesia fellowships, 71% provided anesthesia primarily to children, 71% had been in practice > 10 years, 29% had PALS or APLS training during the

previous year, and 37% had a patient requiring chest compressions in the previous year. Overall, 89% of respondents knew the correct initial dose of epinephrine for asystole, 44% knew subsequent management for asystole if initial epinephrine dose was ineffective, 49% knew defibrillation sequence to treat pulseless ventricular tachycardia (VT), and 73% knew the medication sequence to treat pulseless VT. Only those respondents who reported to be in practice > 10 years scored significantly ($p < 0.0001$) better on all resuscitation treatment questions. Respondents who had PALS or APLS training in the previous year or previous 2 years scored significantly better on the defibrillation sequence for pulseless VT ($p = 0.001$ and $p = 0.045$, respectively), and the medication sequence for pulseless VT ($p = 0.0005$ and $p = 0.011$, respectively) when compared with those who had no previous training."

Articles such as this point out our deficiencies so that we may find ways to improve through processes. Knowing what is expected and where we fail is the first step.

It was great to see everyone in Orlando and I appreciate the Contributing Editors and volunteers who have submitted material to this edition of the newsletter. You are the best.

- (1) Heitmiller ES, Nelson KL, Hunt EA, Schwartz JM, Yaster M, Shaffner DH. A survey of anesthesiologists' knowledge of American Heart Association Pediatric Advanced Life Support Resuscitation Guidelines. *Resuscitation*, 2008.

Ultrasound in Regional Anesthesia and Pain Therapy

By Ira Landsman, MD
Vanderbilt University

Workshop held in Vienna, Austria
April 19 - 20 2008

I was captivated by Dr Peter Marhofer's regional anesthesia lecture at the Winter SPA two years ago. So intrigued, I decided to attend his group's regional anesthesia course in Vienna, Austria. Regional anesthesia is the real deal in Vienna. It is safe to say that two days barely scrapes the surface of this topic. It was a treat to meet and compare notes with fellow anesthesiologists from throughout Europe and Asia.

The two-day course is divided between lectures and hands-on experience practicing ultrasound techniques on live models (sans needles). Dr Marhofer's staff are informed and well published in their specialty. Stand out lectures included the physics of ultrasonography, ultrasonic anatomy, and truncal blocks. Ample opportunity is provided to practice nerve identification on very patient models. I was disappointed that we did not receive a syllabus and had to take notes while listening to the lectures. At the end of the second day there is a test (that is taken seriously). It would have been helpful to have been provided with written material both to study and to take back to the States. Dr. Marhofer does provide a DVD that has wonderful videos including fascinating animations describing the common pediatric nerve blocks. In addition, if you ask really nicely you can get the recipe to make a gelatin mold that contains stalks of asparagus used at the conference to practice ultrasound needle positioning techniques. I highly recommend this course for those who are serious about developing the skills required to perform pediatric regional anesthesia.



Supervised ultrasound practice at the Ultrasound in Regional Anesthesia and Pain Therapy meeting in Vienna

I would be remiss not to point out that Vienna is a beautiful city with wonderful food and terrific beer. Before I left for Vienna I rented the movie "The Third Man". The story is about a manhunt (Orson Welles) through Vienna's streets and sewers that takes place just after World War 2. At this time, Vienna is divided into 4 distinct sections that were governed by the British, Americans, Russians and the French. The movie features memorable characters and is hailed as one of the best movies ever filmed. After seeing the movie and attending the regional course in Vienna I highly recommend staying an extra day and joining the "Third Man Tour". Information may be found by going to the following web site: <http://www.viennawalks.com/>. This tour is a very cool way to learn about historic Vienna.

Pediatric Sedation Research Consortium-The Update

By Joe Cravero, MD
Dartmouth-Hitchcock Medical Center

The Pediatric Sedation Research Consortium continues to collect patient encounters in its database - now numbering over 130,000 sedation events.

The consortium was started in 2003 by Joe Cravero with help from sedation leaders from pediatric anesthesiology, pediatric emergency medicine, pediatric intensive care, and sedation nursing under a grant from the National Patient Safety Foundation. It remains a collaborative, multispecialty organization dedicated to highlighting best practice and analyzing adverse events in pediatric sedation.

Twenty eight hospitals and offices currently record sedation encounters in the database on a daily basis and report results via an internet based data collection tool. Each participating center receives regular reports on their data and that of the entire PSRC for QA purposes as well as the opportunity to participate

in research and conference activities surrounding pediatric sedation. The most recent study derived from the database tallies results from 50,000 propofol sedation encounters involving this multispecialty group of sedation providers - specifically addressing adverse events and effectiveness of sedation delivery. The report has been accepted for publication in *Anesthesia and Analgesia*. A previous publication from the PSRC described the complications associated with broad-based sedation practice involving over 30,000 sedation events. [Pediatrics. 118(3):1087-96, Sept. 2006] The results of this study and others are currently being used by consortium members to formulate a data-driven pediatric sedation provider course focusing on core knowledge and core competencies for moderate and deep sedation.

For those who are particularly interested, the consortium remains open to new participants - for further information please contact Joe Cravero at cravero@hitchcock.org.

Guidelines for monitoring and management of pediatric patients during and after sedation for diagnostic and therapeutic procedures: an update.

Coté CJ and Wilson S. *Pediatric Anesthesia* 2008; 18:9-10.

Submitted by: Hoshang J. Khambatta, MD

This article was abstracted by the authors from a report published by them and the Work Group on Sedation of American Academy of Pediatrics and American Academy of Pediatric Dentistry in *Pediatrics* 2006; 118:2587-2602. This report was developed through collaborative efforts of the above noted organizations in order to offer pediatric providers the most up-to-date information and guidance in delivering

safe sedation to children. I will try to summarize the results in this review, but because space constraints preclude a more detailed account here, I strongly suggest that concerned practitioners read the original report.

Procedural sedation requires a systematic approach that includes the following considerations: (1) no administration of sedating medication without medical supervision, (2) evaluation of underlying medical or surgical condition that will affect sedation, (3) appropriate fasting for elective procedures with a balance between depth of sedation and being unable to fast because of the urgent nature of the procedure, (4) a focused airway examination for large tonsils or anatomic abnormalities that may increase the potential for airway obstruction, (5) a proper understanding of the pharmacokinetics and pharmacodynamics of medications used, including drug interactions, (6) appropriate training and skills to undertake patient rescue, with age and size appropriate equipment for airway management and venous access, (7) appropriate medications and reversal agents, (8) appropriate number of staff with qualifications to carry out the procedure and monitor the patient, (9) appropriate physiologic monitoring during and after the procedure, (10) properly equipped and staffed recovery area, (11) recovery to presedation level of consciousness before discharge from medical supervision and (12) appropriate discharge instructions. The guideline defines multiple terms that have been revised with the four primary ones defining levels of sedation described below.

(1) Minimal Sedation (formerly anxiolysis): a drug induced state during which the patient responds normally to verbal commands, while respiratory and cardiac functions are not affected but cognition and coordination may be impaired. (2) Moderate Sedation (formerly conscious sedation or sedation/analgesia): a drug induced depression of consciousness during which the patient responds to verbal commands accompanied by mild tactile sensation (such as touching the shoulder) or without. Age appropriate behavior, e.g. crying in children and reflex withdrawal in adults must be accompanied by another response such as pushing away the painful stimulus which confirms a higher cognitive function. The airway and cardiovascular functions are well maintained. If



Dr. Khambatta

the airway is lost then it can no longer be defined as moderate sedation but instead will be deep sedation. (3) Deep Sedation (formerly deep sedation/analgesia): a drug induced depression of consciousness from which the patient cannot be easily aroused, but may respond purposefully to repeated verbal or painful stimulation as noted above. The ability to maintain the airway is lost but cardiovascular function is maintained. Protective airway reflexes may be partially or completely lost. (4) General Anesthesia: a drug induced loss of consciousness during which the patient is not arousable even after painful stimulation. The airway may be impaired and positive pressure ventilation may be required. Cardiovascular functions may be impaired and may need support.

Finally the goals of sedation in the pediatric patient for diagnostic or therapeutic procedures are detailed (1) guard patient safety and welfare, (2) minimize physical discomfort and pain, (3) control anxiety, minimize psychological trauma, and maximize potential for amnesia, (4) control behavior and movement to allow safe completion of the procedure, (5) restore patient to the conscious state and prepared for discharge following the recognized criteria. These goals are best achieved by using the lowest dose of drugs with the highest therapeutic index. Specific guidelines for the intended level of sedation then follow, with competences, roles and responsibilities of personnel presented in detail. These guidelines cover the practitioner, support personnel, monitoring and documentation, equipment, vascular access, and post sedation care.

Comments: For this section I have very liberally used Professor Coté's paper entitled "Round and round we go: sedation – what is it, who does it, and have we made things safer for children?", published in *Pediatric Anesthesia* 2008; 18:3-8. The initial impetus for setting up guidelines followed multiple misadventures during sedation for pediatric dental procedures. It was in 1985-86 that the American Academy of Pediatrics and the American Academy of Pediatric Dentistry set up the first ever guidelines for procedural sedation for either pediatric and/or adult patients. Unfortunately the phrase "conscious sedation" was introduced in the guidelines as this was then the only term approved by the National Institute of Health. This choice of terms has caused considerable confusion, as it was supposed to incorporate appropriate purposeful movement to verbal or painful stimuli. It was soon noted that personnel other than dental practitioners were administering procedural sedation, so in 1992 the American Academy of Pediatrics revised the guidelines, using an approach based on the practice of anesthesiologists. The salient features here were: (1) informed consent, (2) required presedation history, (3) focused airway examination, (4) a proper fasting regime was introduced, (5) appropriate monitoring was required, (6) during deep sedation another individual was required with sole responsibility to monitor the patient, (7) appropriate staff be available during recovery, (8) children had to be returned to their presedation consciousness level prior to discharge. With the 1992 publication the Dental Academy separated from the Pediatric Academy and published their own specialty specific guidelines, which differed significantly from those of the Pediatric Academy. Next in 2002, the American Pediatric Academy together with the American Society of Anesthesiologist and the Joint Commission of Accreditations of Healthcare Organizations published an ad-

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fibrosis gene and the other without the cystic fibrosis gene were mapped and analyzed. The mapping process revealed an abnormal “standout” protein among hundreds of overlapping proteins. Further analysis of this “standout” revealed the protein responsible for cystic fibrosis phenotype.

Dr. Yaster discussed the challenges encountered by those who study proteomics. Proteins cannot be amplified. Because the cell produces so many proteins, advanced computer techniques and advanced databases are required to process the protein data gathered. Researchers must possess advanced computer skills to successfully engage in proteomic studies.

Dr. Yaster then described the process of analyzing mapped proteins. The researcher begins with study tissue (protein mass). The material is lysed and separated by centrifuge. Proteins are further separated by gel electrophoresis taking advantage of isoelectric points. Utilizing western blot, specific proteins can be identified by molecular weight. When mapping proteins, proteins that fall outside the overlay between health and disease can be identified by mass spectrometry. Robotics and advanced computer techniques are utilized in the identification process. The molecular masses of these mapped proteins are compared to known protein databases (a data mine). Unknown proteins or protein fragments can then be identified if found in the database.

Dr. Yaster then described how proteomics is applied in the clinical arena. Proteomics allows for the study of opioid tolerance. Opioids stimulate the G-membrane protein resulting in a physiological cascade that ultimately produces analgesia by a “down stream effect.” Arrestin is a protein manufactured during this cascade. Arrestin shuts down the opioid receptor. All opioids stimulate arrestin, which probably contributes to tolerance. Pharmacologic manipulation could control tolerance by reducing the production of arrestin.

The next speaker was **Dr. Laurie Demmer**, a pediatric geneticist, who discussed “The Molecular Mechanisms of Genetic Diseases in Children”. She began the lecture with a review of classic Mendelian genetics by describing classic one-gene one-disease syndromes such as sickle cell disease, achondroplasia and cystic fibrosis. Dr. Demmer then discussed non-Mendelian inheritance. We were introduced to the terms anticipation, disorders of trinucleotide repeats, errors in imprinting, silent mutations and gene dosage effects.

Anticipation describes an increase in phenotype severity in successive generations. A classic example is myotonic dystrophy. Anticipation is due to genetic amplification when genetic trinucleotide repeats become unstable. The size of the repeats directly correlates with the severity of disease. Another example of amplification is the fragile x syndrome, an X-linked semi-dominant disorder caused by expansions of the CGG trinucleotide repeat within the FMR-1 gene. Expansions of greater than 200 repeats are known to turn off FMR-1 expression and result in mental retardation.

Spinal muscular atrophy (SMA) is an autosomal dominant condition that is an example of the gene dosage effect. Originally, it was assumed that different genetic mutations would be responsible for the different sub-types of SMA. However, it is now known that the same mutation causes all SMA subtypes. Typical deletion tests alone cannot predict prognosis. Research has revealed that a uniquely different gene plays a critical role in determining the severity of SMA and this gene is subject to amplification.

Imprinting is a change in gene expression without changing

the underlying DNA sequence of the gene. The modification of expression is dependent on maternal or paternal inheritance. This process is thought to regulate highly complex pathways of neurological development, growth and metabolism. Prader Willie and Angelman syndrome are examples of imprinting. Imprinting also is responsible for Beckwith-Wiedemann syndrome and Silver-Russell syndrome. The phenotype depends on growth regulators inherited either from the maternal or paternal gene pool.

Progeria phenotype is the result of a silent gene mutation. The mutation does not change the amino acid structure of the protein, but does change the splice site within the protein exon. The final abnormal protein is called progerin, which causes the characteristic changes found in progeria.

Dr. Demmer then described the search for the gene mutation responsible for Noonan Syndrome. Through genetic detective work, Noonan syndrome was linked to the genes that control the RAS kinase pathway. The RAS cascade in part determines whether cells will proliferate, differentiate, or die. Somatic mutations in the RAS pathway are seen in multiple malignancies. More recently it was determined that germ line mutations in this same pathway lead to abnormalities in embryonic development, resulting in a group of overlapping syndromes characterized by neuro-cardio-facio-cutaneous findings. These syndromes include Noonan syndrome, Costello syndrome, Cardio-facio-cutaneous syndrome, and Neuro-fibromatosis type 1.

Dr. Jeffrey L. Galinkin introduced the audience to “Practical Pediatric Pharmacogenetics”. The goal of pharmacogenetics is to tailor drugs to individuals. Pharmacogenetics seeks to link differences in gene structure or genotype (polymorphisms) with pharmacologic differences in drug action (phenotype). Polymorphism leads to alterations in metabolism, drug transport, and receptor function. It is the goal of pharmacogenetics to identify mutations in drug metabolism before the drug is administered.

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dendum to guidelines published in 1992 so that all would use the same terminology. The term conscious sedation was changed to sedation/analgesia and then changed again to moderate sedation. Children sedated in private offices also fell under these guidelines. The guidelines also emphasize that children under six years usually require a state of “pharmacological coma” meaning deep sedation, to avoid psychological trauma to both child and sedation provider. A clear emphasis was made that sedative medications be only administered under medical supervision and that no home prescriptions be used. It was required to have age appropriate equipment and that the provider be skilled in airway management and cardiovascular resuscitation. Eventually in 2006 at the request of the committee of the American Academy of Pediatrics a task force was formed together with the American Academy of Pediatric Dentistry and passed a joint report on sedation guidelines restating the basic principles and going in more detail in other areas as reported in the article reviewed here.

POINT

Neonates should have their Surgical Procedures Performed in the NICU

Dr. Michael Richards
Seattle Children's Hospital



Surgery has been widely performed in the Neonatal Intensive Care Unit (NICU) both nationally and internationally for several decades¹. The spectrum of procedures performed within the NICU has expanded well beyond the initial experiences with vascular access, to encompass a wide range of interventions carried out on critically ill babies, including such surgical procedures as ductus arteriosus ligation², laparotomy for necrotizing enterocolitis¹, extracorporeal oxygenation (ECMO) cannulation³, gastroschisis repair⁴ and diaphragmatic hernia repair⁵.

With advances in neonatology the viability of premature neonates has pushed the boundaries of 24 weeks gestation; hence the weight of these patients can be as little as 500grams. Caring for such a small baby has its own inherent risks before even considering the concept of surgery; what would otherwise be simple patient care can become complex and challenging purely based on the neonate's size. All forms of monitoring, both non invasive and invasive become difficult to place and easy to displace, critical parts of patient life support systems such as endotracheal tubes are easily dislodged even without transport. When large and cumbersome pieces of equipment that are attached to the neonate are introduced into the equation (such as nitric oxide delivery systems, oscillators and ECMO pumps), transportation becomes a truly alarming prospect. The risk of transporting critically ill children is widely reported within the literature. There are well established guidelines on the resources necessary to provide care for such patients during transfer^{3,6}. However this does not obviate the underlying risks; it just allows us to recognize them and try to prevent their occurrence.

Taking these facts into consideration it is easy to understand the appeal of performing surgical procedures within the NICU. Many of the initial objections to surgery have been overcome with advances in NICU facilities i.e. more space, individual patient cubicles allowing for improved isolation, better access to the patient at the bedside and better lighting (including widespread use of headlights). We now recognize that moving the surgical team, the surgeon and his instruments is far easier than moving the patient. Adequate anesthesia can be delivered intravenously and ventilation is invariably provided by a superior ventilator on the intensive care unit rather than the more basic ventilators provided in the operating room (OR). Thermo regulation is superior in the NICU in this patient group who are particularly susceptible to both hypo and hyperthermia.

The principle ongoing objection to surgery within the NICU is infection risk. To date there is no convincing data showing a sig-

POINT/COUNTERPOINT

Should Neonates Have Their Surgical Procedures Performed in the NICU?

nificant difference in infection rates between the OR and the NICU as a location for surgery^{1,2,7,8,9}. In fact available data suggests no difference in mortality between the two locations. There does appear to be an increase in morbidity in the OR group, particularly in patients under 1.5kg, due to instability of temperature regulation and deterioration of ventilatory status^{1,2}.

There is no doubt that for surgery to be a success within the confines of the NICU then all professionals involved must "buy into" the service. A certain degree of flexibility is necessary from all parties and a willingness to work in what is initially an unfamiliar environment. However, the benefits to an increasingly sick and unstable patient population group are beyond doubt.

In reality we have already moved beyond the question of whether or not surgery should be performed in NICU, since it is the location of choice for the low birth weight, unstable neonate⁷. We are now at a point where we as anesthesiologists, and part of the NICU operative team, can look to how we can enhance this working environment, increase the involvement and education of the neonatal team, and work towards further optimizing patient care, safety and outcome.

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4. Kidd J, Levy M, Wagner C. Staged reduction of gastroschisis: A simple method. *Pediatr Surg Int* 2001; 17:242-244.
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COUNTERPOINT

Should We Perform Their Surgical Procedures in the NICU or the OR?

COUNTERPOINT



**Neonates are Best
Managed by Anesthesia
Teams in the OR**

Dr. John Eck
*Duke University
Medical Center*

While it is true that some procedures have been performed safely in the Neonatal Intensive Care Unit (NICU) in a variety of hospitals, it is not necessarily true that *any* procedure is best performed in the NICU in *any* hospital.

In some hospitals, the NICU is in close proximity to the operating room (OR) suite. In others, it may be on another floor or in a separate building. In some institutions, sending an anesthesia team to the NICU is practical. In others, it is not. Some neonatal units may have separate procedure rooms to safely isolate the operative environment. Many others must perform these operations in the same space where other infants are being cared for. Some neonatologists may be comfortable extending the sedation they are already providing to sick neonates to allow for an operative procedure. Others may need a trained anesthesiologist at their side. In other words, it is too simplistic to assume that doing surgery on infants in the NICU is universally desirable or that every hospital or anesthesia service is equipped to do this efficiently and safely.

The OR is the place where anesthesiologists are most comfortable and where they can provide the safest care to children. Operating suites are designed to provide adequate space for equipment and personnel as well as appropriate access to the patient to perform anesthesia and surgery. Most NICUs were not necessarily designed to meet these goals. A level of comfort and safety may therefore be compromised in performing these procedures in the NICU. In some cases, this may be appropriate when patients are unstable and simple transport to the OR may be impossible or dangerous. However, the use of the NICU for operations has expanded in some hospitals to include the care of stable patients who could be safely transported to the OR.

Anesthesiologists are at their best when they have the full complement of equipment and medications available to them in their practice, especially with critically ill patients. The NICU environment generally does not support the use of an anesthesia machine, either because of space concerns or due to lack of appropriate access to pressurized gases or scavenging. An IV anesthetic can be utilized in the ICU environment but this is not standard practice for most children undergoing operative procedures and suggests a double standard for the care, depending on the location.

There is little doubt that sending a surgical and anesthesia team away from the operating suite may be inefficient. In many parts of the world, there is a shortage of pediatric anesthesia providers and in particular those who are comfortable caring for critically ill infants. The most efficient use of these practitioners is in the OR environment where the greatest number of children can be cared

for efficiently. In some institutions that train residents or allow supervision of nurse anesthetists, anesthesiologists may be responsible for the care of two or more operating rooms at any given time. Taking this valuable resource to another location to care for a single patient may be impractical and may actually limit the overall number of children that a surgical facility can care for.

Finally, although there is some evidence that for certain specific procedures, perioperative infection or mortality rates may be similar between the OR and NICU environments, data from prospective studies demonstrating fewer complications and improved outcomes is lacking for many of the more extensive operations that might be performed in the NICU. It is premature (no pun intended) to assume that because smaller procedures can be performed safely in the NICU, that necessarily any procedure could be performed there with the same success. More objective study is needed.

At the SPA Annual Meeting in Orlando



Drs. Chandra Ramamoorthy, Jayant Deshpande and Anne Lynn enjoy the outdoor reception at the beautiful Rosen Shingle Creek Resort in Orlando during the SPA Annual Meeting in October.

Photo by Andrew Mann

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Dr. Galinkin demonstrated the impact of pharmacogenetics on tailoring doses of warfarin based on identifying variations in the gene that controls metabolism. Warfarin is primarily metabolized in the liver by CYP2C9. Polymorphisms in this gene result in very low dose requirements for Warfarin. Genetic variation in the Vitamin K system (VKORC1) also alters warfarin response. This polymorphism explains much of the warfarin's drug dose variability. In a recent study polymorphisms in both of these genes were tested prior to initiation of drug therapy. Using information from these tests to establish an initial dose resulted in 83% of patients reached therapeutic, stable INR's within 2 weeks.

Dr. Galinkin demonstrated that polymorphism affects the drugs we utilize to anesthetize our patients. He presented an interesting study that revealed patients with red hair required 20% higher concentration of desflurane and higher doses of local anesthetics than their dark haired counterparts. This is validated by the fact that red heads had increased polymorphism for specific membrane receptors.

Pharmacogenetics will eventually allow physicians to screen patients for polymorphisms that affect drug metabolism prior to initiating drug therapy. The concept of applied pharmacogenetics is still in its infancy. Technology has not quite made it to the point that we can analyze all genotypes prior to surgery and plan our anesthetic accordingly. However this goal will be vigorously pursued over the next decade.

Second Morning Sessions

Reviewed by **David Polaner, MD**
Colorado Children's Hospital

The mid-morning session of the Society for Pediatric Anesthesia began with the topic, "Congenital CV Survivors and CATCH 22". **Wanda C. Miller-Hance, MD** (Texas Children's/ Baylor College of Medicine) addressed emerging problems in the care of survivors of congenital heart disease and their transition to adult care. Whereas in earlier eras only 10-20 percent of children with severe congenital cardiac lesions survived to adulthood, that number now exceeds 90 percent. In the year 2000, for the first time there were actually more adults than children with congenital heart disease. To meet the challenges of caring for this population it is critical to recognize the spectrum of disease from simple to complex lesions and not lump these together. The age and physical status of these patients vary greatly, as do the therapeutic options. The operative and medical management has evolved considerably over time, so that one cannot even use a single strategy for patients with the same lesion. Some will require palliation rather than repair; some will do best with surgery and others with medical management, and still others with interventional approaches. Many of the options are not evidence based, and the issues that account for late morbidities are not well understood.

The common problems that are seen in these patients include: residual pathology, pulmonary hypertension, ventricular dysfunction, arrhythmias, heart failure, and the need for re-operation. The incidence of morbidity increases over time, especially after 10 years of follow up. The most common cause of late death is primarily related to cardiovascular complications, especially heart failure. Nevertheless, outcomes remain surprisingly good. A large European study recently found that at age 33 patients on the whole

had good exercise tolerance- 95% were NYHA class 1-2, most were educated and held jobs.

Recently there has been increasing emphasis on the neurologic and developmental morbidities. Two percent of these patients will develop seizures; others will have stroke or choreoathetosis (less common and probably related to uneven brain cooling while on bypass). Late adverse outcomes are now being recognized, including cognitive dysfunction, developmental delays, and behavioral issues. The etiologies appear to be multifactorial, and may originate at different times (immediately after birth, preop, on bypass, and late). It is very likely, however, that at least some of these problems originate very early, before any interventions can be taken. Even preoperatively there is a high rate of abnormalities seen on imaging, which may be related to ischemic vulnerability. Up to 25% of these infants have periventricular leukomalacia. Cerebral blood flow abnormalities may play an important role. Prenatal diagnosis may not offer opportunities for effective intervention and in a study of transposition, it made no difference in outcome. Genetic factors also play an important role. For example, the CATCH 22 genetic defect produces a high incidence of neural crest and aortic arch migration abnormalities, and is also associated with a high incidence of affective disorders.

In addition to the medical issues that these patients face, problems of insurability and lack of resources will be major impediments to their receiving proper care. Because congenital heart disease is not well understood by most adult cardiologists, programs that link pediatric and adult cardiology will need to be developed.

Suane M Daves, MD (University of Chicago) spoke on "Difficult airways: Does getting bigger make it better?" She noted that many airway problems that are characteristic of infancy may lessen in severity as the child grows. Examples include laryngomalacia, which in most cases improves and is outgrown with age, and micrognathia, which is often amenable to surgical advancement. Other problems, however, worsen with age, such as the mucopolysaccharidoses, where accumulation in soft tissues such as the tongue and coarsening of facial features make the airway increasingly difficult to manage with increasing age. Bone marrow and stem cell transplantation and enzyme replacement therapy is increasingly being used in these patients to arrest the progression of disease.

It is not only the size and nature of the patient that can affect the ability to manage the pediatric airway. As children get bigger so does the airway equipment, thus scale of size may, in this instance, translate to better ability to manage the difficult airway because of better optics, more available tools and options. Many advanced devices are now available for even very small infants, and new equipment that will accommodate very small endotracheal tubes is increasingly available.

Randall Flick, MD (Mayo, Rochester, MN) reviewed the conundrum of "Growing up with anesthesia and neuromuscular disease: Should we be nervous?". There has been much confusion and conflict for many years as to how to best anesthetize these patients, whether they are at increased risk of malignant hyperthermia, and what actual risks they do face when undergoing anesthesia. While in the past a non-triggering anesthetic was recommended for all of these children, increasing sophistication in our understanding of the pathophysiology and genetics of these disorders has now altered that generalization. The issue is further confused by a num-

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ber of case reports that suggest increased risk in some of these conditions.

These congenital disorders are generally characterized by hypotonia, and children may come to operation for diagnostic biopsy or more complex procedures. It is well established that King's disease and central core disease are associated with MH. The muscular dystrophies such as Duchenne's, and myotonias such as myotonia congenita, all may contraindicate the use of succinylcholine because of the risk of hyperkalemic response, but MH is a distinct entity from these disorders. However, rare associations between rare conditions are difficult to study. Is there a problem with using volatile anesthetics and is there an increased risk of MH in these patients?

The traditional gold standard for MH susceptibility has been contracture testing, but this test is fraught with reliability problems and may actually result in more uncertainty. Indeed, since calcium flux is involved in producing part of the clinical manifestations of MH a positive test result may be seen in non-MH muscle if calcium flux is abnormal due to another disorder in the tested muscle.

Since many myopathic patients present to the OR for a biopsy to establish their diagnosis it would be helpful to have an estimate of the risk of using a volatile agent in a patient with an undiagnosed myopathy. In a retrospective analysis of 351 children at Mayo with an undiagnosed neuromuscular disease who underwent bx, 274 had a volatile anesthetic and 3 received succinylcholine. None developed rhabdomyolysis or MH. In the 7 of the cohort who were diagnosed with muscular dystrophy, and 3 with definitive and 39 with suspected mitochondrial disorders, no problems were noted with volatile anesthesia. Although the safety of volatile anesthetics cannot be confirmed with these small numbers, the upper confidence interval risk from these data is about 1%. The risk of triggering an MH event with a non-triggering anesthetic is estimated to be 0.46% (Carr, et al, Can J Anaes 1995).

Mitochondrial disorders raise further questions regarding the use of propofol in a non-triggering anesthetic, as it has been implicated in the disruption of mitochondrial electron transport. Rhabdomyolysis, acidosis and cardiac collapse has been reported in propofol infusion syndrome and there is concern that patients with MELAS, MNGIE, MERRF (ragged red fibers) may be at increased risk.

In the face of uncertain data and risk, several factors should be considered when deciding on an anesthetic plan:

- What is the patient's age?
- What are the details of the history- what are the strong diagnostic suspicions?
- Is the CK elevated? If so, avoiding a volatile agent may be prudent.
- Is there something to suggest a dystrophy?
- Avoid propofol in mitochondrial disease; consider using dexmedetomidine.

- For muscle biopsies, consider regional anesthesia

Afternoon Sessions

Reviewed by Cheryl K. Gooden, MD, FAAP
Mount Sinai Medical Center

The Friday afternoon sessions of the SPA annual meeting focused on a variety of issues that were pertinent to our daily practice. The first speaker **David Waisel, MD** (Children's Hospital Boston) presented "Primer on Pediatric Ethics". Dr. Waisel provided an overview on matters related to decision-making abilities with the medical treatment of the pediatric patient. Parents are considered as surrogate decision-makers for their children. The highlights of his discussion included:

- 1) the best interests standard,
- 2) informed assent and informed consent,
- 3) disagreements about appropriate care, and
- 4) special situations in pediatric informed consent.

The second session was a Pro vs. Con discussion of two actual cases. The first case focused on "Arrested Development Assisted/ Rights of Caretaker vs. Disabled".

Nancy Glass, MD (Texas Children's Hospital) was the advocate for the rights of the caretaker and **Lynn Martin, MD** (Seattle Children's Hospital) sided with the rights of the disabled. Their discussion examined the issues related to long-term dependent care by parents of a child with developmental deficits. In the second case, Drs. Glass and Martin reversed their roles in a discussion of a 14-year-old with leukemia. In "Whose Life is it Anyway?/A Child's Right to Decide", the clinical implications of a child's assent are explored. Both cases provided a compelling discussion for the sides which were supported.

In the third session, **Randall Clark, MD** (University of Colorado) presented "Political Platforms, Child Advocacy and Practice Management". Dr. Clark provided an overview of the political platforms of then presidential candidates Senator John McCain and Senator Barack Obama.

The final speaker of the afternoon sessions was **Jayant Deshpande, MD** (Vanderbilt Children's Hospital) who presented "S-CHIP and Child Health Coverage".

Dr. Deshpande provided an in-depth discussion of US federal health coverage programs based on his experience in Tennessee with these issues. The information is timely. On many levels there is a need for active involvement and support of these programs.

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Reviews of a Sampling of Pediatric Sessions at the ASA Annual Meeting in October, 2008

Pediatric Clinical Forum

Reviewed by Allison K. Ross, MD

Duke University Medical Center

The Pediatric Clinical Forum, moderated by Dr. Lynne Maxwell (Children's Hospital of Philadelphia) included three case scenarios to induce provocative discussion around the different ways to manage children when presented with challenging circumstances. The lecture room was full and the audience was very interactive. Dr. Thomas Mancuso (Boston Children's Hospital) led the way by presenting a 9 m.o. with a tracheal foreign body. The value of a chest X-ray was discussed and was felt to be helpful if an object was seen, but not helpful in the majority of the cases where foreign bodies are radiolucent. The history is often the most important piece of information. Parental presence was controversial with the audience. Many felt there was risk to induction and preferred no parental presence whereas others felt comfortable having a parent present, particularly if this was calming and allowed for improved breathing for the child. The nursing staff needs to be prepared to escort the parent out when directed. The crux of the case discussion revolved around mask induction and spontaneous breathing versus rapid sequence induction due to full stomach considerations. Overall, it was felt that loss of airway and the risk of moving the foreign body with positive pressure should be avoided by keeping the child spontaneously breathing as much as possible.

The second case was presented by Dr. Allison Kinder Ross (Duke University Medical Center). The scenario was a case of a 6 y.o. child with an elbow fracture, dusky hand, and history of reactive airway disease with a current URI. A major part of the discussion was NPO status of a child who has sustained an injury with an overall consensus that the child is at risk of aspiration regardless of the time of last oral intake prior to the procedure. More important was time to oral intake prior to the trauma. An exam to rule out other traumatic injury is important in children who present with fracture. In addition, it was felt that a regional block was not advisable due in the presence of neurovascular injury. The URI led to a short consideration of LMA versus ETT, but because of the risk of aspiration in a child who has suffered trauma, the audience chose securing of the trachea.

Lastly, Dr. Anita Honkanen (Stanford University) completed the forum by presenting a 3 y.o. 30 kg child for T & A who has obstructive sleep apnea and a URI. Polysomnogram was recommended, but other parts of the care of this child were controversial. There was discussion whether a premed is appropriate, and if used, perhaps a lower dose or a monitored setting is required. Most members of the audience did not use LMAs for T & A procedures and preferred ETTs, but those who use LMAs were supportive of their use in this case despite the obesity. Analgesics should be titrated as the child is at risk of respiratory complications. Because of the child's history of sleep apnea and the obesity, overnight observation was preferred over outpatient status.

Panel: Anesthesia and Sedation Outside the Operating Room

Reviewed by Cheryl K. Gooden, MD, FAAP

Mount Sinai Medical Center

This panel was moderated by Joseph Cravero, MD (Dartmouth Hitchcock Medical Center) and provided an overview of current issues, challenges and anesthesia techniques for several non-operating room locations. The first speaker Mark Meyer, MD (Cincinnati Children's Hospital Medical Center) presented "Anesthesia in the Pediatric Hematology/Oncology Clinic." He discussed the sedation model utilized at his own institution. Propofol was used quite often in this setting.

Kirsten Odegard, MD (Children's Hospital Boston) presented "Anesthesia and Sedation for Cardiac Catheterization Lab and Cardiac MRI." Dr. Odegard commented on the challenges encountered in these locations. She noted a significant increase in catheterization procedures and specifically, in therapeutic procedures. She emphasized the need for collaboration among medical and nursing services. Anesthesia for pre- and intra-procedure were described.

Deborah Schwengel, MD (The Johns Hopkins Hospital) presented "Anesthesia for Pediatric Patients in MRI and CT." Dr. Schwengel identified safety considerations in MRI and the need for staff training. She described some of the new technology available in MRI that compensated for some degree of movement. The challenges and controversies of both locations were reviewed.

The final speaker in this panel was William McIlvaine, MD (Children's Hospital Los Angeles) who presented "Credentialing the Non-Anesthesiologist to Provide Procedural Sedation." Dr. McIlvaine discussed the credentialing model used at his own institution. The need for non-anesthesiologists to provide sedation arose from an increased demand for services at the hospital. He reviewed the process for patient stratification and care outside the OR.



Dr. Gooden

Point/Counterpoint-Effects of Anesthetic Agents on the Neonatal Brain

Reviewed by Zulfiqar Ahmed, MD

Children's Hospital of Michigan, Wayne State

Dr. Andreas Loepke (Cincinnati Children's Hospital) and Dr. Lisa Faberowski (Denver Children's Hospital), both active basic scientists and pediatric anesthesiologists, squared off in a pro/con regarding the effects of anesthetic agents on the neonatal brain.

Dr. Loepke began his speech with a scenario of concerned

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parents asking questions about the possibility of the detrimental effects of the anesthetic agents on their child's brain. They are already aware of animal studies of ketamine and the resultant neuroapoptosis published in the journal "Science". Dr. Loepke stated that 30 articles to date have been published along with several abstract presentations on this subject. In those articles almost every anesthetic agent has been implicated as contributing to some form of neurotoxicity. Some retrospective small chart reviews have indicated that children receiving multiple anesthetics may have a higher incidence of learning disabilities. When comparing this with basic science, he maintained that one significant issue is that the age of the animals studied does not correspond to a typical newborn. He cited important differences in the animal and human physiology such as mechanism of brain development, response to noxious stimuli, and other physiologic variables.

Dr. Faberowski began with the notion that there is no clear data at present to suggest that anesthetic agents contribute any detrimental neurologic injury in humans. In addition, it would be incorrect to assume that experimental results from animals are applicable directly to humans. Her research on human brain development in an injurious environment such as hypoxia or in the presence of cyanotic heart disease has shown that neuronal development is normal but the supporting tissues are malformed. Dr. Faberowski concluded her talk by stating that based on current evidence, she has not changed her practice except in using caution towards use of drugs acting on NMDA receptors.



Dr. Ahmed

meaningful overview of "quality." These periodic observations could potentially focus on areas such as respiratory events, pain management, quality of induction and parental reports. He stressed that though clearly difficult and labor intensive, we must devise some sort of quality measures for our subspecialty or we will find others (government, payors, patients) willing to impose their definitions of anesthesia quality on us.

Randy Flick, MD (Mayo Clinic) spoke about the risk of perioperative adverse events in pediatric patients. He reviewed the recent data from the Perioperative Cardiac Arrest (POCA) registry that demonstrated that fewer cardiac arrests are seen in otherwise healthy infants and ASA 1 and 2 patients of all ages than those reported prior to 2000. Much of this reduction has been attributed to the switch from halothane as the primary induction agent to sevoflurane. More recent data from the Mayo Clinic for the period from 1988 to 2005 found that most perioperative cardiac arrests occurred in children with congenital cardiac disease and that neonates, sicker patients (ASA 3 or greater), or patients undergoing surgeries with significant blood loss (particularly spinal fusion) are at the highest risk. Another recent study from the Mayo Clinic showed that, not surprisingly, laryngospasm either during induction or emergence from anesthesia was more common in children with an intercurrent upper respiratory infection (URI) or airway anomalies. One unexpected finding, though, was that there was a significantly higher incidence of laryngospasm in children whose airway management included a laryngeal mask airway (LMA) versus ETT or mask techniques. This difference persisted even after controlling for pre-existing URI's or airway anomalies. No clear etiology for this difference was determined in this study but differences in anesthetic depth at the time of removal were speculated to have contributed to this complication. One of the more disturbing issues presented in this talk was that of potential neurotoxicity in young children undergoing general anesthesia. In a recent case control study presented at the 2008 ASA meeting, Wilder and colleagues found a significantly higher incidence of learning disabilities in children who underwent multiple general anesthetics prior to age 4 when compared to children having a single anesthetic exposure or no anesthesia exposure before the age of 4. Further studies to examine this association are ongoing at Mayo Clinic and elsewhere.

Anne Lynn, MD (Seattle Children's Hospital) focused her talk on how careful preoperative evaluation and preparation can potentially reduce the risk of perioperative complications. She outlined specific perioperative concerns when anesthetizing children with: congenital cardiac disease, airway anomalies, premature birth, asthma, neurologic diseases, seizures, diabetes, sickle cell disease, and childhood malignancy. Particular emphasis was placed on assuring recent evaluation and medical consultation for significant comorbidities such as cardiac, endocrine, hematologic, and neurologic disorders. These measures were highlighted as ways to not only aid in anesthetic planning and reduce surgical cancellations but also to reduce the likelihood of unanticipated anesthetic and surgical complications.

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Risk and the Pediatric Patient: Society for Pediatric Anesthesia/American Academy of Pediatrics, Section on Anesthesiology and Pain Medicine Breakfast Panel

Submitted by Constance Houck, MD

Boston Children's Hospital

This year's SPA & AAP Breakfast Panel, moderated by Constance Houck, MD from Children's Hospital Boston was entitled "Risk and the Pediatric Patient" and focused on both the incidence of adverse events in pediatric anesthesia as well as strategies to reduce the risk.

The Panel began with a talk by Don Tyler, MD (Children's Hospital of Philadelphia) describing the difficulties of measuring quality in pediatric anesthesia. He emphasized that most quality measures in medicine have focused on either 1) process-oriented issues, such as timing of antibiotic administration or 2) outcome measures, which can depend greatly on a patient's underlying severity of illness and the invasiveness of the surgery. He stressed that measuring adverse outcomes, though clearly essential, cannot be the sole measure of quality of pediatric anesthetic care. He proposed that measurement of adverse outcomes be combined with periodic observations of practice in order to provide a more

Oral Abstract Presentations

Moderators: Lynne Maxwell, MD (Children's Hospital of Philadelphia); Jeffrey Galinkin, MD, (Children's Hospital, Denver)

Reviewed by Constance Monitto, MD

Johns Hopkins Medical Institutions

The Wednesday morning oral presentation session was opened by Dr. Constance Monitto (Johns Hopkins Hospital) who presented **Optimal Dose of IV Naloxone to Ameliorate Opioid Induced Side Effects in Children Receiving IVPCA** by Constance L. Monitto, M.D., Elizabeth White, R.N., Sabine Kost-Byerly, M.D., Myron Yaster, M.D. The purpose of this study was to determine the optimal naloxone infusion rate to most effectively reduce the incidence of opioid-induced side effects without affecting analgesia or opioid analgesic requirements in pediatric patients receiving IVPCA morphine following major surgery. 59 patients were studied in 8 dose-finding escalation cohorts (dose range 0.05 mcg/kg/hr to 1.65 mcg/kg/hr naloxone). The minimum naloxone dose at which patients were successfully treated with $\leq 10\%$ failure rate was 1 mcg/kg/hr. Increasing the naloxone infusion rate to 1.65 mcg/kg/hr was equally effective in treating side effects though 24 hour morphine consumption and 20 hour VAS pain scores tended towards higher values. Naloxone was more effective in preventing pruritis than nausea and vomiting, but concomitant use of supplemental medicines to treat opioid-induced side effects was required at all naloxone infusion rates. Discussion concerning this study centered on the important role that opioid antagonists may play in the treatment of opioid-mediated side effects as well as the uncertainty concerning their clinical dosing and role in ameliorating the development of opioid induced hyperalgesia and tolerance versus their dosing to treat side effects.

Efficacy of Addition of Fentanyl to Epidural Bupivacaine for Post-Thoracotomy Analgesia in Infants

Arjunan Ganesh, MBBS, Travis Foster, PhD, Scott Adzick, MD, Giovanni Cucchiari, MD The Children's Hospital of Philadelphia

Dr. Arjunan Ganesh presented this prospective, randomized, double-blinded study evaluating the efficacy of the addition of fentanyl to epidural bupivacaine for postoperative continuous epidural analgesia in infants. 32 infants ≤ 6 months of age (mean age 2 months) who underwent thoracotomy were randomized to receive a continuous epidural infusion containing bupivacaine 0.1% alone or bupivacaine 0.1% and fentanyl 2 mcg/ml as their primary post-operative analgesic. The authors found that total nalbuphine consumption (rescue analgesia) in the first 24 hours and pain intensity assessed using the CRIES score were significantly lower in the bupivacaine/fentanyl group than the bupivacaine alone group. Thus, they concluded that addition of fentanyl 2 mcg/cc to bupivacaine 0.1 % results in improved analgesia. Importantly, there was no increase in side-effects and no patients suffered respiratory depression in the opioid containing group, suggesting that given the observed benefit its inclusion is a reasonable option.

Ultrasound for Evaluation of Accuracy of Needle Placement for Caudal Blocks in Children

Jocelyn Park, MD, Andreas H. Taenzer, MD, FAAP

Anesthesiology, Dartmouth Hitchcock Medical Center, Lebanon, NH

This study, presented by Dr. Jocelyn Park, was designed to look at the accuracy of caudal needle placement and grade the available ultrasound view in relation to final block efficacy. Two investigators with experience in ultrasound for regional anesthesia performed ultrasound examinations during the primary (blinded) anesthesia teams' placement of 43 single shot caudal blocks. They observed that when the needle was directly visualized in the caudal space (70% of blocks), blocks were successful based on intra-operative and post-operative nursing assessment. When the needle could not be visualized, but the injectate was seen within the caudal space, blocks were also successful. However, failure of visualization of both the needle and the injectate resulted in block failure. Since in about 20% of patients a successful block could only be predicted by expansion of the caudal space, the author's recommended a test injection of 1 ml sterile normal saline before the actual local anesthetic in order to improve block success. This study generated discussion concerning the balance between incorporating ultrasound in your practice to improve block efficacy versus the requirement for an additional care provider to assist with the technique, as well as the possible ultrasound views that can be utilized.

Morbidity of Regional Anaesthesia in Children: Results of One Year a Prospective Survey

Frédéric Lacroix, MD, Claude Ecoffey, MD, Gilles Orliaguet, MD, PhD, Philippes Courrèges, MD DARP, Pôle d'AR Adultes Enfants, CHU Timone, Marseille, France

Dr. Frédéric Lacroix traveled from Marseille to present the findings of a study designed to update data previously reported by Giaufre et al. regarding the complications of regional anaesthesia in children. 46 centers associated with the French-Language Society of Pediatric Anesthesiologists participated in compiling data. Participants prospectively reported all complications associated with the use of regional anesthesia in pediatric patients (less than 18 years) over the course of one year. 168 complications were reported. Over half of the reported complications occurred at the time of needle placement (98/168), while over 1/3 (70/168) occurred once the needle was in place. The incidence of the complications was 0.96% for central blocks (epidural > spinal > caudal per 1000 blocks) and 0.27% for peripheral blocks. Two visceral punctures (after ilioinguinal block) and a convulsive crisis (after an axillary blockade) represented the most serious complications reported. The authors concluded that the frequency of complications of regional anesthesia in the child remains low, with no reports of long-term sequelae or death, but the incidence has increased since the original report in 1996. They found complications to occur significantly less frequently for peripheral blocks than for neuraxial blocks. Dr. Lacroix was recognized for the huge amount of work that went into compiling this multi-institutional data, and this presentation generated discussion regarding similar work now in early stages in the United States.

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Adjunctive Acupuncture Therapy for Sympathetically Mediated Pediatric Pain: Can We Improve Function?

Juliane H. Lee, MD, MS, Santhanam Suresh, MD
Pediatric Anesthesiology, Children's Memorial Hospital,
Northwestern University, Chicago, Illinois

Dr. Juliane Lee reported on a prospective audit of the pain treatment service database at Children's Memorial Hospital. 27 patients who suffered from sympathetically mediated pain and were receiving standard treatment including oral anticonvulsants, tricyclic antidepressants, physical therapy, and psychological intervention were also treated with acupuncture or acupressure. 74% showed a significant improvement in pain symptoms (n=20); 4% showed minimal improvement (n=1); and 15% showed no improvement. The average decrease in VAS was 3 points ($p < 0.0001$). Thus, the authors concluded that acupuncture can provide an effective adjunctive therapy for children with chronic sympathetically-mediated pain, while maximizing patient function and minimizing pharmacologic side effects. This study provides an interesting alternative approach to help patients with debilitating sympathetically-mediated pain and allowed a number of patients to significantly diminish their use of medications, however, during the audience discussion Dr. Suresh emphasized the amount of work that Dr. Lee had undertaken in providing this modality to this group of patients.

Non-Site-Specific Epidural Infusions of Clonidine and Morphine for Postoperative Pain in Children

Heather J. Frederick, MD, Ann G. Bailey, MD, Justin B. Hauser, MD, Robert D. Valley, MD Anesthesiology, University of Chapel Hill Hospital, Chapel Hill, NC

Dr. Heather Frederick reported on a review evaluating the efficacy of a morphine-clonidine infusion via a caudal or lumbar epidural in 23 children who underwent abdominal or thoracic surgery. Low caudal and lumbar catheters were placed after induction and a bolus of clonidine and morphine was administered followed by an infusion started during surgery or in the recovery room. Mean infusion rates were 5.4 mcg/kg/hr morphine and 0.13 mcg/kg/hr clonidine. Post-operatively pain scores were 0 for $\geq 95\%$ of the time in 14 patients, while in 11 patients pain > 5 occurred at least once. Eight patients received no fentanyl (epidurally or intravenously) and 13 required no change in their epidural infusion rate, while three catheters were discontinued for inadequate analgesia. Dr. Frederick concluded that while non-site-specific infusions have not replaced the traditional practice of delivering local anesthetics through thoracic catheters for thoracic and high abdominal procedures, this approach provided a reasonably successful alternative and may warrant further prospective study. She also acknowledged, though, that some facets of the patient's therapy, including treating breakthrough pain with epidural fentanyl which may not be acting epidurally, might be better optimized.

What is PRAN?

By Santhanam Suresh, MD

Children's Memorial Hospital, Chicago

The Pediatric Regional Anesthesia (PRAN) database is a collection of data from a consortium of hospitals including:

- Children's Hospital of Seattle,
- Denver Children's Hospital,
- Lucille Packard Children's Hospital at Stanford University,
- Dartmouth Children's Hospital, and
- Children's Memorial Hospital of Chicago.

These centers are presently collecting valuable data on pediatric regional anesthesia performed in North America including efficacy and safety of blocks. The database is an on-line network managed by Axio from Seattle, Washington. The concept and collection is young and other centers are invited to participate. If interested, please e-mail Dr. Lynn Martin at Seattle Children's Hospital (lynn.martin@seattlechildrens.org) to be part of the network.



Dr. Suresh in action

BOOK CORNER

By: **Helen V. Lauro, MD, MPH, FAAP**

A Practical Approach to Pediatric Anesthesia, Robert S. Holzman, MD, FAAP, Thomas J. Mancuso, MD FAAP, David M. Polaner, MD, FAAP, 690 pages, \$79.95, ISBN 9780781779432, New York, N.Y., Lippincott Williams & Wilkins, 2008.

This fifth volume in the *Practical Approach* series, whose series editor is Glenn P. Gravlee, focuses entirely on pediatric anesthesia.

The soft cover textbook is divided into four sections including the Approach to the pediatric patient, Clinical and operational aspects of pediatric anesthesia, Anesthetic management of normalities and abnormalities, and Special situations in pediatric anesthesia. The authors write most of the thirty-seven chapters themselves with the preponderance of the remaining contributors being drawn from Children's Hospital, Boston and Children's Hospital, Denver. The

text emphasizes their institution's anesthesia practice, experience and recommendations, and is written in a clear readable format.

The book is novel in its organizational structure of a developmental system-based approach. System development is viewed as the bedrock upon which a framework for understanding background, embryology/anatomy, physiological consideration, surgical repairs and anesthetic issues of specific disorders of each system is built. Numerous drawings and photographs are clearly presented in black/white; figures and tables are nicely set apart from the text. Critical textual information is reinforced in bolded material throughout chapters as well as in summary sections.

The text packs a surprising punch in being adaptable for academic use by educators, residents, and fellows in pediatric anesthesia as well as clinical use by practicing anesthesiologists seeking quick review and reference on everyday problems, and represents a very worthwhile investment.

President's message, from page 2

continue to keep meeting registration expenses nominal. We will carefully examine our expenses and revenues to maintain a healthy investment portfolio. The Board of Directors has been planning a capital campaign in order to firm up our endowment. New regulations from the Accreditation Council for Continuing Medical Education (ACCME) may drastically limit the support of educational activities by industry sponsors. Without industry support, we would be running a budget shortfall with our current meetings and expenses. We will continue to offer first rate educational forums and comply with ACCME guidelines and demonstrate our willingness to avoid real or perceived conflicts of interest.

As many of you know, we will soon celebrate our 25th Anniversary as a Society. As we approach this anniversary, I reflect on our growth as a professional organization. Our meetings are not only venues for clinicians and scientists to present their work, but we have grown to invite nationally renowned speakers from many areas of medicine and healthcare and their unique perspectives and contributions to the care of children. We support international outreach and the SPA website now includes a list of many international organizations providing healthcare to children that are always in need of volunteers, and new educational syllabi and enduring materials have been added for member benefit. We

have sponsored the development of the Congenital Cardiac Anesthesia Society, multiple interest groups and have provided a venue for pediatric anesthesia program directors to meet and share their challenges. I invite your proposals for further educational topics we should address. We hosted a joint meeting with members of the Malignant Hyperthermia Association of the United States (MHAUS) and are currently planning another international meeting, this time with the Society for Paediatric Anesthesia in New Zealand and Australia.

SPA is your professional organization! Leadership is committed to being responsive to your needs and ideas. We are a growing society dedicated to safety and quality in perioperative care of children. If you haven't had the chance to visit the website recently, please do, and tell us what you think. We remain a vital organization because of member involvement and participation. I also wish to extend my thanks to the Ruggles Service Corporation for capably providing our Society's administration and event planning. Another challenge in our success includes that as our meetings grow in size, we are constantly evaluating new venues. Please join me in Jacksonville for a great spring educational program from March 19-22, 2009.



SPA contributors honored

Dr. Deshpande thanks outgoing members of the SPA leadership. Clockwise: Dr. Frank McGowan, SPA past president; and Drs. Shobha Malviya, Steve Stayer and Frank Kern from the board of directors.

2009

January 20-22: Bristol, England, United Kingdom

Advanced Paediatric Intensive Care Simulator Course
Tel: 0117 342 8843, Fax: 0117 342 8910
Information: Mrs. Adrienne Fitt-Williams, APICS Course Coordinator, Paediatric Intensive Care Unit, Bristol Royal Hospital for Children, Upper Maudlin Street, Bristol BS2 8BJ
Website: <http://www.apagbi.org.uk>

February 4-8: Atlantis, Paradise Island, Bahamas

Twelfth Annual Update on Pediatric and Congenital Cardiovascular Disease—Strategies to Improve Care Through a Multidisciplinary Approach
Tel: (215)-590-5263, Fax: (215)-590-4342
Information: Ms. Glorene Ford, Meeting Planning Manager, Department, Continuing Medical Education, The Children's Hospital of Philadelphia, 34th Street and Civic Center Boulevard, Philadelphia, PA 19104
Website: <http://www.chop.edu/cardiology2009>

February 6-8: Anaheim, California, USA

47th Clinical Conference in Pediatric Anesthesiology
Tel: (323)-361-2262, Fax: (323)-361-1001
Information: Tivi Ortiz, Pediatric Anesthesiology Foundation, 4650 Sunset Blvd., Mailstop #3, Los Angeles, CA 90027
Website: <http://www.pac.chla-accm.org>

March 12-13: Brighton, England, United Kingdom

Association of Paediatric Anaesthetists of Great Britain and Ireland Annual Scientific Meeting
Tel: +44 20 70921739, Fax: +44 20 70921733
Information: APA Secretariat, Churchill House, 35 Red Lion Square, London WC1R, 4SG
Website: <http://www.apagbi.org.uk>

March 19-21: Berne, Switzerland

9th European Postgraduate Course in Neonatal and Pediatric Intensive Care
Tel: ++41 31 331 82 75, Fax: ++41 31 332 98 79
Information: BBS Congress GmbH, Rabbentalstrasse 83, Postfach CH-3000 Bern 25
Website: <http://www.bbscongress.ch>

March 19-22: Jacksonville, Florida, USA

Congenital Cardiac Anesthesia Society (CCAS)/Society for Pediatric Anesthesia (SPA)/American Academy of Pediatrics (AAP) 2009 Winter Meeting
Tel: (804)-282-9780, Fax (804)-282-0900
Information: Society for Pediatric Anesthesia, 2209 Dickens Rd., Richmond, VA 23230-2005
Website: <http://www.pedsanesthesia.org>

March 20-21: Jacksonville, Florida, USA

Fundamentals of Pediatric Anesthesiology—Pediatric Anesthesiology for the Generalist
Tel: (804)-282-9780, Fax (804)-282-0900
Information: Society for Pediatric Anesthesia, 2209 Dickens Rd., Richmond, VA 23230-2005
Website: <http://www.pedsanesthesia.org>

March 26-27: Ho Chi Minh City, Vietnam

Seventh Scientific Meeting of the Asian Society of Paediatric Anaesthesiologists (ASPA) 2009
Tel: +84 8834 6242, Fax: +84 8927 0053

Information: Le Anh Tuan, M.D., M.P.H., 341 Su van Hanh, Q.10, Ho Chi Minh City, Vietnam

Website: <http://www.aspa-2000.com/index.html>

March 26-28: Marrakech, Morocco, North Africa

30^{ème} Congrès del Annual Association des Anesthésistes-Réanimateurs Pédiatriques d'Expression Française (ADARPEF)

Tel: + 33(0) 5 57 97 19 19, Fax: + 33 (0) 5 57 97 19 15

Information: COMM SANTE - Sonia Bousbiat, 76 Rue Marcel Sembat - 33 323 Bègles Cedex, France
Website: <http://www.adarpef.org>

April 22-23: Florence, Italy

Second International Pediatric Simulation Symposium and Workshops

Tel: + 39 055 2608941

Information: Meeting Secretary, ENIC meetings and events, Piazza Adua, 1/d, 50123 Firenze
Website: <http://www.ipssw2009.com>

May 14-16: Philadelphia, Pennsylvania, USA

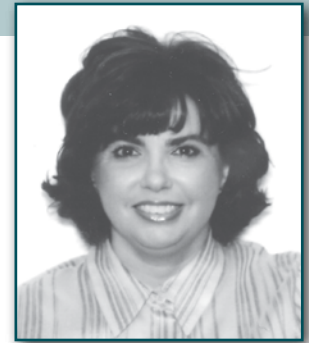
3rd Annual Pediatric Anesthesiology and Critical Care Medicine Conference: Perioperative Care of the Infant and Child
Tel: (215)-590-2646, Fax: (215)-590-4342
Information: Elizabeth Utsch, Children's Hospital of Philadelphia, 34th Street and Civic Center Boulevard, Philadelphia, PA 19104
Website: <http://www.chop.edu.cme/>

June 7-10: Acapulco, Mexico

Eighth International Symposium on Pediatric Pain
Tel (604)-681-2153 Fax: (604)-681-1049
Information: Vanessa Idler, Conference Coordinator, International Conference Services Ltd. Suite 2101 - 1177 West Hastings Street, Vancouver, BC Canada V6E 2K3
Website: <http://www.ispp2009mexico.com>

June 14-17: Verona, Italy

20th European Society of Paediatric and Neonatal Intensive Care (ESPNIC) Medical and Nursing Annual Congress 2009
Tel: +41 22 908 0488, Fax: +41 22 732 2850
Information: Kenes International, The Secretariat, 1-3 Rue de Chantepoulet, PO Box 1726, CH-1211 Geneva 1, Switzerland
Website: <http://www.kenes.com/espnic>



Helen V. Lauro, MD, FAAP
Long Island College Hospital,
Brooklyn, NY

Please forward all information concerning congresses relevant to Pediatric Anesthesia to:

Helen V. Lauro, MD, MPH, FAAP, Department of Anesthesiology, Long Island College Hospital, 339 Hicks Street, Brooklyn, New York 11201.



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