

Society for Pediatric Anesthesia



education • research • patient care

spa@societyhq.com

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Find it on the Web

www.pedsanesthesia.org

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- Literature Reviews (Complete)
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Society for Pediatric Anesthesia



The Society for Pediatric Anesthesia (SPA) publishes the SPA Newsletter three times a year. The information presented in the SPA Newsletter has been obtained by the Editors. Validity of opinions presented, drug dosages, accuracy and completeness of content are not guaranteed by SPA.

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The complete communications committee roster and assistant newsletter editors can be found on the SPA website www.pedsanesthesia.org.

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Editor's Corner



Rita Agarwal, MD, FAAP

The Pediatric Anesthesiology Meeting 2004 was wonderful and well attended; the weather curse seemed to be intact again (for those of you who didn't go, it was cold and rainy in Phoenix for the first two days of the meeting). Several members of the communications committee have ably reviewed the meeting so those of you who weren't able to attend know what you missed. Thanks everyone for your hard work

There are a lot of exciting new plans for the website and newsletter coming up. I hope by now many of you have had an opportunity to check out the Web Education and the Problem Based Learning Discussions (PBLD) type offerings. There are two so far and we are working on the next one. Our goal is to have three or four new PBLD's each year. Suggestions, contributors and contributions are always welcome! We will also start a new section aimed at the lay public that targets the parents of children who are having procedures requiring anesthesia. It will be called "Frequently Asked Questions About Anesthesia for Children". Several members of the Communications Committee are already hard at work and the plan is for the new section to be available on the website this summer.

There have been some Bylaw changes that will be on the website as well as more details about the Nominees for the SPA Board of Directors, so please take a moment to review them.

There are the usual wonderful literature reviews by Drs. Cheryl Gooden, Hoshi Khambatta and Tom Mancuso. As always, we welcome comments, suggestions and critiques. Send them to me at Agarwal.Rita@tchden.org.

Rita Agarwal, MD, FAAP

Editor

REGISTER NOW
2004 Annual Meeting

October 22, 2004

Las Vegas Hilton

Las Vegas, NV

www.pedsanesthesia.org

President's Message

I know I'm ready for sunshine, warm weather and flowers and Seattle has been most obliging this past few days. I also know some of you just finished digging out from a last (at least we hope so!) snowstorm. I hope the Pacific Northwest weather finds its way across the country.

Our Winter Meeting in Phoenix was spectacular and our biggest yet, with more than 450 attendees. Starting with a pre-meeting PALS workshop for 30 registrants, Lynne Maxwell organized an outstanding three-day event, with a thought provoking keynote address by Lucian Leape on a systems approach to minimizing errors. Anaphylaxis and an update on the POCA (pediatric operative cardiac arrest) registry were followed by excellent talks about surviving litigation from personal experience, from the lawyer's perspective and the institution a la sentinel event reporting. The speakers were all extremely engaging, so the room remained full despite the appearance of sunshine. Workshops, refresher courses and PBLDs continue to be popular and well-attended sessions. Sunday's talks included sessions on different ways to approach international medical service, continued with updates on anesthetics as neuro-protectants or neurotoxins and finished with the experience in California with credentialing for those practicing pediatric anesthesia. The topics were varied over the three days but shared the feature of excellent engaging presentations. If you weren't able to attend, check out our website for syllabus materials.

The ability to produce such meetings is a testament to the dedicated work of many, starting with the program chair and all of the faculty involved. For those who are SPA members, most or all of the substantial amount of work to develop a plenary session lecture, PBLD discussion, workshop, or refresher course is donated to the membership, since the SPA Board is very stringent about its reimbursement policy. As President, I want to take this opportunity to thank the faculty and acknowledge their hard work and dedication to advancing pediatric anesthesia education.

I would also be remiss if I did not remind the members that we have been gifted in having long-term support from corporate sponsors. Their unrestricted educational grants have been an integral part of the success of our meetings. They are listed on our website and I hope we all realize that these represent the forward

thinkers to my mind, in realizing that advancing pediatric anesthesia care is important even if our patients are not old enough to do much purchasing. Abbott Laboratories has been an outstanding example of long-term significant support, both for our meetings (specifically the CD-ROM syllabus) as well as support for our website. As you go to the new educational offerings on the website, take a moment to reflect on those who are helping SPA accomplish this education.

Progress is being made on the development of pediatric anesthesia modules that SPA hopes will prove useful for the needs of anesthesiology graduates with time-limited certificates. As the American Board of Anesthesiology develops the criteria for demonstration of Life-Long Learning, pediatric anesthesia material will be an important part of portfolios for many practitioners. Dr. Frank McGowan, the President-Elect of SPA, is leading this effort. It will again ask major effort from many members without any financial remuneration, only the satisfaction of helping the field and the care of pediatric patients.

Finally, I want to thank those members who read my last message and contacted me about becoming active in SPA committees. I know some of you joined committees in Phoenix when they met. Welcome aboard. For any others who felt shy, don't! SPA is meant to be inclusive of all our members who wish to be active participants. Committee memberships are time-limited to encourage new faces and points of view. The next election for officers and Board Directors will occur before our October meeting (by mail or e-mail) over this summer. We are moving to this method to allow fuller member participation, even if one can't attend the meeting in October. Watch for ballots and vote. Most who run for office started as committee members.

Anne M. Lynn, MD
President



Anne M. Lynn, MD

Bylaws Amended

The Board of Directors has approved amendments to the bylaws of the Society. These are the first substantial changes in the bylaws since 1987. One of the primary goals for the revision in the bylaws was a change in the process for election of officers and directors designed to broaden participation. Historically, election of officers and directors was limited to only those attending the business meeting held during the annual fall meeting of the society. The revised bylaws will allow for participation by all members of the society through electronic mail elections. In fact, plans are currently underway for the 2004 election of officers and directors to be held via this new process. The revised bylaws can be viewed on the SPA website at www.pedsanesthesia.org.

The Bylaws Committee would appreciate any comments from our membership. Please contact the committee chair (Lynn Martin) at lynn.martin@seattlechildrens.org.

Lynn D. Martin, MD
Chair, Bylaws Committee

Pediatric Anesthesiology 2004 Meeting Review

Pointe Hilton Squaw Peak Resort • March 4-7, 2004

Friday, March 5, 2004

Friday began with welcome remarks from Anne Lynn, President of the SPA, Patty Davidson, Chair AAP Section on Anesthesiology and Pain Medicine, and Lynne Maxwell, Program Chair.

James Steven (Children's Hospital of Philadelphia) moderated the morning session "Patient Safety: Process Improvement / What to do When Bad Things Happen". The first speaker **Lucian Leape** (Harvard University School of Medicine) presented "Patient Safety – A Systems Approach to Minimize Errors". His thesis was to understand the complexity of medical errors, we must consider the systems under which those in the health care professions operate. The systems are replete with latent errors and defects, triggering factors, unsafe acts, defenses against errors, and errors. When circumstances are such "the holes line up" – i.e. when systems in place allow errors to get through undetected, medical errors can occur. Errors are commonly contributed to by bad systems, not bad doctors. The culture of blame in medicine today does not address the complex cause of most medical errors. He also discussed barriers to a more universal acceptance of a systems approach to medical error. He attributed cost, public perception, lack of administrative leadership, and doctors themselves as obstacles.

Robert Brown (Bloomberg School of Public Health, Baltimore) opened the next session "Unanticipated Events in the OR" where his lecture "Anaphylaxis" revealed while rare in the OR (incidence of 1/10,000-20,000), mortality remains high. He stressed that anaphylactic reactions are mediated by IgE, and anaphylactoid reactions are not, the end results are the same. He reviewed the allergy cascade. Signs and symptoms of anaphylaxis can be widespread, affecting skin, eyes, the upper and lower respiratory tract, the cardiovascular system, and the GI tract. Treatment requires eliminating exposure, and the ABC's of resuscitation. Epinephrine remains the mainstay of pharmacologic treatment, and large resuscitation doses are often not necessary. Causes of anaphylaxis in the OR are changing with Neuromuscular blockers decreasing and Latex increasing in frequency as a cause. A study from his institution found that 12 percent of anesthesia personnel tested positive to Latex. He felt that OR's should be Latex free to decrease exposure of patients and personnel, and that heightened awareness of potential Latex allergy is important in terms of prevention of anaphylaxis.

Jeff Morray (Phoenix Children's Hospital) spoke next "Unexpected Cardiac Arrest in the Anesthetized Child". He discussed the PeriOperative Cardiac Arrest (POCA) project results, which looked at 150 cases of perioperative cardiac arrest in children where 55 percent of the cases were less than one year of age, and most less than one month. Survival was no different across age groups and far more likely in ASA class 1-2 patients than in ASA class 3-4. The causes of cardiac arrest have been changing; inadequate ventilation has been replaced with underlying medical conditions, and primary cardiac events are increasing in frequency. Hyperkalemia, secondary to massive transfusion (not succinylcholine) is rising in frequency as a cardiac cause, and it is recommended that blood be washed if it is old or irradiated to reduce the K⁺ concentration. He recommended that a comprehensive analysis of events be undertaken following such events.

Susan Retzack (Medical College of Wisconsin) started the second session of the morning "Managing Bad Outcomes", with her talk "Personal / Professional". This was an honest and frequently heart-felt account of her personal experience with an unexpected death in the OR. She described the events and her reactions to them. She elucidated that our reactions as physicians to such events are ones of sadness, shame, guilt, isolation, and fear. Most physicians react to such an event or subsequent lawsuit with depressive symptoms, which if poorly managed, may increase stress and possibly increase the likelihood of a second event occurring. She suggested coping strategies should include seeking support, reasserting control over one's personal life, and changing the meaning of the event (a claim does not always equal negligence). Lawsuits are less likely to occur following a bad outcome if good communication exists with the patient and family.

Steve Kern, a defense lawyer with Kern, Augustine, Conroy and Schoppmann (Bridgewater, NJ) spoke about the legal perspective in his talk "Legal / Media". He asserted bad things happen to good doctors, and his over-riding theme was protect yourself, because no one else will. He discussed perspectives of various parties involved in a lawsuit over a bad outcome, and how interests for all parties are different from your own. In his words, "Your enemies are everywhere. Your friends are few and far between."

The final presentation for the morning "Sentinel Event Process" by **Eugenie Heitmiller** (Johns Hopkins University Hospital) involved the process of root cause analysis, and how important it is to look at the whole system, not just at the primary individuals involved.

Catherine R. Bachman, MD
*University of Chicago Hospital
Chicago, IL*

Friday noon was an industry-supported lecture on recombinant rVIIa with **Guy Young** (Children's Hospital, Orange, CA), expert hematologist and **Joseph Tobias** (University of Missouri). They opened the session with clear disclosure that this drug is currently recommended for Hemophilia A and B only and any other use is clearly off label. Dr. Young gave an update on new changes in coagulation pathways. He gave a nice animated presentation and elaborated the central role of factor VIIa. Afterwards Dr. Tobias reiterated the dangers of transfusion of PRBC and FFP. He then went on to multiple case reports where he has used rVIIa with the hospital committee approval and the success in decreasing the blood and factor transfusions including spine fusions, Jehovah's witnesses and trauma among others. Of particular mention was a comment by a surgeon on prompt hemostasis as "what did you do?" He mentioned the cost of the factor to be about \$4,000 with concerns from pharmacy regarding the source of reimbursement. His talk ended with questions like the level of platelets or fibrinogen needed for the drug to be effective, the prophylactic use, use in Post CABG or repair of congenital heart diseases among others but most importantly the end point of the treatment remaining unanswered.

Linda Jo Mason (Loma Linda University Medical Center) and **Francis X. McGowan** (Children's Hospital Boston) heralded the afternoon session. Dr. McGowan gave a superb song and dance performance frequently interrupted with thorough and diligent discussion of adult patients with congenital heart diseases undergoing mostly non cardiac surgery. He first presented an overview of basic pathophysiologic problems including shunts, volume vs. pressure overload, pulmonary hypertension and contractile problems of myocardium. He stated the importance in consulting the cardiologist after reading the cardiology report. Use of positive pressure ventilation vs. spontaneous ventilation use in the face of altered pulmonary blood flow was another important point discussed. Dr. Mason presented a detailed and informative approach to managing patients for non-transplant surgery who have had transplants. She emphasized the need to look for clues regarding stability or complications of drug therapy with references towards Calcineurin inhibitors, Antimetabolites, IL-1 inhibitors and TOR inhibitors. She emphasized that often the signs of rejection may be very subtle and nonspecific. She presented pre-operative, peri-operative and post-operative management of these patients in a very comprehensive way.

Bells and whistles kept everyone attentive during Jeopardy, as important questions were discussed in a game-show format.

In the afternoon refresher courses, the audience attended individual sessions. Refresher courses included "Size Does Matter" with **Robert Holzman** (Children's Hospital Boston) discussing the importance of not extrapolating the adult anesthesia teachings to pediatric practices. **Melissa Wheeler's** (Children's Memorial Hospital, Chicago) session on "Neonatal Surgical Emergencies", **Alan Tait's** (University of Michigan) session "Perioperative Control of Infection" and **Zeev Kain's** (Yale University School of Medicine) "Myths of Pediatric Anesthesia" discussing NPO guidelines, URI, and parental presence.

Zulfiqar Ahmed, MD
Children's Hospital
Ann Arbor, MI

Saturday, March 6, 2004

The second day began with Problem-Based Learning Discussions (PBLDs) groups. Thirteen different discussion groups were offered, each moderated by two experts. A broad range of clinical problems were presented, including a Down's syndrome patient with Moya Moya disease scheduled for cerebral revascularization, posterior spinal fusion in a Fontan patient, pinning of a femur fracture in a patient with Duchenne's muscular dystrophy, removal of a safety pin from the trachea, management of CRPS-1, etc. This author attended a discussion of Williams syndrome presented by **Anthony Clapcich** (Children's Hospital of New York) and **Lynne Maxwell** (Children's Hospital of Philadelphia). The discussion centered on a child with severe supravalvular aortic and pulmonic stenoses with pulmonary artery hypoplasia who underwent one surgical procedure and several catheterizations. The delicate anesthetic management was discussed in detail and thoroughly integrated with current understanding of the cardiac pathophysiology of Williams syndrome. A handout with a comprehensive summary of published literature on the subject was included.

Oral abstract presentations and the Young Investigator Awards followed as **Cynthia Shields** (Walter Reed Army Medical Center) presented "The Utility of Bispectral Index Score and the Modified University of Michigan Sedation Scale (MUMSS) in assessing the depth of pediatric sedation." Findings from this study of 38 children undergoing sedation for CT or MRI included: first, patients spent up to 25 percent of the time in a state of deep sedation; second, the correlation between the BIS and MUMSS was poor with all agents used, particularly chloral hydrate; and third, the BIS score frequently underestimated the MUMSS.

Alan Tait presented "Improving the Readability and Processability of an Informed Consent Document for Pediatric Anesthesia Research: Effects on Parents' Understanding and Satisfaction." In this study, a previously used consent form was modified by a reading expert to maximize readability and understanding by modifying the organization and layout, lowering the reading level, providing context clues, and using pictures, etc. Parents demonstrated significantly greater understanding and satisfaction using the modified form compared with the original.

N. Mallavaram (Columbia University), also awarded third place for resident research, presented "EEG and Inhalational Anesthetics in Infants and Children." Children six months - three years had analysis of 128-lead geodesic EEG readings during general anesthesia with isoflurane or sevoflurane. Changes consistent with arousal, including a decrease in 20-30 Hz frontal lobe signals were found with emergence from both agents. Also, an increase in sleep-spindle activity was demonstrated on emergence from isoflurane but not sevoflurane.

The junior faculty Young Investigator Award winner **Lisa Wise-Faberowski** (Duke University) presented "The Effect of Isoflurane on the Developing Brain: a Function of Age." In a previous in-vivo study, diffuse neurodegeneration was noted in seven-day-old rats exposed to isoflurane. In this provocative study, tissue cultures of rat hippocampal neurons from pups aged four, seven, 14, and 21 days were exposed to 1.5% isoflurane for one, three, or five hours and then assayed for neuronal cell death one or three days later. Significant cell death (>50% compared with air control) was observed only in the slices prepared from seven-day-old pups exposed to five hours of isoflurane. The authors related this age-dependent finding to the ontologic neuronal composition of GABA subunit A and NMDA receptors. Stimulation of these receptors lead to depolarization of neurons from immature rats but inhibition of mature neurons. Isoflurane is both a NMDA antagonist and GABA_A agonist. Dr. Wise-Faberowski was awarded a plaque and \$1,000.

Second place for resident research went to **M.B. Robinson** (Children's Hospital of Philadelphia) for her presentation "Incidence of Neurological Complications Following Placement of Epidural and Caudal Catheters in Anesthetized Children for Postoperative Analgesia." Six hundred, seventy patients had 676 epidural catheters placed. Twenty-one patients required evaluation for neurologic sequelae. These included five cases of motor weakness, four of localized site infection, four cases of muscle spasm or myoclonus, three of mental status changes, three of non-specific headache, one of PDPH, one Horner's syndrome, one hysterical paralysis, and one dysesthesia. All of these complications resolved with appropriate intervention. No epidural abscesses or hematomas were noted.

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Mark Crawford (Sick Children's, Toronto) was awarded first place in the resident category for his abstract "Patient Controlled Analgesia (PCA) Opioid Consumption after Laparoscopic Cholecystectomy in Sickle-Cell Disease." The duration of PCA use in SSD patients was double that of controls and overall morphine use was three-fold higher in SSD patients.

Anne Lynne, president of SPA, presented Lynne Maxwell with a plaque in appreciation of her excellent job planning the last two Pediatric Anesthesiology meetings. Next, **Juan Gutierrez** presented the Robert M. Smith Award for Lifetime Achievement in Pediatric Anesthesia to **Ted Striker** (Cincinnati Children's Hospital). In accepting the award Dr. Stryker commented on the need for continued involvement and advocacy within the AAP Section of Anesthesiology by pediatric anesthesiologists.

Joanne Wolfe (Boston Children's Hospital) presented the AAP Advocacy Lecture "Pediatric Palliative Care, Can We Do Better?" Dr. Wolfe, a pediatric hematologist-oncologist, described the formation and daily functioning of a committee of physicians and ancillary health professionals dealing exclusively with quality of life issues in terminally ill children. Much of this care centers around ambulatory care and control of pain. Often, despite our best efforts, the control of pain and suffering in terminally ill children remains inadequate.

Walk-around poster discussion groups met next. The 10 group leaders were Ira Cohen, Myron Yaster, Joe Tobin, Steve Stayer, Francis McGowan, Doug Ririe, Dean Kurth, James Stevenson, Anne Lynne, and Linda Mason.

During lunch, an "Ask the Experts" panel was convened which answered audience questions in their area of expertise. Participants included **Steve Stayer** (cardiac), **Charles Nargoizian** (airway), and **Santhanam Suresh** (pain and regional anesthesia).

Following a brief AAP business meeting moderated by **Tom Mancuso**, the afternoon workshops commenced. The workshops, by ticket only, lasted two hours and included: Airway, Life Outside the Operating Room, Clinical Trial Designs, What's New in Circulatory Support, Managing Epidurals, Anesthesia for Thoracic Surgery, Regional Anesthesia, and CQI/Outcomes/Database Issues. This author attended the Epidural workshop where **K. Goldschneider** (Cincinnati Children's Hospital) presented his recent experience using a modified Taylor approach to thread styletted epidural catheters to thoracic dermatomes. Simultaneously, there was a complementary three-hour fellows' workshop by **Jerry Lerman** and **Alan Tait** on "Research Skills, How to Write a Grant Proposal, Trial Design, and Academic Career Development."

Refresher courses rounded out the sessions with "Anxiety, Awareness, and Premedication", **Carolyn Bannister**, "Pitfalls of Pediatric Anesthesia" **Linda Mason**, "Opioid Tolerance and Abstinence Syndromes" **Julia Finkel**, and "Complications of Acute Pain Management in Children" **John Rose**.

The night ended with a barbecue dinner and live music held outside at the hotel's recreation of Tombstone.

Samuel E. Golden, MD, FAAP
Loyola University
Chicago, IL

Sunday, March 7, 2004

Quentin A. Fisher (Medstar-Georgetown University Hospital in Washington, DC) moderated the first session "International Medical Services", and provided an overview of the variety of services pediatric anesthesiologists have donated to developing countries. The first speaker, **George Politis** (University of Virginia) described Voluntary Services Abroad (VSA), a chance for pediatric anesthesiologists to volunteer their skills in developing countries for one to four week periods. By volunteering, anesthesiologists can provide care to children who would not receive it, make contacts and friendships with the host country and enhance the stature of the United States in the world by their presence. Dr. Politis described the pitfalls these missions need to avoid including choosing an inadequate facility for surgery, mistaken expectations of the host country, poor selection of mission team members, and improper selection of patients. He suggested the quality of VSA missions could be improved with better resources and methods of quality assurance to review critical events. Dr. Politis concluded by stating that the ultimate goal of VSA is to empower host countries to improve the medical care of their people. For those interested in participating, he provided a link from the SPA website: www.pedsanesthesia.org/vmsa_search.iphtml

The second speaker, **Robert K. Crone** (Boston Children's Hospital), described Harvard Medical International, a non-profit subsidiary of Harvard University. He noted enhanced communications and travel, and improved economics have led to population shifts from the country into the city. These population shifts have been accompanied by global changes in disease, including the reemergence of infectious diseases like HIV and TB, increases in chronic diseases like diabetes, and increasing recognition of mental health issues such as depression. Consequently, developing nations are experiencing a great need to create public health and prevention strategies to combat these new trends in disease. The mission of Harvard Medical International is to work in partnership with selected international partners to create medical and health care curriculums in international medical schools, encourage basic and clinical research and help hospitals develop strategic and management programs. Dr. Crone argued that while medical missions may provide immediate help, their impact on a developing country is short term and potentially disruptive. Programs like Harvard Medical International teach countries to develop their own self-sustaining medical system. The challenges that this approach faces are no leadership and support from local and U.S. governments, inadequate feedback and education, and inability to establish financial self-sustainability.

The third speaker, **Charles J. Coté**, (Children's Memorial Hospital, Chicago), described the World Federation of Societies of Anaesthesiologists (WFSA) pediatric anesthesia fellowship programs. The WFSA is a non-governmental organization that in conjunction with the World Health Organization, creates educational programs for anesthesiologists throughout the world. The WFSA has created two pediatric anesthesia fellowships, in Santiago, Chile and Tunisia, with a third planned in Cape Town, South Africa. The oldest program was established in 1996 in Santiago, Chile at the Luis Calvo McKenna Hospital, a 230-bed hospital which performs 8,500-9,000 anesthetics per year. Anesthesiologists from various Latin American countries are selected by their local societies for a six-month to one-year pediatric anesthesia fellowship. Fellows receive training from nine European trained anesthesiologists and

do a minimum of four months of general pediatric cases and two months of pediatric cardiac anesthesia. After the fellowship, these anesthesiologists return to their country and become an educational source for pediatric anesthesia for their colleagues. Dr. Coté felt that educational programs like this fellowship are a better use of money and resources compared to short term VSA.

The final presenter in this session, **Lynda Jo Means** (Indiana University) described the collaboration of Indiana University School of Medicine and Moi University and Hospital in Kenya, Africa. This partnership was created in 1990 with the goals of enhancing medical education, creating a collegial relationship and developing health care leaders in both countries. Between these two universities, programs have been created to promote medical education and research in Kenya, HIV prevention and agricultural and nutritional teaching.

The second session, moderated by **Francis X. McGowan** (Boston Children's Hospital) asked, "Will Anesthesia Make My Child Stupid, Doc?" **Sulpicio G. Soriano** (Boston Children's Hospital) discussed the potential neurotoxicity of anesthetic agents as addressed in a recent study by Jevtovic-Todorovic. This study reported rat pups exposed to midazolam, isoflurane and nitrous oxide developed neurodegeneration and learning disabilities. Other studies found NMDA and GABA antagonists also led to similar neurodegeneration in rat pups, thus leading researchers to question whether these common anesthetic agents could lead to similar neurodegeneration in neonates. However, rat pups exposed to surgical stimuli and stress were shown to experience abnormalities in pain perception and behavior. Dr. Soriano reviewed other possible factors involved in neurodegeneration. For instance, the rat pups that received prolonged, chronic exposure to anesthetic agents had neurodegenerative changes compared to those that received an acute exposure. Other insults such as hypoxia, decreased brain perfusion and malnutrition may contribute to neurodegeneration in the immature brain. Finally, the applicability of the results from the rat subjects to human subjects remains unclear. At this time clinicians can address the concerns brought up in these studies by minimizing exposure of the neonate to surgical stress and anesthesia and preventing other insults to the brain.

The second speaker, **C. Dean Kurth** (Children's Hospital Medical Center, Cincinnati) asked whether volatile anesthetics are neuroprotectants or neurotoxins. Volatile anesthetics block NMDA, AMPA and several calcium channel voltage gated receptors and may ameliorate calcium levels and increase tissue oxygenation. Animal studies looking at the effect of volatile anesthetics during ischemia and reperfusion showed these drugs conferred neuroprotection during ischemia and early perfusion. Studies showed during the preconditioning period, a time just before the onset of ischemia, receiving volatile anesthetics might help the brain resist ischemia, although this effect is not clear. He noted neuroprotective effects of volatile anesthetics are not potent, but can be additive with mild hypothermia and the dose needed may be greater than one MAC. Volatile anesthetics may need to be present in the brain for some period of time and it is more effective for focal ischemia rather than global ischemia. Regarding the possibility of volatile anesthetics acting as neurotoxins, Dr. Kurth referred to the same study cited in Dr. Soriano's talk. Again, differences between species need to be considered when extrapolating the results of animal studies to humans. Also the amount of exposure to volatile anesthetics leading to neurodegeneration in humans is unclear. At

this time he recommended continuing the present course of treatment until new evidence in humans appears. As for surgeries with ischemic risks (e.g. cardiopulmonary bypass) volatile anesthetics can provide protection before and during the period of risk at greater than one MAC.

"Pediatric Perioperative Environment: Should Hospitals and Anesthesia Practitioners Have Performance-Based Credentialing: The California Experience" ended the meeting as **Alvin Hackel** (Stanford University Medical Center), described how SPA, AAP and the Committee of Pediatric Anesthesia of the ASA created guidelines for defining clinical competency, rules for the pediatric perioperative environment and the criteria for pediatric anesthesia fellowships. Since the practice of pediatric anesthesia differs from adult anesthesia due to the unique anatomy and physiology of pediatric patients, standards needed to be set for all involved in the care of children. With input from major medical organizations, hospitals, program directors three major areas were addressed. First was the definition of clinical competency. Guidelines created stated that general anesthesiologist by the end of the CA-3 year would be competent to provide safe anesthesia and post-anesthesia care for infants and children undergoing routine surgical, diagnostic and therapeutic procedures, and recognize when the clinical condition of the patient or the proposed procedure required skills, facilities or support beyond the capability of the anesthesiologist or institution. After at least one year of subspecialty training, the pediatric anesthesiologist would provide anesthesia care for neonates, infants and children undergoing all types of surgical, diagnostic and therapeutic procedures as well as pain management and routine and critical perioperative care. The second is guidelines for the pediatric perioperative environment recommended establishment of a minimum pediatric case number needed for competency as well as type of cases, emergent versus elective cases and ages of patients with neonates being the highest risk population. The final area provided a formal definition of a pediatric anesthesia fellowship adopted by the ACGME in 1997. Future goals of these guidelines include further improvement in pediatric care, expansion of pediatric fellowships and creating similar guidelines for nursing and surgery.

The final speaker, **Mark A Singleton** (Good Samaritan Hospital, San Jose) offered his perspective from the community hospital. He described how his department changed from a group where every anesthesiologist provided care to all pediatric patients to the development of a core group of fellowship trained pediatric anesthesiologists. At this time, the California Children Services was given a mandate to update and revise the criteria for qualifications for anesthesiologists providing care for pediatric patients covered by their funding. The Bay Area Pediatric Anesthesia Consortium and the California Society of Anesthesiologists (CSA) participated in this project. While much progress was made, efforts are now on hold due to the budget issues occupying the state. However in 2003, the *LA Times* reported cases where infants and children suffered complications and death during anesthesia. The CSA responded to these events by creating a policy on pediatric anesthesia using the published documents from the AAP and ASA as a guide. This policy is available on the CSA website (www.csahq.org).

Elizabeth Yun, MD
*University of Wisconsin
Madison, WI*

Society for Pediatric Anesthesia Election Procedures

As outlined in Sections 5.7, 5.8, and 6.4 of the Amended Bylaws of the Society for Pediatric Anesthesia and authorized by resolution of the Board of Directors on March 4, 2004, the Society will conduct elections by mail utilizing the process outlined below.

- I. The Board of Directors, after consultation with the President, shall appoint a Nominating Committee (chaired by the Immediate Past President) which shall be responsible for identifying suitable candidates for director-at-large and officer positions to be filled. The Nominations Committee shall report it's slate of proposed nominees for director-at-large and officer positions to the Board of Directors for discussion and approval within 30 days of the regular meeting of the Board held in conjunction with the winter meeting.
- II. The slate of nominees as approved by the Board of Directors will be published in the next (Spring) edition of the regular newsletter of the Society and distributed to the membership.
- III. The Date of Record to determine members entitled to receive notice of the election shall be 60 days prior to the annual (Fall) meeting of the membership.
- IV. Notice of the annual meeting, notice of election, the election by mail process, slate of nominees and applicable ballot materials shall be delivered by first class U.S. mail addressed to such members at his/her address as reflected on the records of the Society and/or electronic transmission to such e-mail address shown on the records of the Society no more than 10 days following the date of record.
- V. Each member of record will be allowed to submit only one ballot via first class U.S. mail or electronic means to the Society. As outlined in section 5.10 in the amended bylaws, any member of record is entitled to vote by proxy executed in writing by such member or his/her attorney-in-fact.
- VI. Any member of record entitled to vote for director-at-large or officer positions may enter additional nominations via the ballot of record.
- VII. Reminders of the election will be sent to all members of record at 30 and 15 days prior to the annual meeting via first class U.S. mail and/or electronic transmission as outlined in IV above.
- VIII. The election will be closed to further ballots 5 days prior to the annual (Fall) meeting of the Society.
- IX. The results of the election will be announced at the annual (Fall) meeting of the Society.

Nominations

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Reviews & Commentary

Reviewed by: Thomas J. Mancuso, MD, FAAP

Perception of Child Vulnerability Among Mothers of Former Premature Infants

Allen EC, Manuel JC, Legault C et al. *Pediatrics* 2004;113:267-273

It is known that high parental perception of child vulnerability is associated with disproportionately high use of health care. Parents of former preterms often feel that their child is highly medically vulnerable. The objective of this study was to determine whether or not parental perception that their child was highly medically vulnerable was associated with worse developmental outcome at one year.

Mothers of 116 preterm (< 32 weeks gestation) infants were enrolled. Indices of anxiety, depression, impact on family life, general health were obtained from participants at the outset of the study and at one year of age the child's development was assessed as well as maternal anxiety. A chart review was conducted to determine presence or absence of specific indicators of medical vulnerability.

The authors concluded, through multi-variate analyses and use of linear regression model that of all factors, greater maternal anxiety was the only variable that was statistically significantly related to poorer developmental outcome of these ex-preterms.

Commentary

Ex-preterms often come for surgical procedures, such as the very commonly performed inguinal herniorrhaphy. While this a relatively minor procedure to us it certainly is not at all minor to the parents of any infant but even more so to the parents of an ex-preterm. I think this paper points out how important it is that we, as anesthesiologists, understand the parents of these infants so that we can provide the best overall care to the family, which is more than excellent medical care to the infant. I am sure that most, if not all of you, have had parents confide, during the preanesthetic visit, that the anesthetic is much more frightening to them than the surgical procedure. Maternal anxiety was the only factor that reached statistical significance in affecting developmental outcome. Strongly associated with increased maternal anxiety were: longer neonatal hospitalization and greater impact of the illness on the family, factors that should come up during the pre-anesthetic interview. With information such as contained in this paper, we should be better able to connect with and reassure anxious parents of ex-preterm infants even during a brief preanesthetic visit.

Billing Practices, Ofri, D; Uninsured, Unwanted, Unworthy? Chesleigh, F. *The Hastings Center Report* Jan-Feb 2004

These two articles are about money and medicine. In the article titled Billing Practices, an MD discusses her involvement with an uninsured patient who suffered a fractured femur. The billing practices she discusses involve the difficulty with reimbursement for outpatient treatment vs. inpatient. Following treatment of the fracture, the patient was prescribed anticoagulation and the author describes how the care given to the patient was

influenced by his lack of insurance. At first he was not prescribed expensive low molecular weight heparin but SQ heparin. Once home management of his warfarin was undertaken, it took much of the MD's (uncompensated) time to arrange prescription refills, phlebotomy to check anticoagulation etc. She closes with "Perhaps it is time to...view the patients medical treatment as an organic whole. Otherwise, there is no incentive to...increase efficiency and patient care efficacy".

A former patient, also a pedestrian MVA victim, who had no health insurance, authors the second paper. He expresses his feeling of humiliation and stigmatization as he was treated for his injuries.

Commentary

While these two short papers have no direct relationship to pediatrics or pediatric anesthesiology, I urge all to take the time to look up this issue of the Hastings report and read them. They look at the issue of free care from our medical perspective and also from that of a recipient of the free care we all provide. After reading the second one page report I will be more sensitive to a patient/family with "insurance problems."

Overweight, Ethnicity and the Prevalence of Hypertension in School-aged Children.

Soro f JM, Lai DL, Turner J et al. *Pediatrics* 2004;113:475-482

The authors used school-based screening to determine the prevalence of hypertension in teen aged (mean 13 yr) children and the relationship to gender, overweight and ethnicity. Overweight was defined as BMI > 95th percentile. Hypertension was considered to be a systolic BP > 95th percentile for age. There were three screenings of BP in this study. The distribution of ethnicity in the study group of 5,102 children was White 44 %, Hispanic 5%, African American 22%, and Asian 7%. The prevalence of overweight was 20% overall but varied with ethnicity in the following manner: Hispanic 31%, African American 20%, White 15% Asian 11%. The prevalence of hypertension decreased with each screening: 19% in the first screening, 9.5% at the second and 4.5% at the third screening. After controlling for overweight, there was no difference in the prevalence of hypertension among the ethnic groups.

EMLA Toxicity After Application for Allergy Skin Testing

Parker JF, Vats A, Bauer G. *Pediatrics* 2004;113:410-411

EMLA is now widely used to provide topical analgesia to a depth of 5mm. Adverse effects that have been reported have generally mild, local reactions. Methemoglobinemia and seizures have been reported following higher than recommended doses. This report describes a case in which seizures occurred despite administration of a proper dose of EMLA, but spread over a larger than recommended surface area.

The child involved was a healthy 3-year-old scheduled for allergy skin testing. Her parents were given a 5 gm tube of EMLA to be applied to the child's back and covered. The parents applied the EMLA to the area of her back as directed (approximately 1140cm²) and approximately 1 hour later, while driving to the allergists office, the parents noted their child was less responsive then shortly thereafter she was foaming at her mouth, shaking all extremities, eyes open and was unresponsive. While waiting for an ambulance, the father noted a raised erythematous rash on the child's back and removed the plastic wrap and small amount of cream remaining on her back. Emergency services reported that she had peripheral and perioral cyanosis. Supplemental oxygen was given en route to the hospital. In the ED she was alert and interactive, but later developed moderate hypotension and her cyanosis worsened. Venous blood gases approximately five hours after EMLA application: pH 7.37, PvCO₂ 42, PvO₂ 90 HCO₃ 24 oxyhemoglobin 80%, methemoglobin 17.7%. Lidocaine level (2.5 hr after EMLA application) 3.0 micrograms/ml. She spent an uneventful night in the hospital receiving supplemental oxygen. The following morning her methemoglobin level was 1.4%

The authors speculate that the seizure was due to both an elevated lidocaine and methemoglobin levels. These may have resulted from EMLA application to a large area of eczematous skin.

Commentary

It always something!

Recommended EMLA dosing from the package insert:

AGE/Wt.	Max dose	Max cm ²	Max time
0-3 mos or < 5kg	1gm	10cm ²	1 hr
2-12mos or > 5kg	2gm	20cm ²	4 hr
1-6 yr or > 10 kg	10 gm	100cm ²	4 hr
7-12 yr or > 20kg	20 gm	200 cm ²	4 hr

Drug Discovery, Science Volume 303, No. 5665 19 March 2004 1795-1822.

This special section in a recent issue of *Science* describes the problems with advances in the field as well as advances made in analysis, planning and synthesis of new medications. There are several articles in the section. The piece begins with a lament that, despite increases in R&D, the number of new agents has remained steady, perhaps a result of companies falling prey to “the blockbuster syndrome”. Following are articles about new developments in synthesis including protein kinase inhibitors. Although most work with protein-kinase inhibitors focuses on uses as anti-neoplastic agents, these agents may have roles as anti-inflammatory medications. The essay on novel drug delivery systems does not describe any specific uses in anesthesia but, given the many ways in which anesthesiologists currently administer medications, it is worth a look.

The Effect of Obesity, Gender and Ethnic Group of Left Ventricular Hypertrophy in Hypertensive Children: A Collaborative Study of the International Pediatric Hypertension Association

Havevold C, Waller j, Daniels S et al. *Pediatrics* 2004;113:328-333

The authors of this paper wanted to determine the prevalence of left ventricular hypertrophy in a group of hypertensive children and adolescents. Data from the International Pediatric Hypertension Association were reviewed. Left ventricular mass index (LVMI) was defined as LVM/height. Left ventricular hypertrophy (LVH) was determined using both pediatric (> 38.6 gm/m) and adult (>51gm/m) criteria.

There were 129 children in the study from three pediatric centers in the US. The mean age was 13.6 +/- 3.6 years. The group was 67% male, 46% white, 38% African American, 15% Hispanic. The prevalence of LHH was 15% using adult criteria and 41% using pediatric criteria. Using either pediatric or adult criteria LVH was associated with a body mass index (BMI) > 95th percentile. The authors noted that LVH was seen more frequently in African and American children than in white children. Using pediatric criteria, 70% of Hispanic children in this study had LVH. In addition, LV geometry was evaluated. In similar studies of adults, those with hypertension and concentric hypertrophy had the worse prognosis for cardiovascular disease whereas those with eccentric hypertrophy had an intermediate prognosis. Concentric hypertrophy was noted with greater frequency in hypertensive children who were Hispanic and African American in this population.

Commentary

These two papers demonstrate an increasing prevalence of cardiovascular risk in children and adolescents. Overweight, hypertension are increasing and serious sequelae are rather common. As the authors of the second paper state in the final paragraph of this publication “...if current trends continue, the frequency of obesity-related hypertension and LVH can be expected to increase in the future”. I am uncertain how to interpret these results and equally uncertain what changes to make in the preop evaluation and intra-op management of obese teenagers. Certainly it is prudent to any obtain pertinent records from pediatricians such as prior ECG or Echo's, BP trends, etc. It is also obviously important to have accurate measurements of BP in these children both in the preanesthetic evaluation and during the procedure itself. Proper size BP cuffs are essential. It may be that soon we, in pediatrics, will be monitoring two ECG leads as is done in the care of adults. Given the high prevalence of LVH found in this retrospective review, it is hard to argue against intra operative monitoring of the V5 lead in addition to V2 on the ECG in hypertensive, obese adolescents.

A Cautionary Tale About Supplemental Oxygen: The Albatross of Neonatal Medicine

Silverman, WA *Pediatrics* 2004;113:394-396

This special article is a thorough, eminently readable review of the history of the use of supplemental oxygen in the treatment of respiratory distress in newborns and the morass of efforts to study whether retinopathy of prematurity (ROP) was a result of oxygen administration and later if it was possible to administer oxygen in a manner to avoid the development of ROP. Dr. Silverman describes the first trial of oxygen administration to newborns that failed to establish normal respirations in 1780! The modern era of oxygen administration began in the late 1900s following the observation (in 1942) that the erratic respiratory pattern seen in preterm infants could be converted to a regular pattern with the administration of supplemental oxygen. In 1948 the first cases of ROP (initially called RLF, retrolental fibroplasias) was described in Britain. In the next several years, poorly conducted trials of oxygen administration, reliance retrospective analysis the vigor with which proponents and opponents of supplemental oxygen administration voiced their opinions all contributed to public and medical uncertainty. Dr. Silverman nicely summarizes the situation now with the remark: "For decades, the optimum range of oxygenation (to balance four competing risks: mortality, ROP blindness, chronic lung disease and brain damage) remains, to this day, unknown." He concludes with the hope that the planned international trial, Pulse Oximetry Saturation Trial for Prevention of ROP, will resolve this uncertainly.

Commentary

This report is of interest to all who care for preterm infants. Whatever the relative risk of ROP in preterms given supplemental oxygen, it is very hard for me to argue against the use of 100% oxygen at induction and emergence of anesthesia. As a mentor of mine, one who described cases of ROP early on, once told me "the brain gets soft before the eyes get hard".

The Ancillary-Care Responsibilities of Medical Researchers: An Ethical Framework for Thinking about the Clinical Care that Researchers owe their Subjects.

Richardson, HS, Belsky L *The Hastings Report* Jan-Feb 2004;25-33

The title of this thoughtful paper describes the objective of the authors. They posit that researchers owe their subjects "ancillary care", care that goes beyond the requirement of scientific validity, safety, keeping promises and rectifying injuries. The authors stake out a middle ground between the two polar opposite roles researchers might have regarding research subjects: being a personal physician trustee of the patients' well-being or being the disinterested researcher who has only a contractual relationship with a subject. A research subject partially entrusts her health to the researcher. Such entrustment relationships are characterized by both discretion and vulnerability. The research subjects uses discretion in choosing to enroll in a protocol and allow the researcher to exercise judgment in deciding

how to act on her behalf in matters of importance to her. Vulnerability refers to the fact the research subject's well being may be affected by how the researcher acts. The limited responsibilities that researchers have toward subjects derive from the permission granted by the subjects (discretion), their resulting vulnerability and the duties resulting from the research h relationship: compassion, engagement and gratitude. Compassion requires that researchers remain responsive to the needs and perspectives of the vulnerable subjects. By engagement, the authors mean that researchers acknowledge the existence of a relationship that extends beyond the narrow confines of the protocol. Gratitude on the part of the researchers toward those who voluntarily enter a protocol that may hold no benefit is self-evident.

Finally, the authors address the question of the scope and strength of the entrustment. Here, the detail of the research and of the subjects' is paramount. Consider a hypothetical study of malaria in children in an area where the illness is endemic. If the researchers detect shistosomiasis in 10% of children in the study, provision of care for this illness is clearly within the scope of a partial entrustment relationship. If, in addition to shistosomiasis, approximately 10% of the children suffer from various orthopedic injuries suffered as a result of ill-treated traffic accidents. Treatment of these orthopedic injuries is not within the scope of the research partial entrustment relationship since detection of the injuries is evident and not as a result of research procedures. Consider another study of functional MRI in normal subjects given specific task to do. Researchers in this area have generally agreed that in addition to reviewing the scans for research-related information, radiologists also do diagnostic readings of the MRI's.

Commentary

This provocative paper should be read by those who themselves are clinical researchers, those who read clinical research papers those who care for patients who also are subjects in clinical research and those who are concerned with the conduct of clinical research especially protection of human subjects. The authors make a good first try at more precisely characterizing the relationship investigators have with their subjects. This difficult relationship has been discussed in the context of the therapeutic misconception seen in oncology patients who enroll in studies but the authors here extend the discussion to all clinical research.

Short term Use of umbilical Artery Catheters may not be Associated with Increased Risk For Thrombosis.

Coleman MM, Spear ML, Finkelstein M et al. *Pediatrics* 2004;113:770-774

This study was designed to determine prothrombin fragment (F1.2) and thrombin-antithrombin (TAT) levels over time and compare those levels with platelet counts and ultrasound evidence of UAC thrombi during the first week of life of sick newborns with UAC's. Infants who had UAC's placed within the first 24 hours of life were included. The study duration was five days. The investigation was a prospective, non-blinded, observational design that enrolled 33

newborns in a six-month period. In this group, only one ultrasound study was positive for an aortic thrombus, there was no significant change of F1.2 or TAT over time. The authors conclude that UAC in sick newborns may not carry an increased risk of thrombus formation in the first five days of use.

Commentary

Sick newborns come to the OR with indwelling UAC's and on occasion, placement of such a monitor is planned as part of the anesthetic care. This report is useful simply to alert us the possible, albeit rare complication the use of such a monitor has. This report does not specifically address the topic of location of the tip of the UAC but it is important to be aware of where, in the course of the very short aorta of the newborn the tip of the catheter lies. One does not want to flush anything directly into the PDA, the renal arteries or mesenteric trunk.

It is known that the use of umbilical artery catheters is associated with the quite serious, but rare complication of thrombus formation. The true incidence is difficult to ascertain owing to two factors; the varied methods used to diagnose the problem and the timing of the search for the thrombus. Doppler sonography, aortography, and autopsy have all been used to investigate the problem of thrombosis. Reported incidence is often in the range of 1% but some investigations have had a much higher incidence. Further complicating interpretation of the data, studies have been prospective, others retrospective. Some investigators have reported that clot formation began only after catheter removal.

Recurrent Abdominal Pain, Anxiety and Depression in Primary Care.

Campo JV, Bridge J, Ehmann m et al. *Pediatrics* 2004;113:817-824

The authors of this paper sought to learn the prevalence of psychiatric disorders in children and adolescents with recurrent abdominal pain (RAP). Children eight to 15 years of age comprised the study population and they were recruited for this case-control study in the offices of a primary care setting. The psychiatric diagnoses were generated using a standard psychiatric interview with the interviewer blinded to the status of the patient. In report for the child, parents and clinicians were used. Patients with RAP were significantly more likely to have anxiety disorder (79%), depressive disorder (43%), higher levels of depressive and anxiety and depressive symptoms and functional impairment than control subjects. In patients with anxiety disorders, the appearance of the disorder was very likely to precede the development of RAP by several years.

Commentary

While RAP is clearly a primary care pediatrics problem, these children do come to require the care of an anesthesiologist. No one wants to miss serious medical pathology. This concern often leads to invasive diagnostic tests such as upper and lower endoscopies, various scans etc. and many of these require anesthesia, particularly give the high level of anxiety in these patients as documented above. I think it is important that we, as anesthesiologists, are sensitive to these anxious, frightened children when they are in our care.

Literature Reviews

The Effect of Small Dose Fentanyl on the Emergence Characteristics of Pediatric Patients After Sevoflurane Anesthesia Without Surgery

Cravero J, Beach M, Thyr B, Whalen K. *Anesthesia & Analgesia* 2003;97:364-367.

Reviewed by: Cheryl K. Gooden, MD, FAAP

The goal of the study was to determine whether a small dose of IV fentanyl would improve the emergence agitation (EA) of a group of patients receiving sevoflurane anesthesia and no surgery. The investigators of this study evaluated the percentage of patients with emergence agitation, the duration of agitation, and the time required to meet hospital discharge criteria. This randomized, double-blinded study consisted of 32 patients, aged 18 mo - 10 yrs. American Society of Anesthesiologists physical status I or II, and scheduled for magnetic resonance imaging (MRI) scans with general anesthesia. Exclusion criteria for this study were patients with a defined psychological / emotional disorder, cognitive delay, or any neurological condition that would limit one's ability to communicate or comprehend. Patients were randomized to receive either placebo (saline) or fentanyl during the MRI.

The decision to premedicate the patient was at the sole discretion of the anesthesiologist. Any patient who received midazolam was considered ineligible for the study.

An inhalation induction consisting of sevoflurane in oxygen and nitrous oxide was the technique of choice. After induction, an intravenous catheter was inserted, and then followed by placement of a laryngeal mask airway (LMA). Anesthesia maintenance consisted of sevoflurane with oxygen and nitrous oxide was discontinued. Those patients randomized to receive fentanyl, were given 1 mcg/kg IV 10 min before the end of the anesthetic. The other patients randomized to receive saline, were given an equal volume of saline IV 10 min before the end of the anesthetic.

At the completion of the scan, sevoflurane was discontinued. The LMA was removed while the patient was still nonresponsive to stimulation. Following removal of the LMA, the patient was transferred to the PACU, and subsequently to the secondary recovery unit (SRU). A blinded observer was present at the end of the anesthetic and upon admission to the PACU. The observer recorded the level of agitation, starting with discontinuation of anesthesia, using an EA scale. The scale assessed agitation from one to five as follows: 1) the obtunded patient with no response to stimulation, 2) asleep but responsive to movement or stimulation, 3) awake and appropriately responsive, 4) crying and difficult to console and 5) wild thrashing behavior. EA was defined as a score, greater than or equal to four for greater than or equal to five min, despite efforts to calm the patient. A record of agitation levels was kept until the patient was awake, alert, calm, and responsive to his/her parent or guardian. The nurses in the PACU and SRU determined respectively, when the child met discharge criteria from each unit.

Following final analysis of the data, this study showed a decreased incidence of agitation (12% vs 56%) in patients who received fentanyl compared with placebo. The difference in the time to meet discharge criteria was not significant.

Comments: This study is the first to examine the incidence of EA, outside the realm of surgical procedures. Over the course of the past year, I have reviewed several studies that described the incidence and characteristics of EA in pediatric patients receiving sevoflurane anesthesia, and undergoing a surgical procedure. Despite the small number of patients, the significance of this study, is that the effect of fentanyl on emergence behavior being strictly related to its pain control could be eliminated. The behavior observed with EA can be quite distressing to the child, the parent/guardian, and all involved in his/her care. The results generated are truly worthy of consideration in one's clinical practice

Epidural analgesia in children. A Survey of Current Opinions and Practices amongst UK Paediatric Anaesthetists.

Williams DG and Howard RF. *Paediatric Anaesthesia* 2003;13:769-776

Reviewed by: Hoshang J. Khambatta, MD

The authors state that despite the widespread use of epidural analgesia in children, its place in pediatric pain management has not been clearly established. The authors surveyed pediatric anesthesiologists and pediatric pain management teams in the UK in order to investigate current practices. An initial questionnaire was sent to all members of the Association of Paediatric Anaesthetists of Great Britain and Ireland working within the UK (n = 254). A subgroup of anesthesiologists was identified as lead clinicians for acute pain in the major centers for pediatric surgery (n = 26). Each member of this subgroup was sent an expanded questionnaire. This expanded version was also sent to the clinical nurse specialist in pain management at each of the pediatric surgical centers, one of which had two hospitals but a single specialist nurse. Replies from pediatric anesthesiologists totaled 185 (73%), lead pain clinicians 23 (89%), and clinical nurse specialists 17 (68%). When calculating the overall percentage response to each question the denominator was the actual number of responders for that question.

Overall, epidural analgesia appears to be increasing in popularity. Half of the respondents from the initial questionnaire performed between two and five epidurals per month, a fifth did more than five, and a third did one or less per month. As for the pediatric surgical centers, half performed over 100 epidurals per year, a fifth did between 50 and 100, and a third less than 50 a year. Postoperative epidural analgesia was routinely considered for all age groups, including neonates, by half of the anesthesiologists. It was offered as a treatment for chronic pain in seven of the 26 main pediatric centers.

A consultant was present in 71% of the surgical centers during insertion of epidural catheter. Neonates and infants up to six months age had 100% supervision by a consultant. The procedure was discussed with parents and/or patient by 99% of the responders, of which only 5% obtained written consent. Adverse reactions were discussed, such as failure of technique, dural tap, neurological sequelae, infection, and if opioids were used – itching, urinary retention, and respiratory depression, but there was considerable variation as to what was discussed on each occasion. Abnormal

coagulation and local infection was considered to be a contraindication by all responders, systemic infection was considered a contraindication by 70%. Neurological disease and bony deformity of the spine were evaluated on an individual basis, and some felt that in diseases such as cerebral palsy, epidural anesthesia may even be beneficial. Written protocols for management of epidurals were present in 88% of the centers and 43% had protocols for the technique itself. All epidurals were performed under general anesthesia. Aseptic technique using sterile gloves and towels were used by all, 79% also used sterile gowns, and 50% a face mask. Loss of resistance to injection was used by all to find the epidural space, followed by saline 79%, or by air 17%, and either by 4%. Application of continuous pressure to the syringe was used by 67%, intermittent pressure by 15%, and either by 18%. An 18 g or 19 g needle was normally used, 48% had a hospital policy specifying this choice. Of the anesthetists, 57% used a test dose, of which 74% used a local anesthetic, 1% used epinephrine, and 25% used a combination of these drugs. Nine percent gave local anesthetic through the needle before insertion of the catheter. The amount of catheter left in the space was variable, averaging 3 – 5 cm, depending on the level of insertion, site of surgery, age, weight, and size of the patient, and anesthetic drug usage. There was little consensus on the selection of the local anesthetic or the concentration used (most common was 0.25% bupivacaine), nor of the use of other drugs (most common fentanyl, morphine, and diamorphine) either during surgery or in the postoperative period. During surgery, half the responders used repeated boluses and the remainder used a continuous infusion after the initial dose. In the postoperative period, over half used an infusion alone and a third used an infusion plus extra doses as needed. Concurrent nonsteroidal analgesics were prescribed by most of the anesthetists. Post operative epidural management was shared between several groups within each hospital. Of the responders, 5% of the inserting anesthetist had the sole responsibility during the day and night. In 19%, there was supervision during the day by the inserting anesthetist, but outside of normal working hours, the responsibility fell on the on-call anesthetist. Over half of the responders felt the general ward to be the appropriate location for the child. Special designated areas were used by 32% of the responders, and 16% stipulated intensive care, where the nursing staff was specially trained in the care of epidurals, but the mandatory nurse patient ratio was not reported. A common minimum acceptable standard for monitoring was not identified. All responders agreed that some basic monitoring was required, but there was little consistency regarding the actual vital signs, or frequency and duration of monitoring. Pain score, sedation score, heart rate, and respiratory rate were advocated by the majority of the responders; and then in reducing frequency, blood pressure, oxygen saturation, nausea/vomiting, pruritis, motor function, and apnea monitor. Nasal oxygen was routinely given by 17% of the responders, and urinary catheter was routinely inserted by 31%. Most epidural catheters were removed on postoperative day two or three, with the maximum time being five to seven days. The removal of the epidural catheter was undertaken by the ward staff in 81% cases, the pain team was involved in 56%, and the anesthetist alone in 38% of the cases. A majority used a transparent dressing so that the insertion site could

be inspected. The dressings were not changed, as it was considered a risk factor for accidentally displacing the catheter.

The practice of epidural analgesia was not audited by over a third of the pediatric surgical centers. In many centers, the audit system is still in its early stage. The data reported showed large variations in the incidence of complications among different hospitals, and it is difficult to draw any conclusions about this factor. A total of 30 serious events were reported, half were neurological, with foot drop and convulsions accounting for the majority of the problems. High blocks, total spinal, and Horner's syndrome were reported. Technical errors such as infusion pump programming and malfunctioning and drug doses formed the next largest group. No attributable mortalities were reported.

Of the 26 UK pediatric surgical centers, 23 had an acute pain team, of which 20% had been operating for less than a year. The composition of the teams differed between hospitals. In two hospitals, the pain team was run by a consultant anesthetist alone, in three hospitals a single specialist nurse dealt with acute pain, in the remainder both the anesthetist and the nurse were involved. An educational program for the management of epidurals was operating in all institutions.

Comments: The use of epidural analgesia in children in the UK appears to be increasing in popularity. This is despite any conclusive evidence for any benefit over other methods of analgesia and little data in terms of efficacy and outcome. Evidence is accumulating in the adult literature as to the benefits of epidural analgesia in major surgery. However, these findings need to be confirmed in children. Well constructed prospective, randomized, controlled trials are needed in all aspects of the technique. Because of the low numbers of epidurals performed, a multicenter approach will be needed. An ongoing audit is a potential tool for obtaining useful outcome data and should be undertaken by all centers. Adequate financial support and resources are vital for the operation of an acute pain service. Education of all staff in pain management is of great importance. The data reported in this study gives statistics related to the procedure of pediatric epidural anesthesia. No statistics were presented with regards to number or relative frequency of this procedure compared to others. Such information is sorely lacking. The true place of epidural analgesia in pediatric practice will not be fully elucidated until we have gathered an extensive body of thorough and extensive data concerning all aspects of the technique as compared to other methods. It is high time, that a major pediatric center in the US, either on its own or in conjunction with other centers, give us a definitive answer to the very important questions posed by our British colleagues.

Rapid emergence does not explain agitation following sevoflurane anaesthesia in infants and children: a comparison with propofol.

Cohen IT, Finkel JC, Hannallah RS, Hummer KA, Patel KM. *Paediatric Anaesthesia* 2003;13:63-67

Reviewed by: Hoshang J. Khambatta, MD

Rapid emergence following the use of a highly insoluble volatile anesthetic agent, such as sevoflurane, is associated with emergence agitation in children. The authors studied 53 children who were undergoing ambulatory surgery. These children were randomized to receive either sevoflurane as a maintenance anesthetic or propofol, which is also associated with rapid, but calmer, emergence. The children were aged 2–36 months. No premedication was used. The two groups were matched for age, weight, sex, duration of surgery, and type of surgery. Induction of anesthesia was with 60% nitrous oxide, 40% oxygen, and 8% sevoflurane in all patients. Following induction, in the sevoflurane group the children were maintained on the same amount of oxygen and nitrous oxide, but received a maintenance dose of 1.5 to 2.5% sevoflurane. In the propofol group, following induction, sevoflurane was discontinued and the children received i.v. propofol, initially at a rate of 200 ug/kg/min, and maintained on nitrous oxide, oxygen, and propofol. (Maintenance dose of propofol is not mentioned by the authors.) Intra operative analgesia was administered by either a caudal block with bupivacaine 0.25%, or with 2 ug/kg of fentanyl i.v. according to surgical procedure. The two groups were matched for analgesics as well. Muscle relaxants were used when tracheal intubation was necessary. At the end of surgery, patients were transferred to the post anesthesia care unit. An observer blinded to the anesthetic technique recorded degree of agitation on a 3 point scale. 1 = calm, 2 = agitated but consolable, 3 = agitated and unconsolable. Pain was noted using the Objective Pain Scale. Recovery, using the Steward Recovery Score. When compared for agitation, the patients who received sevoflurane had a significantly higher incidence of severe agitation than those who received propofol, 23% to 4%. There was no relationship to agitation with the type of intra operative analgesic. The patients who received sevoflurane also had a higher incidence of pain, 23% versus 7%, and there was no significant difference in the incidence of vomiting.

Comments: The true nature of the phenomenon of emergence agitation is not properly understood. The incidence of severe agitation and pain was higher in the sevoflurane group, though the use of intra operative analgesics was similar. The authors felt that perhaps the increased pain reflected the effect of severe agitation on measuring pain on a pain behavior scale. They also suggest variable rate of neurological recovery, resulting in a dissociative state. There are reports that intra operative use of ketorolac also reduced the incidence of emergence agitation. In a recent report (*Anesth Analg* 2003;97:364-7), the authors studied children undergoing MRI who received sevoflurane anesthesia. Hence there was no question of surgical pain confounding the study. The patients were divided in two groups. Sevoflurane was administered to both groups, but in the second group, 10 minutes prior to the end of anesthesia, the children received 1 ug/kg of i.v. fentanyl. There was a 56% incidence of agitation in the only sevoflurane group, where as in the second, fentanyl group,

the incidence of agitation dropped to 12%. The time to discharge from the hospital was the same in both groups, indicating that the use of narcotics at the end of a procedure in an outpatient setting had no adverse effect on discharge time. The authors, though, do not offer an explanation for emergence agitation. The above and other studies suggest that even in the absence of a surgical maneuver, which could otherwise be blamed for pain and agitation, the additional use of a narcotic or an agent such as ketorolac, at the end of the procedure, does decrease the incidence of emergence agitation. It is very likely that the surgical pain being responsible may prove to be a red herring, and is also very likely that a central neurological mode is responsible instead. Nevertheless, analgesics were not able to completely abolish emergence agitation. For the present, analgesics administered shortly before the end of surgery appears to be the best treatment modality, awaiting a definitive etiology for emergence agitation.

Genesis of ACPT Code

The scope of pediatric anesthesia and pain control continue to expand as witnessed by the number of attendees and the quality of presentations at the recent Winter SPA/AAP Meeting. The presentations and abstracts demonstrated respect for the past, continued improvement of the present and a challenge to expand the boundaries of our capabilities for the future. However, like all medical specialties, we must overcome the obstacles that lie in our path. The obstacles today are not only related to our clinical responsibilities, but also the environment in which we practice. The leadership of the organizations representing pediatric anesthesia on a national level obviously understand these issues as evidenced by sessions on malpractice, quality, risk, and relationships to hospitals during the recent meeting. We must not consider these issues resolved simply because we have heard these presentations because this is just the beginning of the journey attempting to effectively overcome these obstacles. Also, we must not ignore the subtle issue that a surgeon and a lawyer, not a pediatric anesthesiologist, presented much about the current state of affairs. There are truly many obstacles that challenge our efforts to provide the best and safest care for our children. While malpractice insurance rates soar, governmental agencies use ridiculously low per unit reimbursement, and states eliminate the mechanisms that adjust for deteriorating health and emergent conditions in patients. One measure of this is that state agencies pay at an average 70% discount for our services and a high of 88% discount for one payer. (State Medicaid rates per anesthesia unit, 10/2002)

Representation, strong representation, by pediatric anesthesiologists on the diverse forums developing policy is the only method we have to have a meaningful impact on how we will practice in the future. These forums are those that engage in the formation of policies regarding state and national legislation, risk management, and economics and are vital to our ultimate success. I would like to use this opportunity to discuss one of these forums. For the past 6 years I have been a member of the Committee on Economics (COE) for the American Society of Anesthesiologists (ASA). The COE develops policies regarding economics and reimbursement, interprets these policies for questions arising from third party payers and anesthesiologists, maintains a dialogue with Community Medical Services (CMS) which manages Medicare, and publishes the popular Relative Value Guide (RVG), which contains the codes and values for all the procedures performed by anesthesiologists including pain relief procedures.

The Relative Value Guide is universally used by anesthesiologists to guide their billing. The codes listed in the RVG are actually licensed and maintained by the American Medical Association through the Current Procedural Terminology (CPT) section. The process of placing a numerical code on a medical procedure was first published in 1966 as a result of calls from the country's health insurers for standardization to track procedures and reimbursement. The RVG actually predates the CPT, another example of anesthesiology leadership in health care. In 2000, the CPT Code Set was designated under the Health Insurance Portability and Accountability Act (HIPPA) by the Department of Health and Human Services as the standard mechanism for reporting all health

Genesis of a CPT Code

Concept

Idea for new code is formed
Is procedure performed >500 times per year

Support

Presentation to specialty
ASA COE
CPT & RUC Advisors

Research

English language peer reviewed journal articles

Proposal

Typical case
Accurate work description

Consolidation

Search for allies
Other specialties associated with procedure
AAP, Ped Surg

Presentation

CPT Editorial Panel

Acceptance

Work surveys completed by performing physicians
Relative Update Committee

Work value assigned

Federal Register
Final work value

Code published in CPT

Published in ASA RVG
Base + Time

care professional services nationwide. The addition or revision of an anesthesia code requires submitting a Code Change Request form - a case report including peer reviewed references that clearly delineate the need for change. This change is then presented in person by the requester to the CPT Editorial Panel, a group of physicians and allied health care professionals, including third party payers, for approval. The exercise to create codes is essentially an effort to equate the amount of work different physicians put into their various tasks and put some comparative value on that work.

The CPT process is the first in a two step process that will eventually result in a code that will be published and given a work value. The second step is presentation of the code as approved by CPT to the Relative Update Committee (RUC). At this point, the committee work and final publication is under the auspices of the federal government (CMS). The determination of the value of the new code occurs after presentation by the sponsoring specialty, including data that indicates the work entailed in performing the procedure. This is a complex and difficult process that uses the zero sum principle. For work value to be assigned to a new code, another code must be devalued to the same extent.

This process finally yields a code that is assigned a base unit value in the RVG. This code is used by all payers reimbursing anesthesia work. Having been the ASA representative to the CPT Advisor Panel for the last three years, I have submitted 76 anesthesia and pain relief codes for addition, revision or deletion. 74 of these requests have been approved by the CPT and successfully presented by the ASA-designated RUC representatives and are currently listed in the RVG. The COE has accomplished a monumental task of revising over 20% of all the codes we commonly use, including a thorough overhaul of the pain management codes. Just as importantly, the ASA has been extraordinarily successful in finding its way through an incredible bureaucratic process and obtaining higher values for the work we all do.

The success of the ASA's Committee on Economics is possible only with support that extends far beyond the realm of anesthesiology. The approval of the many CPT codes and the valuation of work that benefits all anesthesiologists is the result of working closely as a team with many allied specialties. Of particular interest to pediatric anesthesiologists is the support our colleagues in pediatrics and many of the pediatric surgical specialties have offered. We have also developed welcomed support from our neurosurgical and radiology colleagues. In my next article, I will discuss some of the recent increases in codes that are designed specifically for anesthesiologists caring for children.

In this world of competing economic forces and constituencies, pediatric anesthesia has become an effective, strong, and welcomed voice. At least for the next three years, we will have a voice in the COE and CPT committee to push for issues related to pediatric care. I welcome any input you have regarding economic policies or codes that will benefit all of us and our the children we care for.

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Fellow's Corner

This segment presents topics of interest to anesthesiology trainees in pediatric anesthesia and is not endorsed or necessarily representative of the views of the Society for Pediatric Anesthesia. In this issue, Dr. Valerie Armstead will focus on ACGME approved fellowship training programs for pediatric anesthesia. This topic is relevant in light of both the high demand for pediatric anesthesiologists and the increase in residents seeking post-anesthesiology residency training positions. This position is the counterpiece to Dr. Joe Tobin's presentation in the last issue on unaccredited Fellowship programs. As always, please e-mail any commentary you have and I will be happy to add it to the next newsletter.

Fellows corner is an excellent opportunity for future pediatric anesthesiologist to present their viewpoint or ask question about articles, current controversies in anesthesia, or fellowship training. Additionally, it allows trainees an early exposure to the SPA. Questions, commentary or reviews can be sent to jeffrey.galinkin@uchsc.edu. Include your name and hospital affiliation and whether you want these included if printed.

Jeffrey Galinkin, MD

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Choosing a Career in Academic Pediatric Anesthesia

In response to Dr. Joe Tobin's Fellows' Corner article in the winter 2004 edition of the SPA Newsletter, *Non-ACGME Approved Fellowship Training Programs for Pediatric Anesthesia*, I wholeheartedly agree with his final words. I too would like to see more clinical and academic physicians in pediatric anesthesia. Moreover, we should SEED more physicians for academic anesthesia. To this end, I would like to briefly discuss why more residents and fellows in pediatric anesthesia should consider a career in academic anesthesiology.

I have the opportunity to serve as a sub specialty site visitor for the ACGME (Accreditation Council for Graduate Medical Education) residency review committee and from time to time am requested to evaluate anesthesia and anesthesia fellowship programs in consideration for approval by the ACGME. I am always impressed at what effort must go into establishing an approved fellowship program. Anyone who is considering a career in academic pediatric anesthesia should choose an approved fellowship program that can prepare them for this type of practice.

The objectives in finding a suitable program for training a pediatric anesthesia fellow for academic practice should include four main goals:

Clinical service

- A program must be able to sustain itself financially, and provision of an active, successful clinical service is the bedrock which does the following:
- Emphasizes the anesthesiologist as a physician and one who provides comprehensive perioperative care.
- Takes a pro-active role in coordinating the team approach to patient care in the operating rooms and peri-operative areas
- Provides state of the art, cutting edge clinical care.
- Leads in innovation in the practice of the specialty.
- Redefines and expands the breadth of anesthesiology services.
- The department maintains or develops nationally and internationally recognized leaders in each of the major areas of clinical anesthesiology.
- Maintains excellence and national visibility in Critical Care and Pain Management as these areas come under increasing financial pressures.

Education

- A program should have an educational program that will train fellows and residents who have competency in knowledge and clinical skills that will provide:
- Graduates of the program who will be sought after by top departments for faculty positions and by practice groups as their top recruits.
- Evidence based education
- A focus on continuous quality improvement in education and a vision for the future.
- Development and implementation of innovative educational methods, including computer and multimedia approaches
- Expansion and improvement of the Department's role in medical student education.

Research

- Personnel shortages make excellence in research a challenge; however the goals should be ones that do the following:
- Create and apply new knowledge in basic and clinical research programs
- Move the specialty of Anesthesiology and of medicine forward
- Ideally are in the mainstream of medical science.
- Develop or continue research programs that integrate well with areas of research excellence
- Fosters collaboration and takes advantage of critical mass.
- Develop and promote clinical research programs
- Include focus on evidence based medicine and translational research.
- Establish and maintain fellowship programs in clinical and health services investigation.
- The operating room and ICU are research laboratories for outcomes and health services research
- Its process and management must be evaluated and measured through critique and innovation.
- Studies and improves resource utilization, quality and safety.

Leadership

- Programs with effective leaders produce leaders in kind. Some of our senior leaders trained at a time when there was no such thing as a fellowship in pediatric anesthesia, yet they had the foresight to help establish ACGME-approved programs. A focused, inspirational head of a pediatric anesthesia program does the following:
- Emphasizes, empowers, and encourages each member of the faculty to develop her/his professional careers and goals to the fullest.
- Develops leaders within the department, the medical school, the national anesthesiology community and the broader community of medicine.

Academic Anesthesia Practice Pros and Cons

The rewards of academic pediatric practice can be gratifying. I have tried to do an objective inventory of the pros and cons of a career in academic anesthesia and propose two short lists (see Table 1).

Table 1: Pros and cons of a career in pediatric academic anesthesia

Pros

- Teaching
- Potentially rewarding and satisfying
- Collegiality
- Academic advancement
- Non-clinical time
- Benefit package
- Constant learning
- CME
- Meetings
- Literature
- Travel
- Life style

Cons

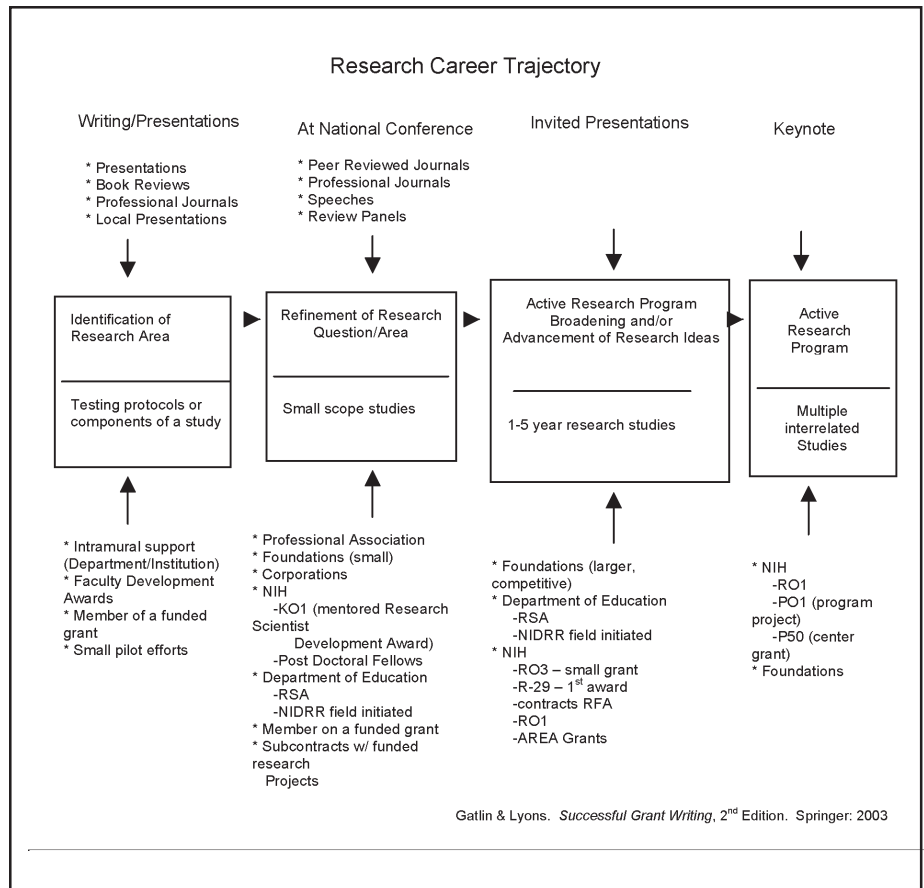
- Teaching
- Potentially frustrating and irritating
- Lower earning potential
- Professional expenses
- Liability
- Time consuming
- Life style
- Tied to effort and compensation

When medical students ask me what influenced my choice of medical specialty and subspecialty I include all those things that made the choosing easy for me. I also mention the fact that anesthesiology is chameleon-like in that a lot of the parameters such as intensity, patient contact, time commitment, practice management, can be ramped up or down throughout one’s career. I give similar advice to fellows in pediatric anesthesia. It is possible to move in and out of pediatric academic or private practice. Like many aspects of life, the choices may not be easy but the results often depend ultimately on one’s individual attitude and resourcefulness.

The final piece of advice I would like to give to anyone considering a career in academic anesthesia is to establish a mentor relationship with a successful person who has your best interest in mind as they help guide you through the process.

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Table 2: Milestones necessary for establishment of a career in academic research.





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The Society for Pediatric Anesthesia (SPA) was founded in 1987 to promote quality perioperative care for infants and children. Membership in SPA has more than 4000 members. Membership consists of community-based and academic physicians who have an interest in pediatric anesthesia, as well as resident and affiliate members. The goals of SPA include:

1. To advance the practice of pediatric anesthesia through new knowledge
2. To provide educational programs on clinical, scientific, and political issues that are important to pediatric anesthesia practice
3. To promote scientific research in pediatric anesthesia and related disciplines
4. To provide a forum for exchange of ideas and knowledge among practitioners of pediatric anesthesia
5. To support the goals of the American Society of Anesthesiologists and the American Academy of Pediatrics

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