Society for Pediatric Anesthesia

education • research • patient care ®

Volume 18 Number 3 | Fall 2005 | www.pedsanesthesia.org

Inside this Issue

Find it on the Web

- Pioneering a New Blood Test for Malignant Hyperthermia
- Literature Reviews with full references
- SPA Supporters and Exhibitors
- SPA Committee List - Chairs

Society for Pediatric Anesthesia

education • research • patient care ®

2209 Dickens Road
P.O. Box 11086
Richmond, VA 23230-1086

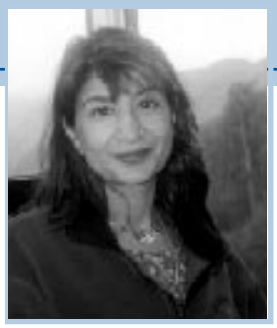
Non-Profit Org.
U.S. Postage
PAID
Permit No. 956
Richmond, VA

Society for Pediatric Anesthesia

education • research • patient care

The Society for Pediatric Anesthesia (SPA) publishes the SPA Newsletter *four 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.*

Editor's Corner



Rita Agarwal, MD, FAAP

I am writing this in the wake of Hurricane Katrina ensuing catastrophe in Louisiana, Mississippi, and Alabama. My thoughts and prayers like many of yours are with the victims of that tragedy. The physicians and other medical staff at Charity Hospital are begging for help to evacuate patients from the hospital. There are reports that medical personnel in some institutions have been working for days without a break. So much for the 80-hour week!! I can't even begin to imagine the chaos, turmoil, exhaustion and despair that they must feel, I find myself asking how or if I could cope.

This issue of the newsletter is traditionally the one that immediately precedes then ASA and SPA's Annual Meetings. We usually highlight all the wonderful speakers at the SPA and encourage everyone to attend. Obviously that will not happen this year.

I do want to as always thank my great contributing authors for all their hard work and effort. Dr. Cheryl K. Gooden has provided a review of an excellent article on PONV in infants and the efficacy of ondasetron from *Anesthesia and Analgesia* as well as writing a new Section called "What's New in Pediatrics". The focus of our first "What's New" is pediatric airway devices. We will try and have a "What's New" segment at least once or twice a year. If you have any suggestions for topics please let me know. Drs. Hoshi Khambatta, Helen Lauro and Mike Williams have also written insightful article reviews. Dr. David Abramson, is a guest editor after having coerced his children into cooperating with our latest "Keeping up with the Kids". Dr. Elizabeth Yun volunteered to summarize the fascinating discussion on the PAC e-mail site that occurred in August and early September on the use of general or regional anesthesia for former premature infants.

As always I welcome contributions of any kind. I'm definitely going to need help with the next "Keeping up with the Kids" unless you want to hear more about what children in Denver like. The next issue of the newsletter is usually dominated by the ASA and SPA's annual meeting review. Since the SPA has cancelled their meeting obviously that won't be the case. You can contact me at Agarwal.Rita@tchden.org.

Rita Agarwal, MD, FAAP
Editor
The Children's Hospital/UCHSC, Denver, CO

Recruit SPA Members and Enter to Win a "SPA" Weekend at the Sanibel Harbour Resort

As a member of the SPA, you are already aware of how the Society meets your needs as a physician. Now is the perfect opportunity to share these benefits of SPA membership with someone else!

For every new member you bring to the Society, your name will be entered into a drawing to win:

- *A complimentary luxury suite for three nights during the SPA 2006 Winter Meeting at the Sanibel Harbour Resort, Fort Myers, Florida*
- *Plus, $100 gift certificate to the hotel Spa*

Membership applications are available online at www.pedsanesthesia.org. Print the application, write your name at the bottom and pass it along to a non-member. For each application we receive with your name, a ticket will be entered:

five applications = five tickets

SPA Cancels 19th Annual Meeting in New Orleans

During and immediately after the recent disaster that struck the Gulf Coast, the SPA Board of Directors carefully monitored not only the state of affairs in New Orleans, but also what decision the ASA would make with respect to holding their own annual meeting.

As soon as the ASA decided to relocate their annual meeting to Atlanta, the SPA Executive Committee met by teleconference to weigh the options for the SPA annual meeting. After considering the three options of 1) scheduling the annual meeting in Atlanta, 2) scheduling the meeting in some other city or 3) canceling altogether, the committee agreed unanimously to recommend to the SPA Board of Directors that the meeting be cancelled. The full board then voted unanimously to cancel the meeting and not try to reschedule it.

The process for arriving at this decision began with a statement by the ASA that they would not be able to look after the component societies in moving their meetings to Atlanta and that the ASA's annual meeting would be somewhat condensed. The SPA annual meeting, which is held on the Friday preceding the ASA, is by far the largest meeting of all subspecialty meetings held at that time, and there was no available space in any of the downtown Atlanta hotels.

The SPA board then considered holding the meeting as a free-standing event in some accessible hub such as Charlotte or Dallas. It was noted, however, that most of the SPA registrants also attend the ASA, so it was unclear how many people would attend our particular meeting in a "non-ASA venue."

The SPA would have to secure its own room block without any history of whether or not people would attend the meeting. The board agreed that unlike the Winter Meeting where there is hotel performance history, that it was in the best interest of the society not to take the risk of facing hotel attrition, which could amount to $50,000-100,000.

Since the CD ROM syllabus for the meeting was almost completed, the board decided to make it available to all meeting pre-registrants and to all members of the society as a member benefit. The CD will be mailed in the coming weeks. In addition, the meeting materials will be developed into a web-based enduring material for CME credit.

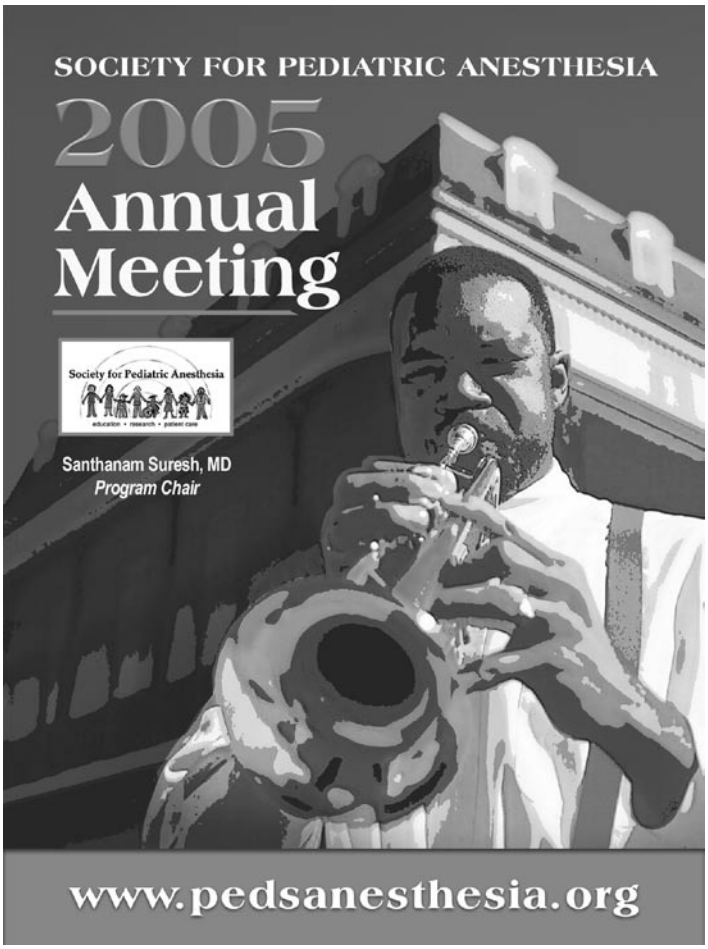
For those persons who were pre-registered, we appreciate your patience while we process your refund. You should also contact your airline carrier immediately to see what arrangements / refund is available for your ticket.

The society is very grateful for those commercial supporters who agreed to let SPA use their grants for other educational purposes in 2005. A complete list of SPA supporters may be found on the back cover. When you see your local reps, please thank them for their support of the SPA. Their contributions to the society are the main reason why the SPA has been able to keep dues and meeting registration fees low.

The 2006 Winter Meeting program will be available in the coming weeks and abstracts are being accepted for possible presentation at the meeting. Visit www.pedsanesthesia.org for more information.

Stewart A. Hinckley
Executive Director

Francis X. McGowan, Jr., MD
President, SPA



MARK YOUR CALENDAR!

Pediatric Anesthesia 2006

February 16-19, 2006

Sanibel Harbour Resort & Spa
Fort Myers, FL

SPA is now accepting abstracts for the 2006 Winter Meeting at the SPA website, **www.pedsanesthesia.org**

Abstract Submission Deadline:
December 5, 2005

www.pedsanesthesia.org

What's New in Pediatric Anesthesia?

New Devices for Managing the Difficult Pediatric Airway

Cheryl K. Gooden, MD

By: Cheryl K. Gooden, MD, FAAP

The topic of the difficult pediatric airway is not new. However, what is new are some of the latest devices for approaching the difficult pediatric airway. This section is meant to provide a brief overview of the newest devices available to the pediatric anesthesia provider.

Most or all of us, may be familiar with the following devices/techniques for managing the difficult airway, and these include the flexible fiberoptic bronchoscope, laryngeal mask airway, lighted stylet (lightwand), Bullard laryngoscope, Shikani Optical Stylet, and retrograde assisted. Some or all of these devices/techniques you may already be using in your anesthesia practice. The choice of which is used will depend upon your experience and personal preference.

The management of the difficult pediatric airway can present many challenges to the laryngoscopist. The incidence of difficult airways in pediatric patients is not known[1]. The majority of difficult airways in children will be easily recognized prior to the induction of anesthesia. Therefore, appropriate measures and techniques may then be incorporated into the anesthesia plan.

The management of the difficult pediatric airway can present many challenges to the laryngoscopist

GlideScope®

The GlideScope® Videolaryngoscope (GVL; Saturn Biomedical Systems Inc., Burnaby, BC, Canada) was initially introduced as a device for intubating the difficult adult airway.[2] Recently, the GVL became available for management of the difficult neonatal and pediatric airways.

The GVL may not be familiar to some of us, and therefore a brief description is warranted. The GVL consists of a laryngoscope blade that contains a digital video camera and light source embedded along its inferior border. The blade has a 60° angle, and with its camera provides an extensive view of the supraglottic airway and adjacent structures. The airway image is captured on a 7-inch display unit that can accompany this system, or interface with other compatible designs. So, in essence the GVL provides a video assisted intubation.

On account of the design of the laryngoscope blade, the GVL can provide an unobstructed view of an anterior epiglottis as compared to direct laryngoscopy. The GVL is a good teaching tool. Primarily, because everyone present in the room can view the patient's airway, and the airway anatomy can be easily demonstrated. Patient preparation and intubation time may be less when using the GVL as compared to the flexible fiberoptic bronchoscope. Finally, the learning curve to acquire the skills involved in the use of the GVL is rapidly achieved.[3]

After using the neonatal and pediatric GVL for the past seven months, the problem that I have encountered is in the presence of both a small mouth opening and a large tongue. With these two clinical features, and the curvature of the GVL blade, I find that the laryngoscope does not always lend itself to ease of insertion in the mouth.

Laryngeal Mask Airway (LMA) Fastrach™

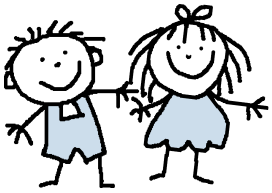
The LMA Classic™ (LMA North America, San Diego, CA) became available in the U.S. in 1992. During the course of time, several generations of LMAs™ have evolved. Since most of us have at least an understanding of its use, I will not describe all of its details. More importantly, the American Society of Anesthesiologists (ASA) has included the use of the LMA™ in the "Difficult Airway Algorithm".[4]

The LMA Fastrach™ is a type of LMA™ that allows for tracheal intubation, blind or assisted by a fiberoptic bronchoscope. Currently, the smallest size LMA Fastrach™ available for children is size 3, with patient weight 30 – 50 kg. The LMA Fastrach™ is ideal for the patient with a difficult airway or limited cervical mobility requiring an endotracheal intubation. The beginner using the LMA Fastrach™ will find that dexterity is required in order to remove the LMA Fastrach™ after the endotracheal tube is in place.

Summary: For those of you who have not had an opportunity to use these new airway devices, I hope that I have sparked an interest in the reader of this section. Of course, the choice of which device/technique, new or old, to use for the difficult pediatric airway is up to you! If these airway devices, as well as others are not available to you in your anesthesia practice, one can learn more about them at the Difficult Airway Workshop, at the 2006 Winter SPA Meeting.

References:

1. Frei F, Ummenhofer W. Difficult intubation in paediatrics. *Pediatric Anesthesia* 1996;6:251-263.
2. Cooper RM, Pacey JA, Bishop MJ, McCluskey SA. Early clinical experience with a new videolaryngoscope (GlideScope®) in 728 patients. *Can J Anesth* 2005;52:191-198.
3. Gooden, CK. Successful first time use of the portable GlideScope® videolaryngo-scope in a patient with severe ankylosing spondylitis. *Can J Anesth* 2005;52:777-778.
4. American Society of Anesthesiologists. Practice guidelines for management of the difficult airway. 2003 updated report by the American Society of Anesthesiologists Task Force on management of the difficult airway. *Anesthesiology* 2003;98:1269-1277.



Keeping Up with Kids

What are Kids into these Days?

Guest Contributor: David Abramson, MD

Ketzia Abramson, aged 10

·**Favorite Books**: Harry Potter, Among the Hidden series, any Blue Bonnet selection (TX chooses suitable books for reading: found in most public libraries)

·**Favorite Sports**: Basketball, ice skating, soccer, volleyball

- **Favorite Characters**: Robin/Beastboy/Cyborg/Starfire/Raven (Teen Titans) Luke/Jen/Nina/Jason (Among the Hidden) Sam/Alex/Clover/Jerry (Totally Spies)
- **Favorite Movie Stars**: Will Smith, Mike Myers, Raven Simone
- **Favorite TV Shows**: Teen Titans, Kym Possible, That's So Raven, Totally Spies, Simpsons, Krypto the Superdog
- **Favorite Movies**: Incredibles, Letterland, Harry Potter series, National Treasure, Spiderman 2, Treasure Planet, movies with action.
- **Favorite Foods**: ice cream, tuna pie, salami, Captain Crunch cereal, Gushers fruit snacks
- **Least Favorite Foods**: coconut, butternut squash, broccoli, cooked carrots, and any other cooked vegetable
- **Favorite Activities** (things I like to do) Hang out with friends, sleep, look at myself in the mirror, GO SHOPPING [her capitals], play basketball, practice ice skating, do nothing but watch TV for hours, remember commercials from TV and sing along when they play!

Daniel Abramson, aged 12

· **Favorite Books**: The Giver, The Series of Unfortunate Events series, Among the Hidden series

·**Favorite Sports**: Tennis, basketball, football, cricket, surfing, track

· **Favorite Characters**: Sponge Bob, Patrick, Napolean Dynamite, Ron Burgundy, Austin Powers

- **Favorite Movie Stars**: Ben Stiller, Owen Wilson, Jack Black, Chris Rock, Eddy Murphy, Will Ferrell, Mike Myers
- **Favorite TV Shows**: Sponge Bob Square Pants, Friends, Simpsons, Fairly Odd Parents, Teen Titans, The Grim Adventures of Billy and Mandy
- **Favorite Movies**: Monty Python and the Holy Grail, Napolean Dynamite, Anchorman, Star Wars (first 3 made), Meet the Parents, Incredibles, Finding Nemo, National Treasure, Elf, Shrek 2
- **Favorite Foods**: Whipped cream, jello, beef, steak, olives and feta cheese (Greek salad), potatoes, beans, Mexican food, hot stuff, stew, sugary stuff, pizza and falafel.
- **Least Favorite Foods**: Mushrooms, chicken
- **Favorite Activities** (things I like to do): listen to music (rock), surf the net, video games, hang out with friends, chat on AOL Instant Messenger, play sports, watch TV, write, go-carting, camping, watch movies

Post Script: So much for my disdain for Simpsons!! Actually, I learned quite a lot from this list: if nothing else, tonight I'm making a vegetarian stew with lots of mushrooms and a coconut topping!!

Breakfast Panel at the ASA

The American Academy of Pediatrics Section on Anesthesiology and Pain Medicine Breakfast Panel

Atlanta, GA
Place to be determined

Wednesday, October 26, 2005
7:30 – 8:45 am

Tickets must be purchased through the ASA.

Safety Concerns for Patients and Practitioners: How is it Changing the Practice of Pediatric Anesthesia?

Moderator: Constance S. Houck, MD, FAAP

The Exploding Anesthesia Machine
Joel B.Gunter, MD, FAAP

Safety Catheters and Needleless Systems
Melissa Wheeler, MD, FAAP

JCAHO Regulations and Sentinel Events
Randall M. Clark, MD, FAAP

Topic Review

From the PAC Discussion List

By Elizabeth S. Yun, MD
University of Wisconsin
Madison, WI

The PAC Discussion list is an international forum where anesthesiologists who practice pediatric anesthesia can address many issues via email. This article briefly summarizes the topic that has generated much discussion: the anesthesia technique for inguinal hernia repair in the ex-premature infant. While it is beyond the scope of this article to provide a comprehensive review, the hope is to continue the dialogue on this controversial topic

One of the most common surgeries the ex-premature infant faces is the repair of bilateral inguinal hernias. Because of their post conceptual age and other possible respiratory issues, these infants are at risk of developing postoperative apnea, bradycardia and oxygen desaturations after the surgery. To avoid these complications, spinal anesthesia is a popular choice in patients less than 3 kg. By using tetracaine, spinals lasted 50 to 60 minutes. However the drawbacks of spinals are bloody or dry taps, injection into the subarachnoid space, and failure of the spinal. Other regional alternatives were awake caudal epidurals and combined spinal and caudal epidurals. One practitioner suggested that an awake caudal with 0.375% bupivacaine with epinephrine at 1 ml/kg provided enough anesthesia for both sides. The combined spinal and epidural provides an option of extending the block. However issues about the spread and toxicity of local anesthetics in the spinal and epidural space make this technique controversial

If regional anesthesia doesn't work, the alternative is to perform a general anesthesia. By doing a mask induction and maintenance with sevoflurane along with a caudal epidural, one is able to maintain optimal surgical conditions for the surgery with minimal inhalational agents requirement (about 1 MAC of sevoflurane). While studies have noted postoperative apnea after general anesthesia, the clinical significance of this finding is uncertain because of the small number of patients. Another concern with general anesthesia is whether an endotracheal tube or a laryngeal mask airway is placed or spontaneous mask ventilation is maintained. One must balance the risk of laryngospasm versus an unprotected airway in these patients.

Many studies have shown that spinal anesthesia is associated with less postoperative apnea. A recent study by Williams et. al. compared spinal versus general anesthesia with sevoflurane in 28 ex-premature infants undergoing hernia repair. Both groups also received caudal epidural for the same analgesia. The general anesthesia group had more episodes of apnea and bradycardia but the spinal anesthesia group had a higher failure rate. However, a review of the Cochrane database noted that general anesthesia might cause complications to the infant after surgery that a spinal anesthesia might avoid. However they concluded that there was not enough evidence to state that spinal anesthesia improves patient outcomes. At this time, the technique that the anesthesiologist has the most experience is the one to use for these patients.

To join the PAC Discussion list, email pac@mail.anaes.sickkids.on.ca. and type subscribe in the subject line.

References are available on the SPA Website:
www.pedsanesthesia.org

Literature Review

Ketamine and Kids: An Update

Lin C, Durieux ME. *Paediatr Anaesth*. 2005 Feb;15(2):91-7.

Zulfiqar Ahmed, MD

Reviewed by: Zulfiqar Ahmed, MD
Children's Hospital of Michigan,
Detroit, MI

This article overviews a drug with great potential and possible under utilization. The article starts with a description of S (+) ketamine as falling slightly short of expectations. Although on the positive side of being more predictable in onset and duration, S (+) ketamine lacks the absence of side effects. They go on then to discuss the mechanism of action on NMDA receptors as being very similar to nitrous oxide. Also they discuss the reason for higher expectation for S (+) ketamine as being more potent then R (-) ketamine. The clinical applications for ketamine were divided into: pediatric general surgery, procedural sedation, and analgesia.

In the first section of general surgery, an important point was that in adult patients, ketamine has conclusively shown not to increase ICP in head-injury patients even in the doses of 5mg/kg when adequately ventilated and sedated. There is currently no data in pediatrics. Another great point was the use of ketamine in pediatric cardiac patients with cyanotic heart disease. The ability of ketamine to increase afterload and cardiac output without worsening R-L shunt was found to be significant. Later the use of ketamine in patients with M.H. susceptibility was discussed.

In the section for procedural sedation, reports were cited regarding the successful use of ketamine for interventional radiology procedures, and E.R. procedures among others. The incidence of complications was cited to be about 0.2% although the incidence of side effects profile was much higher. For example salivation from 13-30%, nystagmus 7-20%, vomiting 13-20%, and crying in 87% patients were seen. Oral ketamine was also discussed to be effective (although with 16% bioavailability) but oral atropine was described to have a bitter taste and lag time of two hours to be active. The risk factors of emergence agitation were described to be as: age over 15 years, female gender, a history of vivid dreams, and pre-existing personality or psychiatric problems. Emergence reaction was described to have an incidence of 2% in children as compared with 30% in adults. But this has been challenged according to the authors and all children are described to be at risk for emergence agitation. Use of sedatives to control emergence agitation was also elucidated in this section.

Third section discussed the trials designed to assess the use of ketamine for perioperative analgesia and which has been found to be of variable effectiveness. In regional anesthesia, ketamine was used as an additive for single shot caudals. Ropivacaine (0.2%, 1 ml/kg) alone had duration of action of three hours vs. ropivacaine (0.2%, ml/kg) with ketamine (0.25 mg/kg) had duration of analgesia of about 12 hours. These analgesic effects of ketamine are considered to be local rather then systemic. Concerns about the safety of additives in the solutions are yet to be resolved.

Overall the article was a well rounded discussion with the possibility to improve the use of ketamine in medical practice and giving directions for future studies.

Effects of Short-term Propofol Administration on Pancreatic Enzymes and Triglyceride Levels in Children

Gottschling S, Meyer S, Kreen T, Kleinschmidt S, Reinhard H, Graf N, Shamdeen GM. *Anaesthesia* 2005; 60: 660-3.

Helen V. Lauro, MD, FAAP

Reviewed by: Helen V. Lauro, MD, FAAP
SUNY Downstate Medical Center/ Long Island College Hospital Brooklyn, NY

A prospective study on the effects of short-term propofol administration on serum lipase, serum amylase, and triglyceride levels in pediatric patients undergoing magnetic resonance imaging (MRI) was conducted.

Forty children with cognitive and/or motor developmental delay, aged 4-178 months, undergoing MRI participated in the study. Inclusion criteria were ASA I or II children. Exclusion criteria were children aged 3 months or younger, hemodynamic instability, preexisting hypotension, respiratory failure, seizures, or prior sensitivity to propofol. An initial venous sample was drawn prior to each propofol anesthetic, and a second venous sample was obtained four hours after the propofol infusion was discontinued. Blood samples was centrifuged at room temperature (18-23 deg Celsius), and measured within two hours after sampling. Serum amylase was measured by ethylidene liquid test, serum lipase by photometric enzyme colour test, and serum triglycerides by enzymatic colourimetric test.

Mean (SD; range) age was 67 (66; 4-178) months. Mean (SD; range) duration of anesthesia was 46 (29; 15-160) min, mean (SD; range) propofol loading dose was 2.2 (1.1; 1.5-4.5) mg/kg, mean (SD; range) continuous propofol infusion 6.9 (0.9; 5-8) mg/kg/h, mean (SD; range) total propofol dose 7.5 (1.7; 5-15.5) mg/kg. While no patients developed clinical signs of pancreatitis within 24 hours after stopping propofol infusions, mean (SD) serum lipase levels were elevated to 27.3 (13.1) IU/liter four hours after propofol versus 23.8 (7.7) IU/liter baseline (P= 0.035); mean (SD) serum triglyceride levels were elevated to 141.9 (111.7) mg/deciliter four hours after propofol versus 106 (83.2) mg/deciliter baseline (P= 0.003). It should be noted that these higher serum lipase and triglyceride values were still within normal laboratory limits. No significant difference was found between serum amylase baseline values and values at four hours after stopping propofol.

Comment: This is the first article in the published literature to report a possible association between propofol and acute pancreatitis in the pediatric population. Cases of presumed propofol-associated pancreatitis have been reported in adult patients—the postulated mechanism involves hydrolysis of triglycerides in the pancreas leading to toxic levels of high concentrations of unbound fatty acids, causing acinar and capillary injury, possibly via chylomicrons. The authors state that pancreatic cells in children might be more sensitive to propofol; propofol may have a direct damaging effect on acinar cells. The authors purport that pancreatitis as a possible complication of propofol administration should be considered in patients with abdominal pain even after uneventful short term propofol sedation, and that propofol be discouraged for patients with previously sensitized pancreas, history of pancreatitis, biliary tract disease or cystic fibrosis.

This study, while limited by its small sample size, comes at a point in time where many pediatric anesthesiologists are increasingly concerned over the safety of intraoperative propofol infusions for MRI. Propofol infusion syndrome (PIS) (defined as sudden or relatively sudden onset of marked bradycardia, resistant to treatment, with progression to asystole plus one of the following: lipemia, clinically enlarged liver secondary to fatty infiltration, severe metabolic acidosis with base deficit of > 10 mmole/liter, or presence of muscle involvement with evidence of rhabdomyolysis or myoglobinuria) was originally described in pediatric intensive care unit (PICU) setting in patients undergoing prolonged (>24-48 hours), high dose (>150 mcg/kg/min) long-term propofol sedation. To date, at least eighteen pediatric cases of propofol toxicity in intensive care settings have been reported in the literature providing evidence of an association between propofol and PIS. While propofol is widely believed benign for intraoperative use, so far only one published randomized study has validated the safety of propofol in a group of 36 ASA I children, aged 3-12 years, receiving varying rates of short term propofol infusions. In this study, no association with metabolic acidosis was found. Until further prospective studies examining the safety of intraoperative propofol infusions in pediatric patients are available, the clinician must be cautious and vigilant when administering such an anesthetic.

A Double-Blind Comparison of Intravenous Ondansetron and Placebo for Preventing Postoperative Emesis in 1- to 24- Month-Old Pediatric Patients After Surgery Under General Anesthesia

Khalil S, Roth A, Cohen I, et al. *Anesthesia & Analgesia* 2005;101:356-61.

Cheryl K. Gooden, MD, FAAP

Reviewed by: Cheryl K. Gooden, MD, FAAP
Mount Sinai Medical Center New York, NY

Review: The goal of the study was to determine the efficacy and safety of ondansetron in the prevention of postoperative vomiting (POV) in pediatric surgical patients 1-24 months of age. The investigators of this study examined several end-points that include: 1) the percentage of patients who experienced an emetic (vomiting or retching) episode during the first 24 hours of the postoperative period, 2) the median time to first emetic episode, 3) the median time to first rescue medication, 4) the percentage of patients who had an emetic episode after rescue medication. This randomized, double-blind study consisted of 670 patients, aged 1- to 24- months old. American Society of Anesthesiologists physical status I, II, or III, and scheduled for elective surgery with general anesthesia. Exclusion criteria for this study were patients undergoing cardiac surgery, neurosurgery, or receiving either halothane or propofol. In addition, patients who vomited 24 hours prior to surgery, or who were administered metoclopramide, phenothiazine, or systemic corticosteroids within 48 hours of the scheduled surgery were also excluded.

Continued on page 8

Literature Reviews

Continued from page 7

Patients were randomized to receive either ondansetron (335 patients) or placebo (335 patients) after induction of general anesthesia, but before surgery. The patients received a single intravenous dose of ondansetron 0.1 mg/kg, or placebo (saline) over 30 seconds.

The investigators of this study deemed a sample size of 600 patients as appropriate to provide 80% power to test the null hypothesis. The null hypothesis is referring to no difference in the incidence of emesis between ondansetron and placebo in the intent-to-treat population. They examined the relationship between occurrence of emesis and factors that include age, sex, race, ASA classification, anticipated opioid use, and treatment. Of the 670 patients enrolled, 4% of the patients did not complete the study. The reasons given for not completing the study included lost to follow-up, protocol violation, and adverse events.

The demographics of the two treatment groups were similar. Also reported, were patients with histories of previous POV after general anesthesia and motion sickness, and the percentage of patients in the two groups were also very similar. The most commonly performed surgeries that were evaluated in this study, include adenoidectomy, myringotomy, orchidopexy, plastic surgery, hernia repair, and orthopedic.

Following final analysis of the data, this study showed that during the first 24 hour postoperative period, the patients receiving ondansetron following the induction of general anesthesia had an 11% incidence of emesis compared to 28% in the placebo group. The median time to first emetic episode was greater in the ondansetron group compared to the placebo group (207 mins vs. 135 mins). The ondansetron group (5%) received less rescue medication(s) compared to the placebo group (10%). The patients in the ondansetron group who required rescue medication had no further episodes of emesis. On the contrary, those in the placebo group who required rescue medication had at least one episode of emesis following administration of this medication.

Comments: This study is the first of such magnitude to evaluate the safety and efficacy of ondansetron in patients 1- to 24- months old. The study demonstrated that ondansetron (0.1 mg/kg) was quite effective in preventing POV. Earlier studies have examined the efficacy of ondansetron at doses (0.075- 0.15 mg/kg IV) for pediatric surgical patients. However, these studies did not include many patients younger than two years of age.

POV is a topic of great concern to all of us as anesthesia care providers. The experience of POV can be quite distressing to the patient, as well as to the parent/guardian. Therefore, attempts to minimize the occurrence of POV are ultimately our goal. The results generated are truly worthy of consideration in one's clinical practice.

Don't forget to use your SPA Member Resources

SPA Link: www.pedsanesthesia.org/research

Research Funding: Foundation for Anesthesia Education and Research Update

Application deadlines: February 15 and August 15

- Research Starter Grant (RSG)
- Mentored Research Training Grant (MRTG)
- Research Fellowship Grant (RFG)
- Research in Education Grant (REG)

Randomized, Double-blind, Phase III, Controlled Trial Comparing Levobupivacaine 0,25%, Ropivacaine 0.25%, and Bupivacaine 0.25% by the Caudal Route in Children.

Locatelli B, Ingelmo P, Sonzogni V, Zanella a, Gatti V, Spotti A, Di Marco S, Fumagalli R. *Br J Anaesth* 2005; 94:366-71

Reviewed by: Hoshang J. Khambatta, MD

The aim of this randomized, double-blind, phase III, controlled trial was to compare the clinical efficacy of a single-dose administration of caudal levobupivacaine 0.25%, ropivacaine 0.25%, and bupivacine 0.25% in children undergoing day-case surgery. Ninety-nine healthy children, class ASA I or II, age six months to 10 years, weight 5 to 13 kg, scheduled for sub-umbilical surgery of anticipated duration of less then 90 minutes were selected for the study. All children received rectal atropine 0.01 mg/kg and midazolam 0.5 mg/kg (maximum 15 mg) 30 minutes before surgery. Intravenous access was secured following EMLA administration over the target area. Anesthesia was induced with propofol, 2 mg/kg and fentanyl, 2 mcg/kg given intravenously. Anesthesia was maintained with propofol, 0.125-0.130 mg/kg/min. Propofol infusion was discontinued with the beginning of skin closure. The airway was controlled with a facial mask or a laryngeal mask. Thereafter a caudal block was performed using an i.v. cannula. Patients were randomized in to three groups to receive either 0.25 % bupivacaine, 0.25 % ropivacaine, or 0.25% levobupivacaine in a dose of 1 mg/kg for orchidopexy or inguinal hernia repair, and of 0.5 mg/kg for phimosis or for an incision level of lower than L3. In case of inadequate analgesia, a supplementary bolus of 2 mcg/kg of fentanyl was administered. Primary outcome was caudal efficacy. Caudal efficacy was defined as the absence of gross movements and less then 20% increase in heart rate and/or respiratory rate on application of forceps in patients undergoing circumcision, or with the inguinal incision in those undergoing inguinal hernia repair or orchidopexy. In case of changes in two of these three clinical parameters, the block was considered clinically ineffective. The secondary outcome measures were analgesic onset time, post operative pain relief, and residual motor blockade. There were 33 children in each group. There were no significant differences in age, weight, ASA physical status, gender, surgery, dose of fentanyl and propofol during induction, time between block and incision, duration of surgery, time between end of propofol infusion and Aldrete score 8 (wake-up time). There were two failures in the bupivacaine group and three each in the other two groups. These differences were not significant. There were no significant differences in the analgesic onset times. The mean onset time was eight minutes in the bupivacaine and levobupivacine groups and seven minutes in the ropivacaine group. At wake-up time and three hours later the bupivacaine group had significant motor blockade as compared to the two other groups.

Comments: The study showed that even three hours after the end of surgery, in the bupivacaine group there was significantly more residual paralysis then in the ropivacaine or levobupivacine groups. A point of concern here is that patients receiving either 1 mg/kg or 0.5 mg/kg of the different caudal medications were grouped together hence the end points of various measurements become difficult to access. This indeed is a major weakness of this study. In all other respects the three groups were similar. It has also been suggested that levobupivacaine may be less cardiotoxic then bupivacaine. In patients undergoing same-day surgery a shorter duration of residual motor blockade is definitely a major advantage. Thus if this feature and the equipotency of the drugs is confirmed by larger studies, only then it may be time to replace bupivacaine with levobupivacaine or ropivacaine for caudal anesthesia.

Quality of Life and Functional Outcome after Pediatric Trauma

Winthrop AL, Brasel KJ, et.al., *J Trauma* 2005; 58: 468-474.

Reviewed by: Michael Jon Williams, MD
Thomas Jefferson University

While anesthesiologists and critical care specialists concentrate on the acute phase of injury in trauma patients, important information is needed for the activating those specialties and services involved in long term care and post-hospital course of these patients. It is especially important in the pediatric population to access resources needed for the patient as well as the families affected by the injury. Dr. Winthrop et. al. have given some data as regards to the stresses and needs these patients have as they leave the acute care setting.

The study was a prospective, longitudinal evaluation of the quality of life and functional status of patients aged 1-18 years, admitted to the Trauma Service of the Children's Hospital of Wisconsin from 2002 to early 2004 with significant injury (ISS > 9). A total of 156 patients completed data in order for a six-month evaluation to be conducted. Children with head and/or spinal cord trauma were excluded due to the assumption that those patients would continue to have significant long-term impairment in quality of life and functional status. In addition, the impact on family life, financial status, and family strain was assessed.

Not surprisingly, most patients were admitted due to motor vehicle accidents and 45% had femur fractures with the next most common area of injury being abdominal (28%). While children made significant gains in functioning from baseline through one month and six months after injury, children older than five years of age had still not reached their peers in level of functioning at six months post-injury. Additionally, this impairment of functioning had significant affect on the family economics and personal strain although family coping was maintained throughout this period.

While not directly impacting on anesthetic care, this study does reflect the need for continued post-hositalization care required for these patients and their families and the need to activate social and rehabilitative resources as the patient leaves the acute care setting.

Safety of Aprotinin Use and Re-Use in Pediatric Cardiothoracic Surgery

Jaquiss RDB, Ghanayem NS, Zacharisen MC, Mussatto KA, Tweddell JS and Litwin SB. *Circulation* 2002;106[suppl I]:I-90-I-94.

Reviewed by: Barry D. Kussman, MD
Children's Hospital, Boston, MA

A retrospective review of patients who received aprotinin whilst undergoing congenital cardiothoracic surgical procedures at the Children's Hospital of Wisconsin from March 1994 through September 2001 was performed. Reactions to aprotinin were classified as mild (generalized cutaneous erythema, Type A) or severe (cardiopulmonary instability, Type B). The median (range) patient age was 1.0 year (newborn to 42.6 years) in the 681 patients who received aprotinin. Of a total of 865 exposures, there were 681 first exposures, 150 second exposures and 34 third or higher exposures. Reactions occurred in seven of 681 first exposures (1%), of which two were mild and five severe. In second exposures, reactions occurred in 2 of 150 (1.3%) exposures, of which both were severe. In 34 third or higher exposures, there was only one reaction (2.9%), which was severe. Although not statistically significant, reactions appeared more likely with re-exposure. There were 185 children who underwent skin testing before exposure to intravenous aprotinin (all second exposures, all third or higher exposures, and one patient with previous cardiac surgery in another institution and unknown exposure status). Although the positive predictive value of skin testing was only 20%, the negative predictive value was 98.9%. Anti-aprotinin IgE was undetectable in seven of eight reactor cases tested. These authors concluded that the risk of hypersensitivity reactions to aprotinin is low in children undergoing cardiothoracic surgery, even with multiple exposures.

Comment: In the SPA Newsletter Summer 2005, I commented in an article review that aprotinin is frequently used in neonatal cardiac surgery, and the risk of a hypersensitivity reaction upon primary and re-exposure is unknown. I subsequently discovered the paper above; although newborns are included in the cohort, detailed information on individual patient age was not provided. In contrast to adult studies, this study did not observe reactions on re-exposure to be more likely with a shorter time interval between exposures. But as commented by the authors, the size of the study with the low absolute rate of reaction may be too small to demonstrate a time-related risk of re-exposure (or alternatively the risk may not be higher with early re-exposure). Also bear in mind that the retrospective nature of the study may have resulted in some underestimation of the true incidence of aprotinin reactions.

Neurologic and Developmental Disability at Six Years of Age after Extremely Preterm Birth

Marlow N, Wolke D, Bracewell MA, and Samara M, for the EPICure Study Group. *N Engl J Med* 2005;352:9-19

Reviewed by: Barry D. Kussman, MD
Children's Hospital - Boston, MA

The neurologic outcomes of early school age children who were extremely premature (25 or fewer completed weeks of gestation) and born in the United Kingdom and Ireland in 1995 were studied. Each child had been evaluated at 30 months of age and underwent standardized cognitive and neurologic assessments. Of 308 surviving children, 241 were assessed at a median age of six years and four months; 160 classmates delivered at full term served as a comparison group for those children not in special-needs schools. Disability was defined as severe (dependence on caregivers), moderate (reasonable independence), or mild (minimal functional consequences) according to predetermined criteria. The rates of survival as a percentage of live births with no disability at six years of age were 0% among those born at 22 weeks of gestation, 1% at 23 weeks, 3% at 24 weeks, and 8% at 25 weeks. Cognitive impairment was the most common disability of the four domains assessed – cognition, neuromotor, hearing, and vision. Cognitive impairment (results more than 2 SD below the mean) was present in 21% of the extremely preterm children when compared to standardized data, but rose to 41% when compared to their classmates. The rates of severe, moderate, and mild disability were 22%, 24%, and 34%, respectively. Children with moderately or severely disabling cerebral palsy were more likely to have cognitive impairment. Male sex was found to be an important biologic risk factor, as extremely preterm boys were more than twice as likely than girls to have serious cognitive impairment and cerebral palsy. Among children with severe disability at 30 months of age, 86% still had moderate-to-severe disability at six years of age. Twenty-four percent of those categorized as having "no disability" at 30 months had moderate or severe disability at six years of age. Only 20% of the extremely preterm children in this study had no cognitive or neuromotor disability at six years of age.

Continued on page 11

Editor's Choice *Pediatric Anesthesia* Article Highlights

Submitted by Ted Sumner
Editor, Pediatric Anesthesia

Pediatric Anesthesia is the only journal solely dedicated to the medical disciplines in all areas relevant to anesthesia and intensive care in new-borns, infants and children. In 2004 *Pediatric Anesthesia* published the proceedings of the renowned 'Pittsburgh Pediatric Airway Meeting and the World Congress Satellite Meeting' in Bordeaux. These contain some very important and popular articles:

Cricoid pressure: Indications and complications
I Landsman Vol. 14 (2004) pages 43-47

This paper discusses the use of cricoid pressure in pediatric practice and stresses that safe and effective application requires training and experience. The technique may be more difficult in those children who are difficult to intubate and complications such as esophageal rupture and exacerbation of unsuspected airway injuries have been reported. The recommended pressure to prevent aspiration is 30 Newtons.

The airway in patients with craniofacial abnormalities
C Nargozian. Vol. 14 (2004) pages 53-59

Dr. Nargozian presents the challenges associated with this important group of patients with craniofacial disorders, specifically how the changes in the bony and soft tissue anatomy affect the airway and anesthesia management. All the various syndromes such as Treacher Collins and Klippel-Feil are discussed in detail.

Update on TIVA – R Eyres. Vol. 14 (2004) pages 374-379

This article concentrates on the principle drugs, propofol and remifentanil which are currently used for intravenous anesthesia in children and theor infusion devices. Dr. Eyres also points out the disadvantages of propofol, notably the propofol infusion syndrome possibly because of its effect on transport into mitochondria of long chain fatty acids.

The most popular article of 2004 came from Dr. Brian Anderson, the recognized expert on pharmacokinetics of drugs in children: **Comparing the efficacy of NSAIDs and paracetamol in children**. Vol. 14 (2004) pages 201-217

This important review article suggests that doses of these drugs are often compared without the pharmacodynamic and kinetic information to support them. There are large gaps in our knowledge of PK-PD data of commonly used NSAIDs in children and efficacy may vary with age and type of pain. What is needed is to define what target effect and consequent target concentration is required in differing pain circumstances for the different drugs.

Other excellent papers by Dr. Anderson include:

- **Methylxanthines for the treatment of apnea associated with bronchiolitis and anesthesia** – DG McNamara, GM Nixon, BJ Anderson. Vol. 14 (2004) pages 541-550
- **Getting the best from pediatric pharmacokinetic data** – BJ Anderson, TG Hansen. Vol. 14 (2004) pages 713-715

To access these articles for free, click on the article title. Don't forget that members of the Society for Pediatric Anesthesia can get a special subscription rate to *Pediatric Anesthesia*. Simply visit www.blackwellpublishing.com/pan and click on subscribe/renew.

Explore the content further free for 90 days

If you wish to explore the content of *Pediatric Anesthesia* then please visit www.blackwellpublishing.com/freetrial and use the access token PAN-SPA-05 when prompted.

Book Corner

Helen V. Lauro, MD, FAAP

Pediatric Cardiac Anesthesia

Editors Carol L. Lake, MD, MBA, MPH, Peter D. Booker, MB, BS, MD, FRCA, 808 pages, $129.00, ISBN 0781751756, New York, N.Y., Lippincott Williams & Wilkins, 2005.

In this newly released fourth edition, Carol Lake is joined by Peter Booker in creating a totally revamped textbook on pediatric cardiac anesthesia, with international contributors from United States, United Kingdom, Ireland, Canada, and Australia.

The textbook is divided into seven sections: Introduction, Developmental issues, Preoperative evaluation, Principles of perioperative management, Anesthesia for cardiac surgical procedures, and Postoperative care and Practice management. Following an introductory overview of the history of pediatric cardiac anesthesia, forty-one additional chapters are presented. Comprehensive sections on postnatal development of cardiac intercellular organization, postnatal development of the cardiomyocyte and neurohumoral influences on perinatal cardiac function are now included. Brand new chapters address treatment of management of postbypass myocardial dysfunction and postbypass pulmonary hypertension and respiratory dysfunction, as well as hemostasis, coagulation and transfusion in the pediatric cardiac patient. Fresh additions to the part of the textbook on individual congenital heart disease (CHD) lesions include specialized chapters on tricuspid atresia, double outlet right ventricle, truncus arteriosus, cardiomyopathies, pulmonary hypertension, persistent fetal circulation, and Eisenmenger syndrome, secondary vascular tumors and cardiac tumors. Like the prior edition, the format of these chapters on the various (CHD) lesions continues to be reinforced by popular shadow boxes depicting synopses of perioperative management, which are nicely demarcated from textual material. Postoperative care is more elaborated with a discussion of renal, gastrointestinal, hepatic and neurologic dysfunction. Revolutionary topics such as pediatric heart disease in the developing world, anesthesia for cardiac minimally invasive surgery, quality in pediatric cardiac anesthesia, and teaching pediatric cardiac anesthesiology are now covered.

Black and white figures are supplemented with a portfolio of color plates at the beginning of the text. Color graphics illustrating normal versus Fontan physiology and the Stage I-III palliative repairs are especially noteworthy for their simplicity and clarity. Appendices that retain syndromes associated with cardiac defects and endocarditis prophylaxis recommendations are expanded with novel tables on considerations for patients who have undergone cardiac surgery and considerations for adults with congenital heart defects who have not undergone palliative surgery.

The authors have achieved their goal, stated in their preface, of providing comprehensive, authoritative information about pathophysiology, perioperative management, and postoperative outcome of patients with congenital heart disease undergoing cardiac or noncardiac surgery as children or adults, with a bright new perspective.

This text deserves accolades as an enduring mainstay in pediatric cardiac anesthesia. Pediatric anesthesia providers should not overlook the new edition of this text.

PedsPassport:
YOUR GLOBAL MEETING ITINERARY

By Helen V. Lauro, MD, FAAP

2005

October 22-26: Atlanta, GA, USA

American Society of Anesthesiologists (ASA)
Georgia World Congress Center in Atlanta, Georgia
Website: http:// www.asahq.org

November 11-13: Toronto, ON, Canada

Pediatric Anesthesia Conference
Tel: (416) 813-7445, Fax: (416) 813-7543
Information: The Hospital for Sick Children, University of Toronto, Toronto, Canada
Website: http://www.sickkids.ca/anaesthesia

December 7-10: South Beach, Miami, Florida, USA

Pediatric Cardiac Intensive Care Symposium 2005
Tel: (201)-342-5300, Fax: (201)-342-7555
Information: The Center for Bio-Medical Communication, Inc., 433 Hackensack Avenue, 9th Floor, Hackensack, New Jersey 07601
Website: http://www.cbcbiomed.com or http://www.pcics.com

Footnote:
Please forward all information concerning congresses relevant to Pediatric Anesthesia to: Helen V. Lauro, MD, FAAP, Department of Anesthesiology, Long Island College Hospital, 339 Hicks Street, Brooklyn, New York 11201.

2006

February 16-19: Ft. Myers, Florida USA

Sanibel Harbour Resort and Spa

Society for Pediatric Anesthesia (SPA)/ American Academy of Pediatrics (AAP) 2006 Winter Meeting
Tel: (804) 282-9780, Fax: (804) 282-0090
Information: Society for Pediatric Anesthesia
P.O. Box 11086, Richmond, VA 23230-1086
Website: http://www.pedsanesthesia.org

May 24-27: Boston, Massachusetts, USA

Practical Aspects of Pediatric Anesthesia 2006
Tel: (617)-384-8600, Fax: (617)-384-8686
Information: Harvard Medical School, Department of Continuing Education, P.O.Box 825, Boston, MA 02117-0825
Website: http://www.cme.hms.harvard.edu

June 25-29: Vancouver, Canada

7th International Symposium on Pediatric Pain
Tel: (604) 681-2153 Fax: (604) 681-1049
Information: Conference Secretariat
International Conferences Services Limited
604-850 West Hastings Street
Vancouver, BC, Canada, V6C 1E1
Email: ispp2006@meet-ics.com

Visit www.pedsanesthesia.org for up to date listings of educational meetings.

Literature Review
Continued from page 9

Comment: This report has an accompanying editorial (Vohr BR and Allen M. Extreme Prematurity – The Continuing Dilemma. *N Engl J Med* 2005;352:1-2) and is the largest study of infants born at 22 to 25 weeks of gestation with follow-up to school age. Although the data is based on neonatal care in 1995, they are the most up-to-date data available and are relevant to current practices of obstetrical and neonatal intensive care. The authors used classmates of the extremely preterm children as a control group for comparison, as test scores used to standardize the relevant test may be considered to be equivalent to "historical controls" i.e. higher test scores are being achieved currently for the same test compared to when the test was initially designed and administered. The editorial highlights an important issue: As 20% of the children in this report had no disability at six years of age, there are biologic, environmental, and genetic factors that provide protection to some of these vulnerable infants. Although not the focus of this study, this report did not present data on the percentage of their extremely preterm children that received anesthesia in the early neonatal period. This would have been informative considering the hot topic of the effects of anesthetic agents on the central nervous system of the human newborn.

Society for Pediatric Anesthesia

education • research • patient care ®

"The Society for Pediatric Anesthesia greatly appreciates our 2005 commercial supporters and exhibitors. Your educational grants have allowed the society to consistently improve our programs, and provide excellent educational meetings to our membership and attendees. Your support and presence at our meetings are critical to our success." Matt Van Wie, Mgr. Corporate & Educational Support

The SPA would like to thank the following 2005 supporters:

PLATINUM:

Abbott Laboratories
Masimo Corporation

SILVER:

Baxter Healthcare

BRONZE:

Arizant Healthcare Inc.
Aspect Medical Systems
B.Braun Medical Inc.
Belmont Instrument Corp.
Children's Medical Center, Dayton, OH
Cook Critical Care
Daniel & Yeager
Draeger Medical, Inc.
Elsevier
GlaxoSmithKline
iMD-soft
Kaiser Permanente
King Systems Corporation
LMA North America
Ochsner Clinic Foundation
Sheridan Healthcare, Inc.
Smiths Medical MD, Inc.
Texas Children's Hospital, Houston, TX
Vitaid Airway Management

SUPPORTERS:

American Academy of Pediatrics
MHAUS
Blackwell Publishing
TIVA HealthCare