The World of Anesthesia

An International Perspective

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Inaccessibility to basic surgical service is being increasingly recognized as a significant global public health problem. Lack of safe anesthetic care is a contributing factor. This review will outline the extent of the problem, some of the causes, what steps are underway to measure and address it, and how individual SPA members can substantially help improve the availability and safety of anesthesia in resource-poor regions of the globe.

The Unavailability of Essential Surgery

Compounding the challenges of deficient resources among low- and middle-income countries (LMIC) is the disproportionately high burden of disease (both surgical and non-surgical) in those regions. Three-quarters of all the world’s surgical procedures are done for the wealthiest 30%, while the poorest third receive only 3½ % of surgical services (put another way, each year in the poorer countries (spending < $100 per capita annually) fewer than 300 major operations are done per 100,000 population, while in the wealthier ones (spending > $1000 per capita) over 11,000 are done. Unavailability of anesthesia services contributes to the disparity.

Increasing interest in solving problems of distribution and quality of anesthesia services around the world are evident from increased publications in recent years, such as the dedication of entire issues in Anaesthesia (November 2007) and Pediatric Anesthesia in (January 2009).

Surgical Disease as a Public Health Problem

Lifetime disability and premature death from untreated surgical conditions accounts for a significant disease burden in many countries. Four groups of diseases amenable to non-complex surgical intervention have been described:

1. Trauma is responsible world-wide for one million childhood deaths each year, with over 95% occurring in the LMIC’s. Also, 95% of motor vehicle-related deaths also occur in LMIC’s, although per capita vehicle ownership is less than 1/10th that of the US and Europe. This does not speak to the incalculable disability of survivors who have not had effective timely treatment of burns, fractures, or intracavitary injuries.

2. Obstetric complications such as obstructed labor, postpartum hemorrhage, and incomplete abortion are estimated responsible for the deaths of a half million women annually, many from preventable causes.

3. Emergency non-traumatic conditions, such as peritonitis, appendicitis and abscesses, if treated, would prevent permanent disabilities and deaths.

4. Elective surgical conditions for which treatment would prevent substantial lifetime dis-
What Makes Me an Expert?

By Allison Kinder Ross, MD

I recently participated in the Fundamentals of Pediatric Anesthesia Course that coincided with the SPA as part of a panel entitled, “Ask the Experts” with Dr. Steve Hall from Chicago and Dr. Randy Clark from Denver Children’s. At this point I had to wonder, “What makes me an expert?”

The panel started out with a basic question on fluid deficit replacement. My answer is simple and I am ready to move on to the next basic question. However, it is not that simple and soon it is apparent that this group of occasional pediatric providers is hoping to find other answers. They want to know when to it is acceptable to transfer an infant whom your surgeon has inappropriately posted without the proper support, what is the latest policy on consent for a minor has a positive pregnancy test, and can SPA help set these guidelines for them to follow on these and other issues.

It was interesting to quickly realize that the problems in the community are globally complex and extend beyond fluid replacement.

Although I do not know the ultimate influence of anesthetic exposure in infancy on neurocognitive outcome, I believe research in pediatric anesthesia is alive and healthy! This is a remarkable time in that these timely investigations are preludes to an upcoming prospective study supported by SPA and currently in planning with the US Food and Drug Administration. This initiative is along side of two other outcomes research projects: the Wake Up Safe project and the Pediatric Regional Anesthesia Network (PRAN) group, born from dedicated members of SPA. If you have interest in these projects, please don’t hesitate to let me know and I’ll be happy to point you in the right direction.

With healthcare reform as a priority agenda item for the new federal administration, we should keep our attention to the needs of the children and families we serve. Each of us recognize the challenge of CMS reimbursement for anesthesia services, but healthcare coverage for children of the nearly 47 million uninsured Americans may be on the horizon. Regardless of political affiliation, SPA members should advocate for their beliefs with their elected representatives. This is advocacy for children in the perioperative environment.

The SPA Annual Meeting, on October 16, 2009 is being finalized by Dr. Steve Stayer and should be complete soon. The program looks outstanding for our return to New Orleans! We are currently planning for an after program social, but we are carefully watching our expenditures during this time. In Jacksonville, I met many of our ‘newly minted’ colleagues and fellows for their first SPA meeting. Their energy as a group is palpable. Whether interested in clinical care, education, research, networking or other skill development, this group will be the future for children in the perioperative arena. We look forward to seeing everyone in New Orleans.
Anesthetic Induced Neurotoxicity – What does it all mean?

By Lisa Faberowski, MD
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If we have children, or even from our own experience, we are familiar with the story of Mowgli in the Jungle Book. This is a story of a young boy abandoned in the jungle and raised by the animals. I am not one to remember the lines in movies but I remember this line: “I am not animal, I am a man”.

To me this applies to anesthetic neurotoxicity and the developing brain. There are numerous animal investigations, mostly rodent, that support the concept of anesthetic neurotoxicity in the developing brain. I would say that even my own research supports this concept. The concept of neurotoxicity has been confirmed by multiple investigators in both in vivo and in vitro investigations. The in vitro investigation eliminates some of the concerns of the in vivo investigation. Similarly, the in vivo investigation eliminates concerns about in vitro investigation.

However, despite the solidity of our laboratory data, regardless of the species, conclusions in humans can not be made at this point in time. Do I believe in my work? Well, of course I do. But can I stand in front of a parent and convince them that anesthesia is neurotoxic and should be avoided? The answer for most of us, including myself, would be No. Many individuals, including those with whom I have trained, have devoted their entire career to anesthetic neuroprotection. However, despite the wealth of literature on the subject of anesthetic neuroprotection, clinical investigations in humans have yet to prove the validity of the scientific data.

Indeed, we now have some retrospective investigations in humans which suggest anesthetic neurotoxicity in the developing brain does exist; however, we are still left with an unanswered question. Clearly, the mechanisms of anesthetic neuroprotection in both adult and infant animal models have been elucidated. Of interest though, the mechanism of protection is the suspected mechanism of neurotoxicity. Interactions of anesthesia with the NMDA and GABA receptors lead to a change in chloride and calcium flux. Based on this balance of chloride and calcium we have neuroprotection or neurotoxicity.

In summary, what is may be, but like all of us in any criminal investigation, we are innocent until proven guilty. The jury on anesthetic induced neurodegeneration is still out and most likely a decade of research on the subject will continue. So stay tuned!

Presentation on childhood obesity reviewed

By Tae Kim, MD
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Dr. Paul Samuels gave an informative presentation at ASA in October on the growing problem of childhood obesity in America. As a pediatrician and family man, Dr. Samuels informed the audience that he would not be discussing the anesthetic implications, but address the issue of childhood obesity and its impact on the well being of children. The public health risk is real and forecasts a diminution of life expectancy related to pediatric obesity. “The antecedence of adult disease are (is) already present in children that we are caring for right now at ages that are far younger than we have earlier appreciated.” From 1980 to 2000, the number of people with a body mass index (BMI) greater than 30 doubled, a BMI greater than 40 quadrupled and a BMI greater than 50 in 20 years of age is expected to live 20 years less than a normal weighted peer. Also, a prospective cohort study of 100,000 women by Rob M. van Dam, Ph.D. et al found 18-year-old women with an increased BMI were 2.5 times more likely to die a premature death.

In the US, 2-4% of children are at the 99th percentile for age-adjusted weight, representing 1-2 million children. This places childhood obesity more prevalent than pediatric cancer, cystic fibrosis, HIV and juvenile diabetes combined. The development of and severity of pediatric obesity is associated with diseases affecting all the major organ systems over time. Dr. Freedman et al reviewed the cases of 6000 children from the Bogalusa Heart Study and looked at cardiovascular disease risk factors. He found 40% of
2008 Pediatric Anesthesia article highlights

Contributed by Robert H. Friesen, MD
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Pediatric Anesthesia is the only journal solely dedicated to the medical disciplines in all areas relevant to anesthesia and intensive care of newborns, infants, and children. Most issues include editorials and review articles on timely subjects, and themed issues are presented periodically. Many articles in 2008—too many to discuss in this space—were important contributions to the literature in our field. A few highlights are included here:

Themed Issue: Pediatric Sedation
Volume 18, issue 1 (January, 2008)

This issue is devoted to the topic of pediatric sedation and contains pertinent editorials, review articles, guidelines, and original articles.

Original Articles:

The pharmacodynamics of ketamine have been inadequately investigated in pediatric subjects prior to this study, which describes a similar PD profile in children to that of adults.


This is a prospective study of 657 children who underwent cardiac surgery with CPB. Patients who received aprotinin had significantly less blood loss during the first postoperative 24 h but a higher incidence of renal dysfunction. However, aprotinin was not a significant contributor to renal dysfunction by multivariable logistic regression analysis. (See also: Williams GD et al. Pediatr Anesth 2008;18:812-819 and Twite MD, Hammer GB. Pediatr Anesth 2008;18:809-811)


This study was designed to improve our understanding of the neuromuscular junction and its possible contribution to the abnormal response to neuromuscular blocking drugs in children with DMD. Using a special staining technique, the neuromuscular junction of children with DMD was histologically examined. Abnormalities in shape and morphology were observed, but the spread of acetylcholine receptors was comparable to those of non-DMD patients.


This large retrospective study of 747 patients demonstrated that dexmedetomidine provided successful sedation for over 97% of children undergoing MRI. However, a significant incidence of sometimes profound bradycardia was observed, raising a cautionary warning and calling for clinical investigation of methods to attenuate this hemodynamic effect.


This investigation describes the pharmacokinetics of dexmedetomidine in children. Clearance in neonates was approximately one third of that described in adults, consistent with immature elimination pathways.


The authors reviewed the Mayo Clinic’s experience with intraoperative ECMO for the treatment of failure to wean from CPB and demonstrated that this procedure has significantly improved the survival rate of neonates undergoing repair of complex congenital heart disease.

Low dose methylprednisolone prophylaxis to reduce inflammation following intraoperative administration of methylprednisolone prior to collapse of the lung reduced levels of inflammatory mediators from both blood and lung tissue and improved oxygenation during OLV.

Case Report:

This case report describes a potentially serious adverse event following intraoperative administration of dexamethasone for PONV prophylaxis in a child with acute lymphocytic leukemia. Now that dexamethasone is enjoying widespread use as a prophylactic antiemetic, this report warns us that tumor lysis syndrome can be associated with its use in children with lymphoproliferative disease.

Be prepared for questions from your patients and their parents regarding what they hear on the news!

The lay media has been inundated with interpretations of the article from the Mayo Clinic that linked learning disabilities with exposure to anesthesia in young children. Make sure to read the article as well as the editorials that have been featured regarding anesthesia and its effects on the developing brain.


From the editor – AK Ross
Tonsillectomies are one of the most common pediatric surgical procedures. However, this procedure is associated with high rates of postoperative nausea and vomiting (PONV), difficult pain control, and bleeding. Dexamethasone has become a popular drug for preventing PONV in adults and children because of its efficacy and minimal side effects. The Society of Ambulatory Anesthesia has recommended its use for PONV prophylaxis in its recent guidelines. In addition, some research has suggested that dexamethasone may have some analgesic properties, especially in tonsillectomies. Because of these findings, the use of dexamethasone in pediatric tonsillectomies has become the standard of care in many places. However, few studies have examined the appropriate dose for PONV prophylaxis, possible side effects, or the analgesic property of this drug. Therefore, the authors of this study performed a randomized, placebo-controlled trial to determine the dose response of dexamethasone in pediatric tonsillectomy, the adverse effect profile of this drug, and if other analgesics (such as ibuprofen) were needed in the postoperative period.

This study was performed at the University Hospital of Geneva, Switzerland, the only public hospital in Geneva. Children from ages 2-17 years were scheduled for an elective tonsillectomy for either recurrent tonsillitis or obstructive sleep apnea. They were randomized to one of four groups: placebo (saline), dexamethasone 0.05 mg/kg, dexamethasone 0.15 mg/kg, and dexamethasone 0.5 mg/kg. Exclusion criteria included allergy/hypersensitivity to dexamethasone, recent steroid use within one month, using antiemetics 24 hours before surgery, diabetes mellitus, recent vaccinations (less than one month prior), or varicella infections. No preoperative testing for bleeding disorders was done, although those patients with suspected disorders were excluded. The patients received a standard anesthetic plan consisting of premedication with oral midazolam 0.3 mg/kg, induction with sevoflurane or propofol, maintenance with a volatile anesthetic and alfentanil for intraoperative analgesia. Patients were intubated with or without neuromuscular blocking agents. If patients received a relaxant, the effect was reversed at the end of the case. Patients also received rectal acetaminophen 40 mg/kg and intravenous fluids at 20-25 ml/kg. Bupivacaine 0.25%, 2-4 ml/kg was injected around the tonsils. Classic complete tonsillectomy with dissection in the pericapsular plane was performed on all patients with one of three surgical techniques chosen by the surgeon: dissection with cold steel instruments and hemostasis with gauze compression (cold technique), dissection and hemostasis with electrical bipolar forceps (hot), or a combination of the two. Patients were watched in the PACU for 2 hours after the surgery and then transferred to the ward. They received morphine 0.03 mg/kg intravenously in the PACU and acetaminophen-codeine orally or rectally on the ward. If analgesia was not enough, they received ibuprofen (maximum daily dose of 30 mg/kg). Once cleared by the surgeon, the patients were free to eat and drink and they went home the next day. Analgesia at home was the same regimen used on the wards.

The primary outcome investigated in this study was the dose effect relationship of dexamethasone for PONV prevention. The authors defined vomiting as the forcible ejection of stomach contents. Retching was considered unproductive vomiting and counted as vomiting. Nausea was recorded if the patient was able to express it. Patients received ondansetron 50 µg/kg as a rescue antiemetic. The secondary outcome studied was the potential analgesic efficacy of dexamethasone in tonsillectomy patients. Pain intensity was measured by one of three pain scales: 0-10 visual acuity scale (VAS), 0-10 faces pain scale (fPS) and the 4-13 point Children of Eastern Ontario Pain Scale (CHEOPS). A VAS or fPS score less than 3 and a CHEOPS score less than 8 was considered adequate pain relief. The number of children needing rescue morphine was also recorded. Other outcomes examined were capillary serum glucose levels after induction and at the end of surgery, delay to first oral intake, quality of sleep and nurse and parent satisfaction. Bleeding episodes were categorized in one of three groups: history of bleeding and readmission but without evidence of bleeding on examination, readmission due to bleeding with evidence on examination without need for surgery and emergency reoperation due to bleeding. In PACU and wards, nurses recorded the data. On discharge, parents were given a questionnaire to fill out daily until the follow-up appointment on postoperative day 10. If there was an adverse event, the parents were instructed to return to the emergency department or the otolaryngology clinic.

After 200 patients were randomized, the code was broken for an interim analysis due to the unexpected high numbers of postoperative bleeding episodes and the decision of the university hospital to transfer interventions from the Division of the Otolaryngology to the children’s hospital. Continued enrollment was considered, but the interim analysis showed that a statistically significant result for the primary objective had been reached along with a significant increase in bleeding with patient receiving dexamethasone. After consultation with the institutional ethics committee, the study was terminated for the following reasons: the study participants were children, posttonsillectomy bleeding causes potential harm to the patients, the main end point of the study was reached and dexamethasone was not regarded as a vital therapy without alternatives. A post hoc power analysis determined that 50 children per group would provide enough power to study for the antiemetic effect of dexamethasone. An analysis of the crude associations between dexamethasone and outcomes was performed, as well as a multivariate analysis that included variables that could be potential confounding factors.
ability include cataracts, hernias and congenital anomalies such as clubfoot, cleft lip/palate, and ano-rectal malformations.

As specialists in Pediatric care, we recognize that all four of these categories impact the health and survival of infants and children. Unfortunately, even when available within the LMIC’s, surgical services are concentrated almost wholly in capital cities.

Recently, the WHO has recognized that the traditional hierarchy of public health services (water, sanitation, infection control, and primary care) requires the addition of basic surgical care to the list of universally accessible services. The Global Initiative for Emergency and Essential Surgical Care (GIEESC) [http://www.who.int/surgery/globalinitiative/en/] is a collaborative effort of internationally recognized organizations and individuals to address unmanaged death and disability due to emergency surgical conditions.

Parallel with this effort, a working group of NGO’s and individuals has begun the fascinating but arduous task of defining the scale of the worldwide burden of surgical disease. While it has been estimated that about 11% of the world’s disability (measured as disability-adjusted life years) owe to surgical conditions, detailed knowledge of surgical procedures, outcomes, and of unmet needs is often poorly collected, not readily available, or not shared for external evaluation. The BOSD working group seeks to develop common definitions, promote data collection in LMIC’s and explore both barriers to access to surgical care and their resolution in low resource settings.

Causes of the anesthetist shortage

One of the most important barriers is the lack of suitably trained health providers. The numbers of health workers - anesthesiologists and surgeons among them - reaches unbelievably low numbers, especially in Africa, South Asia and many island nations. With only 10% of the World’s population, Africa bears 24% of the global disease burden, but has only 3% of the World’s health force; South Asia, bears a similar disproportion. In rural India, only 22% of hospitals have a qualified anesthetist, and in many African countries, one anesthetist may be available for every million or more population. The availability of physicians per capita in the lowest-development countries is less than 10% of that in the developed countries. Understanding the three components of the “brain drain” might suggest ways of addressing these deficiencies.

The first component is the emigration of trained personnel from middle and low income countries to the US, UK, Australia, Canada, and France. Among the reasons physicians emigrate are limited opportunities in their home countries, poor working conditions, lack of support or supervision, the quest for advanced training, better work environments, and improved life-style. In most underdeveloped countries from which physicians and nurses emigrate, their training is fully supported by free higher education. Thus, the social burden to the home country is two-fold: lost financial resources expended to support medical schooling, and loss of the trained personnel themselves. For 16 Sub-Saharan countries, the WHO estimates that over 50% of their physicians practice outside their country. Seventy-five percent of all Ghanaian medical graduates in the past 10 years have emigrated. Among Tunisian anesthesia residents graduating the past two years, over 70% are now practicing in France. Conversely, in the English-speaking upper income countries (US, UK, Canada, Australia, New Zealand), 20-35% of all physicians are foreign trained.

The second component of brain drain is an internal one. In dedicating extensive resources to combating infectious diseases, malnutrition, and other targeted health problems at an accelerated pace the past five years, international aid agencies have unintentionally drained health providers from their communities. For example, one of the signature accomplishments of the G.W. Bush administration was the commitment of $15B to AIDS therapy in Africa. An unintended consequence has been that the well-paying jobs created to carry out these programs have siphoned scarce health workers away from more-poorly paying government positions, leaving clinics even further understaffed. In-country maldistribution is also a major problem. Commonly, the richest segment of society receives a disproportionate share of government expenditures for health care, as health workers tend to congregate in the capital cities. In Haiti, for example, a survey done in the 1980’s found that in rates of cesarean section in a large area of the country were close to zero, while among the affluent of the country rates were similar to the US.

Finally, attrition of healthcare workers is a major cause of significant loss. The deficiency of national or local political will to support training and clinics, lack of adequate remuneration, lack of professional growth opportunities, inadequate supervision, and unmanageable workload are all factors in driving healthcare workers out of their professions. Attrition due to AIDS itself also has had a significant impact in some regions. In the Lusaka district of Zambia, for example, AIDS-related deaths accounted for 37% of vacancies in nursing positions in 2006, an amount almost equal to the loss due to emigration.

Besides salary, working conditions and having adequate medi-
cations and supplies needed to perform professionally also motivate health workers to stay in their own countries. In the Nigerian Ondo State, for example, when the government addressed these issues, along with improved infrastructure, the percent of nursing staff in rural areas more than doubled over three years14.

**Pediatric Anesthesia in Developing Countries**

Children represent more than half the total population in many low- and middle-income countries. Thus, untreated simple surgical conditions, leading to lifetime disability or early death, constitute enormous social and economic burdens for those countries. Examples include congenital conditions (club foot, cleft palate, congenital hip dysplasia, anorectal malformations), timely management of burns to prevent contractures of extremities or the neck, proper reduction of long-bone fractures, and simple inguinal herniorrhaphy. Surgery in children may be further hampered by concurrent medical problems such as malaria-induced anemia, malnutrition, HIV, or tuberculosis; by the lack of skilled surgeons and anesthesia providers in many rural areas; and by the lack of suitable equipment and facilities adapted for pediatric use15.

There is little information on a worldwide distribution of pediatric anesthesiologists, or even on the outcomes of surgery for children. However, there is little doubt that anesthesia-related mortality is a greater risk for children than in adults, and that the risk is higher when care is by an anesthetist who manages children infrequently16; the disparities may be higher in developing countries than in developed ones17. Our goal, then, should be to boost the anesthetic skills among our developing country colleagues in managing infants and children in particular.

**Bolstering Anesthesia Providers and Their Skills**

In order to address the need, several countries in South America, South Asia, and Africa have undertaken aggressive scale-up programs for health workers. While the initial focus has been on community and mid-level workers to manage a high burden of disease in primary care, training programs for specialties have also been developed18. Throughout Africa and parts of South Asia19, nurses and other health workers have trained as anesthetists, to provide care where there are no anesthesiologists. While most of the non-physician specialists are nurses with additional training, in many countries secondary-school graduates are recruited for 3-4 year programs, which help avoid depletion of nursing numbers20. Clinical officers have been successfully trained to provide anesthesia, cesarean sections, cataract extractions, and orthopedic trauma care21. Indeed, in many sub-Saharan countries Clinical Officers provide the majority of anesthesia care20.

But non-physician providers require training and supervision (many have had only limited on-the-job experience), so anesthesia programs are also essential6. LMIC countries that lack the small critical mass needed to sustain anesthesia training programs require outside assistance to ‘prime the pump’. A joint program of the Canadian Society of Anaesthesiologists and the ASA’s Overseas Teaching Program began the establishment of a four-year residency training program in Rwanda in 2006, modeled after a previously successful program in Nepal22. Over 10 year’s time, the Nepalese program has trained21 anesthesiologists from which a core of in-country faculty has emerged23. Reasons cited for the high rate of retention include high quality of training in all aspects of anesthesia including subspecialty and critical care; increased job satisfaction, parity of status with other faculty colleagues, and reasonable incomes. The Nepalese training program no lon-

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Historically, the mainstay of postoperative analgesia for children undergoing spine surgery has been intravenous opioids delivered either continuously or intermittently by patient or nurse-controlled pumps. Spinal surgeries are amongst the most nociceptive of procedures and achieving adequate analgesia without over-sedation in the post-anesthesia care unit is notoriously difficult. Anyone who has witnessed the early postoperative recovery of a child having spine surgery with insufficient analgesia on-board would agree that the unpredictable response to opioids (particularly after intra-operative infusion of remifentanil) warrants the continued search for more reliably efficacious techniques of analgesia. Having eventually achieved early adequate analgesia, opioid infusions – particularly at the initially high rates required – are associated with a plethora of undesirable side-effects including nausea, pruritis, somnolence, respiratory depression and urinary retention. Add to this the difficulties encountered titrating the required rate in non-verbal or delayed children plus the preponderance of excruciating muscle spasm unresponsive to opioids, and it is clear that we can and should be doing better.

Fortunately, there now finally appears to be robust evidence supporting what many of us have long believed: Epidural analgesia provides the gold standard post-operative analgesia for pediatric spinal surgery. In the past decade a growing number of well-conducted studies have compared firstly epidural with intravenous analgesia, and latterly epidural techniques using one or two catheters. All epidural catheters were placed by the surgeon under direct vision at the end of surgery with their tips threaded to correspond the middle of the incision for single catheters and the upper and lower ends of the incision for two. Infusions of dilute local anesthetic, with or without opioid, were delivered either continuously or as patient-controlled boluses.

For single catheters, encouraging results from several retrospective case-control series from the nineties preceded two prospective randomized controlled trials (PRCTs) comparing epidural bupivacaine/fentanyl with intravenous morphine patient-controlled analgesia. Disappointingly, neither study demonstrated a significant advantage of one over the other, and recorded a similarly high incidence of post-operative nausea and vomiting (PONV) in both treatment arms. From these results, it seems clear that a single catheter technique appears insufficient to provide better analgesia than systemic opioids alone, and has a comparable side-effects profile when epidural opioids are included. This comes as no surprise – the dissections frequently associated with these surgeries are simply too extensive to be completely covered by a single point of epidural infusion.

More recently, Blumenthal and co-workers investigated the efficacy of two epidural catheters in two PRCTs, both comparing epidural ropivacaine with intravenous morphine in the setting of anterior and posterior scoliosis surgery. Unlike the findings with one catheter, two catheters offer significant advantages: Markedly improved pain scores up to the third postoperative day, fewer side-effects and earlier return of gut function. Similarly beneficial results were reported in a subsequent study by Saudan and co-workers who provided children undergoing posterior spinal surgery with patient-controlled epidural analgesia delivered via one or two catheters determined by operative extent, although they did not (and to my knowledge, someone has yet to) directly compare relative efficacies of one versus two catheters.

Unbridled enthusiasm for double-catheter epidural techniques must necessarily be tempered by an awareness of the limitations and possible pitfalls associated with their use. Concerns have been raised about delayed respiratory depression, local anesthetic toxicity, wound infection and perhaps most worryingly of all the potential for a functioning epidural to mask iatrogenic neurological injury. The evidence for all four is lacking; respiratory depression can be largely avoided by the use of lipophilic opioids, systemic toxicity by limiting doses to published guidelines. There are no reports of wound infections associated with epidurals. There are a very few inconclusive reports of neurological sequelae associated with (though not obviously caused by) epidurals. Most authors recommend that catheters should be dosed with local anesthetics only after a normal postoperative neurological examination has been documented. Similarly, using dilute solutions of local anesthetic (associated with decreased incidence of motor block) reduces the possibility of misinterpretation of developing neurological symptoms and signs and is widely advocated. Reliable, recurrent follow-up and nurse monitoring policy and procedures must also be ensured before introducing this technique into your practice.

Bearing these important caveats in mind, isn’t it about time you provided your pediatric spinal surgery patients with the best post-operative analgesia available?

Shared References
Safety concerns regarding best practice for delivering anesthesia and analgesia for spine surgery in pediatric patients remains a contentious debate. The incidence of debilitating sequelae/paralysis following spine surgery is unknown. However, several case reports have been cited in the literature. There is a concern that epidural/intrathecal analgesia may contribute to this complication.

Modern day anesthesia has triumphed over the initial hurdles set forth in 1846 by William Morton to provide surgery without pain. Today anesthesia practice has advanced to being able to provide utmost safety to the patient, full depth of anesthesia (with a lack of explicit recall), a pleasant overall patient experience of the surgical event as well as a limited hospital stay, whilst minimizing the healthcare costs of today.

Thus the debate for how best to manage anesthesia/analgesia for spine surgery continues.

Our pediatric spinal surgery population presents pediatric anesthesiologists with a challenge of diverse pediatric patients, some with significant co-morbid disease. Optimal analgesia for intraoperative and postoperative spinal surgery in this group has to first and foremost provide patient safety, and enable all other goals, to fall into place accordingly.

Most of the following comments relate to analgesia for PSF (posterior spinal fusion).

It is feasible to accept that should it be possible to always ensure integrity of neuromuscular function following surgery for spinal procedures, that the debate concerning best practice analgesia would be limited to the following factors:

1. Optimal analgesic regimen as determined by prospective studies based on postoperative pain scores, taking into consideration patient satisfaction based on potential opiate side effects.
2. Minimal respiratory depression, with adequate analgesic effect to allow adequate post-operative chest physiotherapy and adequate cough (without pain scores above 4-5 on the Visual Analog Scale pictures for pediatric patients)
3. Shortest time to return of bowel function allowing patient to transition to oral pain medications, without nausea and vomiting precluding effective oral analgesia.
4. Optimal oral opiate dosage to allow early ambulation and post-operative rehabilitation
5. Shortest length of hospital stay as deemed possible by a combination of all of the above factors.

In addition to the above post-operative factors the following intra-operative issues are particularly important factors especially for individual patient and surgical needs:

1. Anesthesia techniques that best limit intraoperative blood loss (e.g. scoliosis resulting from neuromuscular illnesses, Jehovah’s witness patients).
2. Anesthesia techniques that ensure optimal monitoring of sensory and motor evoked potential during the surgical procedure, whilst ensuring adequate anesthesia and analgesia without the risk of intraoperative awareness.
3. Anesthesia technique and optimal analgesia quality that is sufficient to allow immediate postoperative testing of intact neuromuscular function.

It is not feasible to extrapolate literature that supports epidural or intrathecal methods of achieving the efficacy or safety profile afforded to adult patients, to the pediatric population.

Children are not little adults. Dalens et al.6, were able to provide epidural/spinal anesthesia as sole surgical anesthesia for 6 patients for staged segmental scoliosis surgery allowing 3-5 segments to be repaired at a time over 3-11 surgeries. Authors caution against this technique in inexperienced hands. This method was selected specifically for patients who were deemed unsuitable for general anesthesia based on comorbid features. This describes a scenario where the risk benefit balance of epidural/intrathecal analgesia is a superior mode of anesthesia and analgesia. This embodies our duty to our patients.

Aronsson et al’s team7 used intrathecal morphine for surgical anesthesia for pediatric spine and orthopedic surgery. I would again caution to attempt to compare the limited segment repair of myelomeningocele as a comparable surgical insult as that caused by posterior spinal fusion (PSF). The challenge to provide optimal analgesia may also be different based on lack of sensation, depending on the extent of the myelomeningocele.

Blackman et al8 reported early respiratory depression after studying the use of intrathecal morphine in 3 patients postoperatively. Late onset respiratory depression (later than 6 hours) was seen in 5 patients out of 33. This complication, if missed, may lead to further unwanted complications (first and foremost), and secondly, may involve medico-legal implications.

Is it not time that we aim to perfect our intravenous opiate regimens instead? Modern day litigation also should be taken into consideration. The searches for the best possible combination of epidural/intrathecal drugs continue to lack evidence of superior analgesia over PCA for spinal surgery. Note that the recent review written by Dr. J.D. Tobias9 reveals a conundrum of how to compare treatment regimens that have very different anesthesia regimens and surgical techniques. His review explores how to assess the differences in epidural/intrathecal regimens thus far tried and tested. Thus we remain in pursuit of minimizing the well-known side effects of intravenous opiate PCA regimens.

As Cassady J et al.1 and O’Hara J. et al.2 have described in different publications regarding the comparison of regional analgesic techniques to intravenous opiate regimens for posterior spinal fusion, neither study was able to show a clear cut major benefit by using regional anesthesia, as was hoped for.

It is time to perfect our intravenous opiate regimens that consistently provide equiopotent analgesia profiles for spinal surgery. Minimizing patient fears and meeting expectations are very much possible, with individual PCA regimens. Concentrating our efforts on safety will ultimately improve the patient experience and our ability to provide protocols that consistently provide excellent results.

Is there really room for debate with the possibility of neuromuscular paralysis and the air of litigation that is part of our culture today? The current lack of clear cut benefit with intrathecal/epidural analgesia only furthermore supports this critical fact.
WFSA takes a lead

The stated mission of the World Federation of Societies of Anesthesiologists is “to make available the highest standards of anesthesia, pain treatment, trauma management and resuscitation to all peoples of the world and to disseminate the same amongst them.” The educational activities are promoted through two committees, Publications and Education24.

The Publications Committee produces a journal, Update in Anesthesia, which provides reviews in basic important topics in five languages. It is available in a print edition, as well as online at the WFSA website (www.anesthesiologists.org - note the British spelling). Also available on the website is the Tutorial of the Week. SPA members are invited to contribute to any of the WFSA publications. In addition, the committee supports publication of a low-cost textbook of anesthesia (authored by Dr. Rebecca Jacob from Vellore, India).

The Education Committee’s activities are centered on providing high-level training through several venues. It provides support for regional meetings and courses; provides teachers and speakers for training courses; and, as its flagship program, supports a network of anesthesia training centers. Training centers provide fellowship level experience for 3-12 months at a time in anesthesia specialties close to the home countries of qualified applicants25. Costs are low, as the WFSA scholarship supports transportation, food and housing; fellows are not salaried during training. A Pediatric Anesthesia fellowship inaugurated the program in 1999 in Santiago, Chile. Since then, 30 fellows have completed Pediatric training and returned to their home countries25. In several instances, those fellows are the only specialized pediatric anesthesia trained resources in their country. Fellowships are now offered at 11 centers worldwide in general, pediatric, neuro- and obstetric anesthesia, pain management, and critical care. Proudly, SPA has committed to support a pediatric anesthesia fellow in Vellore, India.

Anesthesia Safety

Given the austere conditions, paucity of resources, and widespread lack of well-trained personnel, it is not surprising that perioperative morbidity and mortality is quite high in some regions of the low- and middle-income countries. In a recent survey, Weiser estimated a worldwide surgical caseload of about 200 million per year, with an estimated overall major morbidity of 3% and mortality of 0.5% respectively. This would amount to a million perioperative deaths and 7 million major morbidities annually world wide. Published estimates from single hospitals in developing countries in the past decade suggest anesthesia mortality may be 1-2% in some, especially where the most common operations are emergency procedures (e.g. Cesarean)26, so even a small reduction would effect substantially improved survival1.

WFSA’s Committee on Safety and Quality has recently published the 2008 revision of Standards for the Safe Practice of Anesthesia27, which recognizes different levels of resources and intensity of surgical resources. By promoting a set of universally-applicable standards, the WFSA is expressing an expectation that all providers will strive for the highest levels of safety and quality improvement.

The World Health Organization, too, has recognized that safe anesthesia is a prerequisite to safe surgery. WHO’s recent initiative, “Safe Surgery Saves Lives,” includes a safety check list to be used in preparing for surgery. The program targets anesthetic safety, infection prevention, and communication errors; its adoption has been endorsed by over 250 international professional societies, health organizations, ministries, and NGO. Besides confirming identity, operative site, permit, and availability of resources (including blood), the checklist includes the application of a pulse oximeter. A recent report on its implementing the checklist eight hospitals around the world showed that intraoperative complications could be reduced by about a third and mortality by half. The effect was most prominent in austere settings28.

Where to get an affordable, robust pulse oximeter? That is the object of a collaborative effort among the WFSA, the Association of Anaesthetists of Great Britain and Ireland, and GE Healthcare. The three main goals of the Global Oximetry Initiative include (1) provide an oximeter for every anesthetic; (2) train providers in its use and interpretation, and (3) design it to standards of quality, durability, and usability “that even you would use it.” Presently, trials are underway in India, Uganda, Viet Nam, and the Philippines29.

Safety for short-term voluntary medical missions has also been the focus of several recent publications, both from SPA’s Committee on International Education and Service30 and from two plastic surgical societies31,32.

What can you do?

The dual burdens of inadequate access to emergency and essential surgical care, and the high risks of anesthesia in austere surroundings together constitute a significant global health problem which should be of concern to all anesthesiologists, and pediatric anesthesiologists in particular. One of the most pressing needs is for more well-trained anesthesia providers. SPA is already involved in a variety of ways. Anesthesiologists from South Asia and Africa can get fellowship training at the Vellore Hospital under a SPA-sponsored fellowship. Members of the SPA Committee on International Education and Service (“SPACIES”) volunteer their services on short-term trips, as well as the development of educational materials and programs. SPA members are invited to join or sit in on SPACIES discussions at all SPA meetings.

Even without traveling abroad, you can contribute your skills and resources in a variety of important ways:

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Article Discussion, from page 5

From February 2005 through December 2007, 215 patients were enrolled and randomized into the four groups. Each group had similar baseline patient characteristics. Six patients were lost to follow up. The number of children who had at least one episode of PONV 24 hours after surgery were as follows: 24 out 54 patients in placebo group, 20 out of 53 patients in the 0.05 mg/kg group, 13 out 54 patient in the 0.15 mg/kg group, and 6 out of 52 patients in the 0.5 mg/kg group. This dose response was significant in both the crude and multivariate analyses. Twenty-one patients overall had PONV after 24 hours and out of this group, 6 had PONV until postoperative day 3. In the placebo group, 11 out of 54 patients needed rescue antiemetics, compared to 4 out of 53 in the 0.05 mg/kg group, 3 out of 54 in the 0.15 mg/kg group, and 2 out of 52 in the 0.5 mg/kg group. The results for the secondary objective of postoperative analgesia showed that, regardless of dose, children who received dexamethasone needed less rescue analgesia. The other outcomes studied showed no differences across the four groups. Among the 6 children lost to follow up, none had bleeding in the first 24 hours. Among the remaining 207 patients, 22 patients had one bleeding episode and 4 had 2 episodes. All bleeding episodes occurred during the ten day follow up period. Out of these groups, 15 children had bleeding diagnosed after postoperative day 1. The placebo group had 2 out of 53 patients with bleeding episodes, 6 out of 53 patients in the 0.05 mg/kg group, 2 out of 51 patients in the 0.15 mg/kg group and 12 out of 50 patients in the 0.5 mg/kg group. Because the majority of cases occurred in the 0.5 mg/kg group, this dose was associated with the highest risk in all the analysis although the difference compared to the placebo group was borderline significant. Eight patients needed emergency surgery (none in the placebo group, 3 in the 0.05 mg/kg, 1 in the 0.15 mg/kg and 4 in the 0.5 mg/kg). Ibuprofen exposure was unknown for 23 patients, one of whom had a bleeding episode. That patient also received dexamethasone 0.5 mg/kg. In the 190 patients with known ibuprofen exposure, the data did not appear to affect the bleed rate. Twenty two surgeons (staff and residents supervised by staff) performed the surgery and were equally distributed among all the groups. Children who had bleeding were operated on by 9 surgeons who performed 162 surgeries with a median ratio of number of surgeries to number of bleeds being 7 and a range of 4-16.

In the discussion, the authors noted that dexamethasone has become the standard treatment for PONV, especially in pediatric tonsillectomies. They noted that had they looked at their data for the first 24 hours, they would have agreed with previous studies showing that the higher dose of dexamethasone had the best PONV prophylaxis with no side effects. The authors considered several possible explanations for the unexpected association of dexamethasone and postoperative bleeding. They felt that selection bias was unlikely because of randomization and all participants to the study were blinded to the drug given. Surgical technique was equally distributed and they could not identify any clustering of surgeons among the groups. Baseline risk was not excessively high when compared to other studies. They could not rule out patients with unknown bleeding problems since no preoperative testing was done. Because of the dose responsiveness of the bleeding, the authors argued that there might be a causal relationship between dexamethasone and bleeding. However they noted that the 0.05 mg/kg dose of dexamethasone had a higher bleeding rate than 0.15 mg/kg dose. From this finding they could not conclude that dexamethasone doses below 0.5 mg/kg were safe. They speculated that the biological mechanism for this phenomenon might be related to inhibition of the repair of wounds by glucocorticosteroids and to delayed ulcer healing. They also noted that the early termination of the study was a problem since it might lead to an exaggerated magnitude of harm. However, they considered it unacceptable to continue because of the unacceptable risk of bleeding in children.

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World of Anesthesia, from page 10

1. Develop teaching materials for World Anesthesia and for the WFSA’s Tutorial of the Week (http://totw.anesthesiologists.org/wfsa-education-resources/atot/).
2. Share PowerPoint presentations on basic topics for the SPA - CIES lecture library. The goal is to have a collection of topics that could be used by international colleagues, or by itinerant SPA members on their voluntary trips abroad (contact Tae Kim, SPA member).
3. Contribute current educational materials - books, journal subscriptions (not just old journals), CD’s etc, for use by providers with little library access. Many agencies are interested. A good site to find recipients is the University at Buffalo Health Sciences Library, (http://libweb.lib.buffalo.edu/dokuwiki/hsl-wiki/doku.php?id=book_donations). Note: you need to type the whole URL, as there are no links on the library’s home page.
4. Volunteer to help cover obligations of your colleagues who can travel to help our overseas colleagues.
5. Tell your international colleagues about SPA’s international discussion list at species-list-admin@pedsanesthesia.org. The site serves as a discussion of the particular issues of anesthesia in austere locations, and for surgical mission groups.
6. Contribute financial support for educational activities for international colleagues receiving in-country training. Excellent examples of programs deserving support include the WFSA Education and Publications Committees’ programs (http://www.anesthesiologists.org/) and Health Volunteers Overseas (www hvousa.org/)

Of course, those who wish to travel have many options. A good place to start is the SPA website on the tab labeled “Volunteer Service Abroad” to find an organization congruent with your goals and needs.

As a leading international resource for pediatric anesthesia and critical care, the Society is in an excellent position to contribute to improving public health through improved access to surgical care and safe anesthesia for children around the world.

See the references for this article online at www.pedsanesthesia.org
In summary, the authors concluded that dexamethasone did decrease PONV in post-tonsillectomy pediatric patients in a significant and dose dependent way. It also decreased the need for rescue analgesia and NSAIDS. However, they could not exclude the possibility that dexamethasone increased postoperative bleeding. They felt that more randomized trials were needed to confirm or refute their results. In the meantime, the authors suggested that dexamethasone not be given to children undergoing tonsillectomy.

Additional reference:

Comments on Article from Members of Communications Committee

How will the findings in this manuscript change your practice?

Cheryl K. Gooden, MD, FAAP
Mount Sinai Medical Center
The results of this study will not change my practice. There are issues with this study that need further investigation before drawing any conclusions, specifically, the technique of the surgeon and the indication for surgery. After discussion of this article with one of our ENT surgeons (Michael Rothchild, M.D.), he commented that patients with recurrent tonsillitis tend to bleed more than patients with OSA undergoing tonsillectomy. For now it will not change our practice.

Bob Valley, MD
UNC Children’s Hospital
I really wanted to find something terribly wrong with this study but I couldn’t. The study supports current data that demonstrates efficacy for improved analgesia and less PONV with dexamethasone administration. It also found an unexpectedly higher incidence of bleeding when the dexamethasone groups were used on all. My own practice will not be affected by this paper.

Ira Landsman, MD
Vanderbilt
According to our ENT surgeons the approach to tonsillectomy in this paper is associated with a higher rate of bleeding regardless of the dexamethasone. For now it will not change our practice.

Sean Flack, MD
Seattle Children’s Hospital
I think the results are inconclusive and look forward to seeing this study repeated. I currently give 0.25-0.5mg/kg dex and will probably wimp out and limit the dose to 0.25mg/kg pending further studies. The use of dex is commonplace here at Seattle Children’s and we have not noticed an issue with post-op bleeding following tonsillectomy.

Zulfi Ahmed, MD
Children’s Hospital of Michigan
Our surgeons have seen the abstract too but the surgeons and anesthesiologists have no concerns about the use of dexamethasone. Our rebleeding rate is 1-3% and almost all of our patients get Decadron 0.5 mg/kg.

Hoshang Khambatta
Children’s Hospital, Columbia Presbyterian
I personally do not use dexamethasone for PONV. If the resident or the nurse anesthetist wants to use it I do not prevent its use. At the Children’s Hospital at Columbia Presbyterian Medical Center we have 3 ENT surgeons. They request the use of 0.5 mg/kg to a maximum of 8 to 10 mg of dexamethasone on all children for T & A. We have not noted any untoward episodes of bleeding. We also do not use ibuprofam or any other non-steroidal analgesic. Tylenol is used on all. My own practice will no be affected by this paper.
An audit of intravenous fluid prescribing and plasma electrolyte monitoring; a comparison with guidelines from the National Patient Safety Agency


Review by Hoshang J. Khambatta, MD
Children’s Hospital, Columbia Presbyterian

This study was carried out to audit the practice of intravenous fluid administration at a specialist children’s hospital between February 2004 and March 2007. The authors carried out a retrospective review of 100 appendectomy patient case notes, 98 of which were acute appendectomies and two interval appendectomies. Ninety-seven of the acute appendectomies had an intravenous route established on admission with blood samples collected for measurement of electrolyte balance. Maintenance fluid therapy was commenced on patients with an established intravenous route. Ninety-four of these patients received a hypotonic saline solution, 0.45% NaCl + 5% Dextrose even though 21 children were noted to have an admission plasma sodium less than 135 mmol/l. The median duration of fluid maintenance prior to surgery was 10 h. The amount of fluid administered was calculated using the Holliday and Segar formula. Prior to surgery 57 children required fluid boluses, a total of 66 boluses, and these comprised of either 0.9% NaCl (82%) or human albumin 4.5% (18%). The bolus volumes were calculated to be 10 to 20 ml/kg. During surgery 57 patients received an isotonic saline solution for maintenance and 29 patients continued to receive the hypotonic solution. One patient received 10% dextrose and insulin because of clinical signs of hyperpyrexia. The volumes of fluid administered during surgery varied from 3 to 10 ml/kg/h. Thirty-five patients required intravenous fluid boluses for resuscitation during surgery, a total of 39 boluses comprised of either normal saline, balanced salt solution, human albumin or fresh frozen plasma. The volume of all boluses was calculated appropriately according to weight ranging from 5 to 20 ml/kg. In the post operative period all 100 patients received maintenance intravenous fluid therapy. Ninety-two of these patients received hypotonic fluid with the volume of administration calculated according to the Holliday and Segar formula. The intravenous volume was gradually reduced as the oral fluid intake increased. The median duration of fluid administration was 60 h. Seventeen patients required resuscitation and received a total of 24 boluses, calculated as a per weight basis in volumes of 5 to 20 ml/kg of either normal saline, balanced salt solution or human albumin.

The authors noted that of the 100 patients 97 had plasma electrolytes measured on admission whereas the other three patients including the two interval appendectomies never had any plasma electrolyte estimation. During the hospital stay, the median duration of total fluid administration was 78 h, with a range of 19 to 264 h, and only 54 of the 100 patients had only a single notation of plasma electrolytes. All 100 patients were weighed on admission but no patient had daily weight recorded while receiving daily maintenance fluid.

Comments: Over the past decade there were four reported hospital deaths in the United Kingdom of previously healthy children from neurological sequelae of hyponatremia associated with intravenous fluid therapy. There have been other worldwide reports of mortality and morbidity from inappropriate intravenous fluid administration. Such events eventually prompted the National Patient Safety Agency for England and Wales to publish a set of guidelines in March 2007 for fluid administration to the pediatric patient of age 1 month to 16 years. These guidelines, which were summarized in this paper, in turn prompted the authors to audit the practice of doctors in their children’s hospital for the previous 3 years from several disciplines, including emergency department clinicians, surgeons and anesthesiologists. The authors noticed three major shortcomings, namely, administration of hypotonic solution to all patients even when the initial plasma sodium was below 135 mmol/l, failure to monitor daily changes in plasma electrolyte balance when the pediatric patient was on intravenous fluid maintenance therapy, and failure to record daily weight measurements. They state that the recommendations of the Patient Safety Commission are now in practice at their institution and that they hope to do a repeat audit after 3 years to determine if all of the recommendations are being followed.

I wonder if such an audit has been done in a major pediatric hospital or a community hospital where pediatric surgery is practiced in the U.S. Unless we actively look we will never know. It is true that no one has reported an adverse incident in the U.S. in the recent past but that does not mean that they have not occurred. Most anesthesiologists I have discussed this with use isotonic fluid in the operating room but what happens outside the operating room is also of interest. As we note from this report even a specialist pediatric hospital had shortcomings both inside and outside the operating room. Such deficiencies only came to light when the authors looked for them and would have gone unnoticed as their patients had no reportable sequelae. It would indeed be an interesting and a useful project to carry out similar audits at our own institutions. The task will indeed be time consuming but not an onerous financial burden. Our cousins across the Atlantic seem preoccupied with fluid administration in children with papers on the subject with astounding regularity. Maybe not much has changed and we consider such concerns to be old hat and even perhaps waste of time. However, our Society has not had a discussion on the subject of fluid administration for over 10 years. It is not just the anesthesiologist who is concerned, but all physicians who look after the pediatric patient have an interest.

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Patient Safety, Potential Adverse Drug Events, and Medical Device Design: A Human Factors Engineering Approach


Reviewed by: Faisal Motlani, MD
Anesthesia Resident, Wayne State University

Human Factors Engineering (HFE) is a concept that is not necessarily inherent in daily dictation, yet this methodology speaks volumes. Essentially, the HFE discipline applies the science of human capabilities to the design and development of systems and services. HFE is hence synonymous with ergonomics, a term that is more rampant. Historically, HFE gained notoriety during WWII with the advent of aviation quality improvement. Since its inception, HFE has been applied to many aspects of the military milieu. Various other sectors have succumbed to the clout of HFE, including medicine, albeit in an implicit fashion.

The study reviewed in this article focuses attention on both the potential and present merits made possible by virtue of applying HFE to clinical practice. The objective of this project was to investigate whether PCA pump interfaces could be made less error-prone by redesigning them using a HFE approach. HFE is often proposed but seldom tested in medicine. The motivation of this experiment was based on epidemiological revelations such as adverse drug events are the single leading threat to patient safety. Approximately half of these adverse drug events implicate drug infusion devices, such as PCA pumps.

The study was conducted at a teaching hospital, in a simulated clinical environment. The customary PCA infusion device (old interface) utilized at the institution was compared to a new prototype which had been modified, based on HFE criteria. Modifications included: clearly marked exits for user to leave the system; minimal load on users’ memory; provision for reliable shortcuts; prompt and salient feedback after each action.

Twelve recovery room nurses were enrolled, each of whom possessed at least 5 years experience using the old interface.

Results: The investigators of the study discovered that the new prototype designed in HFE fashion resulted in fewer erroneous inputs. Specifically, there were 8 times greater drug concentration errors made using the old interface.

Drug concentration errors account for the greatest impact in terms of patient adverse events. It is remarkable that the subjects performed with greater efficiency and accuracy on the new prototype with minimal training, versus dire results using the old interface (recall that each nurse had at least 5 years of experience with this model.) Furthermore, the majority of the participants preferred the new prototype as measured by a satisfaction survey. Based on these findings, the researchers conclude that adopting HFE criteria to medical device manufacturing and procurement serves to improve patient safety and garner greater loyalty amongst the clients.

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Childhood obesity, from page 3

children in the 95th percentile of BMI-for-age had two risk factors and 2/3 of children in the 99th percentile of BMI-for-age had two risk factors. It was also noted that stratifying the group into those greater than 12 years of age and those less than 12 years of age, the risk factors were present regardless of age.

Treatment of obesity has reduced morbidity and mortality. Cardiologists have found as the BMI increases so does the incidence of concentric LVH and abnormal echocardiograms in the pediatric population. Left ventricular hypertrophy (LVH) has been noted to be an independent predictor of cardiovascular mortality. Also, the risks of a myocardial infarction and stroke are three times more likely with LVH. In a study by Dr. Ippisch et al looking at 38 children, before and after bariatric surgery, researchers noted a resolution of concentric LVH and return to normal cardiac anatomy from 36% to 79%. Early intervention is therefore important due to the plasticity of tissues at a younger age.

A prospective Swedish study by Dr. Lars Sjostrom et al followed 2000 bariatric surgery patients and 2000 matched controls. While there was significant weight reduction in the surgical patients, the non-surgical controls did not lose weight. More importantly, the overall mortality decreased in the bariatric surgery group compared to the control group during an average of 10.9 years of follow-up.

Beneficial effects have also been noted in a study of 11 pediatric patients who underwent bariatric surgery and experienced a resolution of their type II diabetes in 10 patients.

Dr. Samuels’ concluding remarks during the Tuesday Luncheon Panel emphasized the importance of addressing the growing public health risk of childhood obesity. Increased public awareness and early intervention were needed. Without action, the medical community would be witnessing more and more antecedents of adult disease in obese children and adolescents. The plasticity of children is a compelling reason for early and aggressive weight loss intervention.

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From the Editor, from page 2

governance and it is important that the community physicians are assisted rather than put in the position of having their hands tied by bureaucracy. We all want to take care of patients in the safest manner possible, whether in a children’s hospital or in a setting with limited resources.

Fortunately, Drs. Hall and Clark are policy makers and provided a wealth of information to the attendees on the politically charged topics, and to me as well. What makes me an expert? It is from listening to the real experts. I am hopeful that the Fundamentals meeting will be a popular resource for many providers who need a venue to discuss issues of importance that are not addressed at the SPA.
May 14-16: Philadelphia, Pennsylvania, USA  
3rd Annual Pediatric Anesthesiology and Critical Care Medicine Conference: Perioperative Care of the Infant and Child  
Tel: (215)-590-2646, Fax: (215)-590-4342  
Information: Elizabeth Utsch, Children’s Hospital of Philadelphia, 34th Street and Civic Center Boulevard, Philadelphia, PA 19104  
www.chop.edu/cme/  

June 7 - 9: Philadelphia, Pennsylvania, USA  
Fourth International Multidisciplinary Conference on Pediatric Sedation  
Tel: (804)-565-6354 Fax: (804)-282-0090  
Information: Society for Pediatric Sedation, 2209 Dickens Rd., Richmond, VA 23230-2005  
www.pedsedation.org  

June 7-10: Acapulco, Mexico  
Eighth International Symposium on Pediatric Pain  
Tel (604)-681-2153 Fax: (604)-681-1049  
Information: Vanessa Idler, Conference Coordinator, International Conference Services Ltd. Suite 2101 - 1177 West Hastings Street, Vancouver, BC Canada V6E 2K3  
www.ispp2009mexico.com  

June 14-17: Verona, Italy  
20th European Society of Paediatric and Neonatal Intensive Care (ESPNIC) Medical and Nursing Annual Congress 2009  
Tel: +41 22 908 0488, Fax: +41 22 732 2850  
Information: Kenes International, The Secretariat, 1-3 Rue de Chantepoulet, PO Box 1726, Geneva CH-1211, Switzerland  
www.kenes.com/ESPNIC  

June 25-26: Split, Croatia  
First International Conference in Pediatric/Neonatal Intensive Care and Anesthesiology  
Tel: (011)-385-21-556-686, Fax: (011)-385-21-556-590  
Information: Julije Mestrovic, Pediatric Intensive Care Unit, University Hospital of Split, Spinciceva 1, Split, Croatia  
21000, Croatia  
www.signavitae.com  

September 7-10: Warsaw, Poland  
Seventh European Congress of Paediatric Anaesthesia  
Tel: +48 22 6299418, Fax: +48 22 6282988  
Information: Dr. Marcin Rawicz, Dept Paediatric Anaesthesia, Medical University of Warsaw, Marszalkowska 24, 00-56 Warszawa, Poland  
www.feapa.org  

September 12-13: Boston, Massachusetts, USA  
Pediatric Sedation Outside of the Operating Room  
Tel: (617)-384-8600, Fax: (617)-384-8686  
Information: Harvard Medical School, Department of Continuing Education, P.O. Box 825, Boston, MA 02117-0825  
www.cme.hms.harvard.edu  

Please forward all information concerning congresses relevant to Pediatric Anesthesia to:  
Helen V. Lauro, MD, MPH, FAAP, Department of Anesthesiology, Long Island College Hospital, 339 Hicks Street, Brooklyn, New York 11201.
To attend SPA’s upcoming meetings

**2009 Annual Meeting**
October 16, 2009
New Orleans, LA • Hotel TBA

**Pediatric Anesthesiology 2010**
April 15 - 18, 2010
The Grand Hyatt
San Antonio, TX