

Board of Directors Workshop Report: 360° Assessment of the APSF

by Robert C. Morell, MD, Lorri A. Lee, MD, and Maria A. Magro, CRNA

On Friday, October 15, 2010, in San Diego, CA, the APSF convened a 25th anniversary Board of Directors Workshop focused on a 360° assessment of the APSF. The goal of the workshop was to help answer the question, "How do we continue to help reduce serious adverse events in the perioperative period?" The speakers were encouraged to provide a critical view of how APSF might better address patient safety issues in the future. The workshop opened with Robert K. Stoelting, MD, and Jeffrey B. Cooper, PhD, explaining the purpose and conduct of the workshop and providing introductory remarks. Each of 8 carefully selected expert speakers were given 15 minutes to provide their perspectives on the APSF and recommendations as to actions and strategies that the APSF might take to continue to reduce serious adverse events in the perioperative period.

The first speaker was Peter B. Angood, MD, surgeon and former chief patient safety officer for The Joint Commission, and National Quality Forum senior advisor for patient safety. Dr. Angood opened with a vignette of a trauma patient he had encountered as a medical student. The patient experienced anesthesia awareness during an emergency exploratory laparotomy. Dr. Angood related that no follow-up was provided by the anesthesia or surgery teams, or the hospital. The conclusion by the anesthesia team involved was that it was "just sad that sometimes these things happen." He also noted that the last surgery he performed before he retired from clinical practice also had intraoperative awareness.

"The anesthesiologist apologized and that was it," he stated.

Dr. Angood discussed the NQF structure, foundation, and mission to improve the quality of American health care. He noted that the drivers of change in health care include performance measurement, public reporting, payment, infrastructure (information technology and workforce), applied research, accreditation, and certification. He observed that the APSF is not well known outside of anesthesia and is therefore not involved in pending healthcare legislation and healthcare reform. Dr. Angood also questioned if the APSF structure has a process for measuring outcomes related to its efforts and mission.

Linda K. Kenney, the second speaker is president and executive director of MITSS (Medically Induced Trauma Support Service). She raised the question, "What can the APSF do for patients?" Ms. Kenney was a patient who underwent a popliteal fossa block complicated by a catastrophic intravascular injection and complicated difficult resuscitation. She presented her story in the *APSF Newsletter* approximately 5 years ago. She wanted to know what has happened since 1999 to address the emotional impact on families and caregivers after anesthetic complications, and what has APSF done to include patients in its initiatives and processes. She asked if the APSF had written to patients about anesthesia and patient safety. Ms. Kenney also related her experience undergoing a hernia repair under spinal anesthesia when

she told her anesthesiologist, "I can feel that." He said, "No you can't," and gave more sedation. She did not feel that he had listened to her. She recommended that we build a network of anesthesia professionals to give support to both providers and patients. She also questioned the APSF efforts regarding perioperative awareness and noted that little is available on this topic on the APSF website from the patient perspective. Ms. Kenney also suggested that we include patients on the APSF Board of Directors and that we carefully listen to patient input.

The third speaker, Lawrence W. Way, MD, provided the perspective of the surgeon. Dr. Way has been on National Patient Safety Foundation, the American College of Surgeons Patient Safety Committee, and the Quality Care Committee at the University of California at San Francisco. His son is also married to an anesthesiologist. Dr. Way began his presentation with descriptions of accident models including linear cause and effect, human error, latent failures (the "swiss cheese" model), control theory (blunt end failure), and normal accident theory (NAT). In normal accident theory accidents are inevitable in highly complex, tightly coupled systems. Multiple contributing causes converge in an

See "360°," Page 47



Dr. Stoelting convenes Board of Directors Workshop.

Inside:

President's Report 2010.....	Page 46
2011 Grant Recipients	Page 51
Scientific Papers at 2010 ASA Annual Meeting	Page 55
ASA Safety-Related Exhibits 2010	Page 57
Q&A: Best Fire Extinguishers in the OR	Page 59
I.V. Tape: A Potential Vector for Infection	Page 61

President's Report: Highlights and Accomplishments of 2010

As President of the Anesthesia Patient Safety Foundation (APSF), it is my privilege to report annually on the activities of the foundation during the past calendar year. I am pleased that 2010 has been an active and productive year as the APSF continues to pursue patient safety initiatives intended to further our vision that "no patient shall be harmed by anesthesia." Of special note, APSF celebrated its 25th anniversary (1985-2010) in October 2010.

As in my last annual report, I believe it is important to recognize that APSF, as an advocacy group, does not write standards. Recommendations developed and promulgated by APSF are intended to assist professionals who are responsible for making health care decisions. Recommendations promulgated by APSF focus on minimizing the risk to individual patients for rare adverse events rather than necessarily on practices that balance all aspects of population health quality and cost. APSF does not intend for these recommendations to be standards, guidelines, practice parameters, or clinical requirements, nor does application of these recommendations guarantee any specific outcome. Furthermore, these recommendations may be adopted, modified, or rejected according to clinical needs and restraints. APSF recognizes that these recommendations are subject to revision as warranted by the evolution of medical knowledge, technology, and practice.

Research

The APSF Committee on Scientific Evaluation chaired by Sorin J. Brull, MD, received 34 grant applications in 2010. In October 2010, the committee recommended funding 3 research awards to begin in January 2011. In February, 2010, APSF awarded a grant for \$212,000 to Charles W. Hogue, Jr., MD (Department of Anesthesiology and Critical Care, The Johns Hopkins Hospital) for his research project entitled "Assessing cerebral blood flow autoregulation in the head-up versus supine position during general anesthesia with postoperative neurocognitive changes and serum biomarkers of brain injury." This award was for a 2-year period beginning July 1, 2010.

The total dollars awarded by APSF in 2010 for anesthesia patient research was \$661,324.00. Among the named grants were the APSF/American Society of Anesthesiologists (ASA) Endowed Research Award, APSF/ASA President's Research Award and the APSF/Covidien Research Award. The APSF/ASA research awards utilizes funds from the APSF endowment fund that were made possible by contributions from the ASA to APSF over the past 2 decades.

APSF is the largest private funding source for anesthesia patient safety research in the world. Since the inception of the APSF grant program, 464 grant applications have been received by APSF. When the

first grants were funded in 1987, funding for anesthesia patient safety was virtually unknown. Since 1987, APSF has awarded 92 grants for a total of more than \$6,770,000. The impact of these research grants is more far-reaching than the absolute number of grants and total dollars, as APSF-sponsored research has led to other investigations and the development of a cadre of anesthesia patient safety investigators.

APSF Newsletter

The *APSF Newsletter* continues its role as a vehicle for rapid dissemination of anesthesia patient safety information with Robert C. Morell, MD, and Lorri A. Lee, MD acting as co-editors. The circulation of the *APSF Newsletter* exceeds 84,000 recipients and is provided as a member benefit by the ASA, American Association of Nurse Anesthetists (AANA), American Association of Anesthesiologist Assistants (AAAA) and the American Society of Anesthesia Technologists and Technicians (ASATT) to all of their members.

The *APSF Newsletter* became an electronic publication beginning with the Spring 2010 issue. **At the October 2010 meeting of the APSF Executive Committee, the decision was made to return to printing and mailing of the hardcopy as well as maintaining the electronic version.**

Important issues presented in recent editions of the *APSF Newsletter* included "The Challenges of Technological Intensification," authored by Drs. Webster, Stabile, and Merry and appearing in the Fall 2009 issue. In the Winter 2009-2010 issue, Dr. Frank J. Overdyk addressed the continued problems of postoperative, opioid-induced respiratory depression in a letter to the editor entitled "Postoperative Opioids Need System-Wide Overhaul." The APSF recommendation that PCA monitoring include pulse oximetry and capnography if supplemental oxygen is being administered was the subject of an announcement in the Spring 2010 issue from the Indianapolis Coalition for Patient Safety entitled "Hospital Coalition Group Endorses APSF Recommendations for PCA Monitoring."

The "Questions and Answers" and the "Dear Sirs" (Safety Information Response System) columns in the *APSF Newsletter* provide rapid dissemination of safety issues related to anesthesia equipment in response to questions from readers. These columns are coordinated by A. William Paulsen, PhD, chair, APSF Committee on Technology.

Communication

The year 2010 saw the introduction of a new APSF website design and appearance (www.apsf.org) under the direction of APSF Executive Vice President George A. Schapiro. The APSF website includes a

See "President's Report," Page 63



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Anesthesia and Patient Safety Groups Give Feedback to APSF

“360°,” From Page 45

ad hoc pattern to produce failure, but not in a repeatable fashion. NAT is now getting a lot of attention. Dr. Way explained that we need to look behind human error to examine systemic factors that give rise to flawed behavior. He stated that accidents result from complexity, and that complex systems develop goal conflicts from pressures for throughput, efficiency, and cost control in the face of limited time and resources. Dr. Way quoted Marcus Aurelius (160 AD): “We are too much accustomed to attribute to a single cause that which is the product of several and the majority of our controversies come from that.” Dr. Way explained the importance and effectiveness of postoperative debriefing and reminded us that feedback data should be analyzed, not just tabulated. He gave an example of a study including 4800 patients from the San Francisco Veteran Administration Medical Center, which utilized structured debriefings to search for delays, equipment problems, and unwanted events. Dr. Way also emphasized the importance of checklists and observed that surgeons need to become more involved in committees and process improvement.

Alexander A. Hannenberg, MD, current president of the American Society of Anesthesiologists (ASA) gave the perspective of the ASA. He complemented APSF as a jewel in the crown of anesthesiology and congratulated the APSF for not allowing itself to become complacent. Dr. Hannenberg discussed the PQRI, Medicare’s pay for performance program, and addressed payment incentives and the transition to payment penalties (carrot transitioning to the stick), as well as confidential reporting. He noted that public reporting is mandated in current health care legislation, and that www.hospitalcompare.gov is already in place. Dr. Hannenberg reviewed the issues of antibiotic administration, temperature maintenance, and the aseptic protocol for central line placement. He predicted that the antibiotic requirement would disappear because it had received enough attention, and that these initiatives do not really go to the heart of the specialty. Dr. Hannenberg reviewed prior and ongoing APSF initiatives including PCA safety, absorbent desiccation, audible alarms, medication administration, and infusion pump safety, but then asked, “What is our strategy for getting the initiatives from the *Newsletter* to the bedside?” Dr. Hannenberg reviewed implementation timelines for other medical initiatives; for example, the beta-blocker use trial of 1982 did not reach the 90th percentile until 2004. It was adopted as a quality metric in 1996 by the JCAHO and it began to rise quickly. He noted that APSF needed the implementation piece to impact patient safety.

The fifth speaker was John J. McFadden, PhD, CRNA, associate dean and chair at Barry University in Miami and chair for the AANA Practice Committee. Lessons of honesty, courage, vanity, and service leadership were the initial focus points of his

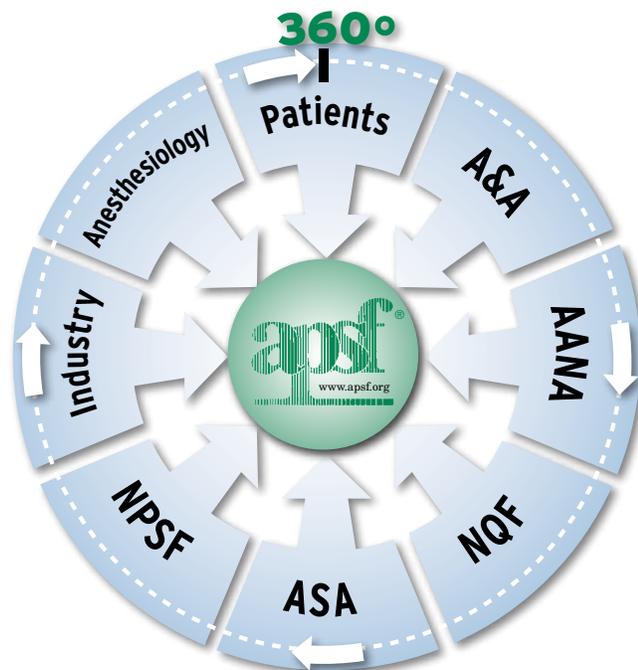
presentation. He found the *APSF Newsletter* to be an invaluable resource, but regrets the all-digital media. Appreciation was expressed for collaborative efforts and improving communication between providers, and between patients and providers. He noted that these important initiatives need to be continued. He reminded us to not forget the basics of preoperative machine check, hand washing, and preventing needle reuse. He also commented that the ongoing issues of provider wellness, fatigue, and production pressure continue to be important issues.

James C. Eisenach, MD, Editor-in-chief, *Anesthesiology*, was the sixth speaker and addressed the role of the APSF in consensus conferences and recommendations. Dr. Eisenach began his presentation with a discussion of the interplay between APSF recommendations and ASA guidelines. He reviewed the publication of ASA guidelines in the journal *Anesthesiology*. Further, Dr. Eisenach noted that some of the recommendations put forth by the APSF are different than published guidelines and acknowledged that there is a subjective component to these recommendations and guidelines. He proposed that if an organization, such as the APSF, puts forth and/or publishes recommendations or consensus conclusions for which guidelines currently exist, several items should be addressed. These include considering overlap with other societies’ guidelines, defending why a different conclusion has been reached, avoiding confusion between visions, goals, and strategies, and recognizing that patients may be harmed by consensus recommendations put forth in the absence of

evidence. Dr. Eisenach reminded the audience that science trumps the process of induction, and recommending action without evidence may not always be the best idea.

The seventh speaker, Paul A. Baumgart, general manager of the Asia-pacific region for Tomo Therapy, Inc., shared the perspective of industries that support perioperative patient safety. He conversed with over a dozen industry partners prior to preparing this talk to give a more global industry perspective. When Mr. Baumgart was a surgical patient, he noted that the anesthesia machine to which he entrusted his life and safety was that of a competitor, but knew the machine that was putting him asleep was every bit as safe as the one he was marketing. Mr. Baumgart provided a historical perspective of the role industry played in the founding days of the APSF, including a \$300,000 corporate contribution from Burt Dole and a \$300,000 corporate contribution from W. D. Rountree. Mr. Baumgart admonished industry representatives present in the room that they have to put patient safety ahead of their corporate and financial interests, stating, “You must have a passion for patient safety.” In the 1980s companies were expending 20% of their corporate revenue for corporate liability costs. Industry must look at the APSF as an investment that can have a long-term return and be a long-term successful relationship. Corporate contributions are generally considered marketing expenses, not research and development (R&D) expense, and therefore run the risk of being cut. He also reviewed technology

See “360°,” Next Page



Various organizations from the anesthesia and patient safety community, and industry provide a 360 degree evaluation of the APSF.

Small Group Discussions Lead to Meaningful Recommendations

“360°,” From Preceding Page

marketing curves and by example noted that the first commercial pulse oximeter was developed in 1964, cost \$15,000, and weighed 36 lbs. Industry wants APSF to be a beacon and a bridge to help take technology from the *Newsletter* to the bedside. The APSF should make itself more accessible to industry to help review R&D roadmaps or specific development efforts and provide guidance and expertise for corporate partners in patient safety. This recommendation is consistent with the APSF Statement on Industry Relations.

The eighth and final speaker was Dr. Steven L. Shafer, MD, editor-in-chief of *Anesthesia and Analgesia*, addressing contributions that the APSF has made via research support and grants, and how the APSF should proceed in the future. Beginning with Dr. David Gaba’s 1987 APSF supported evaluation of anesthesiologist problem solving using realistic simulations, Dr. Shafer reviewed a detailed and extensive list of important research that was funded by the APSF. He also noted that anesthesia remains recognized as the leader of the patient safety movement and that the APSF has been acknowledged in the Institute of Medicine reports and by public media. Dr. Shafer’s recommendations for the future include continuing to use the APSF grant funding processes to fund research and to remain apolitical and inclusive.

Following these 8 presentations and a short break, a panel discussion was held which began with an observation by Dr. Stoelting that it is not generally possible to do randomized controlled trials (RCTs) for certain safety practices. The point was raised that if data are not available via evidence-based medicine, efforts should include expert opinions, with a vetting process so that recommendations and/or regulations such as the “locked-cart” issue do not arise. Dr. Hannenberg proffered that the APSF should not be hindered from making recommendations. Dr. Eisenach discussed the processes of drug approval by the FDA and the role of post-marketing surveillance, which can detect unanticipated problems and make



APSF Workshop speakers include from left to right: Mr. Paul Baumgart, industry representative and general manager of the Asia-Pacific region for Tomo Therapy, Inc.; Steven L. Shafer, MD, editor-in-chief of *Anesthesia and Analgesia*; James C. Eisenach, MD, editor-in-chief of *Anesthesiology*; Alexander A. Hannenberg, president of the ASA.

appropriate modifications. Dr. Weinger asked what the evidence should be and reiterated that one cannot always do RCTs. Dr. Gaba similarly reminded the audience of evidence on fatigue and work hours for surgeons, housestaff, and anesthesia professionals. Dr. Angood recognized that rapid changes are afoot, and in light of the inability to do certain RCTs, there should be scoring and grading of evidence and updating of recommendations and guidelines. Dr. Morell stated that the APSF does not set standards, formal guidelines, or determine standards of care, but rather has issued recommendations and communicated consensus statements. Mr. Baumgart recommended that the APSF have an increased role with the [ASA] standards committee and should serve as a bridge. Dr. Hannenberg commended the APSF for bringing forth patient safety issues. Dr. Stoelting raised the issue of fire safety and asked if it is a problem to minimize open delivery of supplemental oxygen, as there is no hard evidence. Dr. Shafer recommended that the APSF be more transparent where these items arise and indicate what is expert opinion, what is evidenced-based medicine, and so forth. He further reminded the group of the great job done by the American Heart Association in updating ACLS guidelines. Dr. Weinger asked how we engage other specialties in promoting perioperative patient safety. Dr. Angood noted that there is an existing perioperative

council that is trying to gain traction, but it has been politically difficult. Dr. Warner proposed that the APSF name be changed to the Anesthesia and Perioperative Safety Foundation. He asked Dr. Hannenberg, who sits on the perioperative council, how APSF should go about gaining recognition from this group. Dr. Shafer noted that anesthesia issues may not reflect surgeons’ issues, and there are too many surgical subspecialty issues. He recommended that perhaps we should use the APSF model for these groups to come together. Dr. Hannenberg raised the interesting concept of the “medical and surgical home.” He noted that we live in the OR and could provide a common pathway for all of the surgical subspecialties, and manage the “surgical home.” The final component of the workshop was a set of small group breakout sessions. Each group was tasked with considering a specific question regarding what the APSF has done well and what the APSF could do better, and reporting to the entire group with recommendations. The following represents a synopsis of each group’s question and recommendations.

Group 1 was led by Dr. Mark Warner and considered the issue of communication with anesthesia professionals. This group recommended that the APSF reconsider the elimination of the *APSF Newsletter* hard copy. They also recommended that the APSF consider editorials on certain patient safety issues such as locked carts. A recommendation was made for a specific *Newsletter* column entitled “I’ll never do that again.” It was also proposed that synopses of important articles be submitted to *Anesthesiology News* and the *AANA NewsBulletin*. Finally, they recommended the development of a public advisory board to provide input on patient safety issues.

Group 2, was led by Maria Magro, CRNA, and considered the development of recommendations to facilitate positive change. This group commended the APSF on taking action when the evidence did not support recommendations (such as with pulse oximetry); demonstrating courage by addressing risk head on and effecting positive change; creating a safe environment for members to provide open input



APSF Workshop speakers include from left to right: Ms. Linda K. Kinney, president and executive director of Medically-Induced Trauma Support Service, MITSS; Peter Angood, MD, surgeon and National Quality Forum senior advisor for patient safety; John J. McFadden, PhD, CRNA, associate dean and chair at Barry University in Miami and chair for the AANA Practice Committee; Lawrence W. Way, MD, surgeon previously on the NPSF, American College of Surgeons Patient Safety Committee, and the Quality Care Committee at UCSF and member of the APSF Board of Directors.

See “360°,” Next Page

Executive Committee to Review Recommendations

“360°,” From Preceding Page

including anesthesiologists, CRNAs, anesthesiologist assistants, corporate partners, and the public; and demonstrating a commitment to valuing partnerships and collegial relationships among stakeholders. They noted the APSF accomplished these things by remaining apolitical, supporting the development of best practices in safe anesthesia care, using multimodal efforts to disseminate information, and funding research grants and projects. The group recommended that the APSF needs to do better in enhancing communication with stakeholders and increasing transparency of why certain recommendations are made. Further, mechanisms should be developed for feedback from the community at large with continuous closing of the loop, such as the use of a database to track the outcomes of patient safety initiatives. The group also recommended funding for long-term outcome projects and the development of registry type databases. Consideration should also be given to include a perioperative focus. Self-reflection and self-awareness strategies should be used for quality improvement within the organization. Better collaboration was called for with those who set the safety standards, such as the National Quality Forum. The group also recommended having a more receptive ear toward recommendations that can lead to collaborative efforts among other safety organizations.

Group 3, led by Dr. Robert Caplan, considered how to keep evolving the APSF agenda and identify and pursue future initiatives. Group 3 recommended that the APSF expand its scope of engagement to include providers in perioperative medicine, our consumer community, and the younger health care professionals who will next lead our specialty and organizations. Further the APSF should expand its focus to recognize the perioperative breadth of safety, the importance of short as well as long-term outcomes, the importance of major as well as minor injuries, and the reach of perioperative safety issues throughout the health care organization (not just inside the OR). Finally, the group recommended that APSF should expand research-funding strategies to continue its success in stimulating patient safety research.

Group 4, led by Dr. David Gaba, was tasked with considering how to create a true safety culture. This breakout group felt that they had a very difficult assignment in that safety culture is a very broad topic, and does not have a single agreed upon definition (although APSF has published a variety of articles in the *Newsletter* that have advanced the definition and conceptual basis for a safety culture in health care). Despite these challenges the group came up with several recommendations for possible activities of APSF to move the ball forward. In no particular order of priority, group 4 recommended that APSF:

- 1) Should prepare a toolkit of materials to assist individuals, work units, and institutions to

measure or intervene in the local safety culture. It was noted that APSF personnel have participated in projects that promulgate such measures and interventions.

- 2) Broaden the concept of safety culture to include practitioner safety and also to consider the impact of safety culture on less than catastrophic negative outcomes. APSF should encourage the analysis of safety culture at higher levels of the health care endeavor, including the safety implications of the interaction between regulations of accreditors and regulators, on the one hand, and realities of clinical practice, on the other.
- 3) Should encourage clinicians to be involved in and improve mechanisms of organizational learning that are important components of a safety culture including reporting and analysis systems and prospective analysis of risk of proposed changes in practice.
- 4) Should prepare an educational video that explains safety culture and shows vignettes demonstrating both good and poor examples of safety culture.

With all speakers and groups providing their assessments and recommendations, and with a renewed sense of purpose and direction, the 2010 APSF Board of Directors workshop concluded. The APSF Executive Committee will review and take these recommendations under consideration focusing on those deemed to be most critical and practical. Great appreciation is extended to all speakers, moderators, organizers, and participants for enthusiastically helping the APSF strategize for the next 25 years to reduce serious adverse events in the perioperative period.

Check out the
Virtual Anesthesia Machine
Website and the
APSF Anesthesia Machine
Workbook at
www.anest.ufl.edu/vam



Congratulations to John H. Eichhorn, MD Co-recipient of the 2010 John M. Eisenberg Patient Safety and Quality Award



John H. Eichhorn, MD

The APSF congratulates John H. Eichhorn, MD, as a co-recipient of the 2010 John M. Eisenberg Patient Safety and Quality Award in the Individual Achievement Category. This award is provided annually by the National Quality Forum and The Joint Commission.

Dr. Eichhorn's award reflects his contributions to improving the quality of anesthesia care and patient safety through the development of practice standards and protocols. Dr. Eichhorn served as the Editor of the *APSF Newsletter* from 1985 to 2000 and currently is a consultant to the APSF Executive Committee.

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APSF Awards Four Major Grants in 2011

by Sorin J. Brill, MD

The Anesthesia Patient Safety Foundation (APSF) is pleased to report that it continues to attract outstanding applications for funding. The educational focus of APSF includes innovative methods of education and training to improve patient safety, development of educational content with application to patient safety, and development of testing of educational content to measure and improve safe delivery of perioperative anesthetic care.

The application process continues with an electronic, on-line submission format that was introduced in 2005. The applications, as well as all the required attachments, are uploaded to the new APSF redesigned website (www.APSF.org), a process that facilitates the application review by members of the Scientific Evaluation Committee, improves the timeliness of responses to queries, and facilitates transmission of reviewer feedback to the applicants. The Scientific Evaluation Committee members continue to modify and perfect the electronic application and review process.

This year, the Scientific Evaluation Committee is very pleased to report on several significant developments in, and achievements of, the APSF Grant Program. The first is the total amount of funding that APSF continues to award; this year, APSF is committing a total of \$661,326 to support research and educational projects dedicated to patient safety. In addition, this year the APSF Executive Committee developed a Request for Proposals (RFP) process that was the direct result of recommendations developed during the APSF Board of Directors Workshop. The RFP for this new, \$200,000 grant was entitled, "Neurocognitive Effects in Patients Undergoing General Anesthesia during Surgery in the Head-Up ("Beach Chair") Position." Last, APSF is proud to announce the continued funding of named awards, including the APSF / American Society of Anesthesiologists (ASA) President's Endowed Research Award, utilizing funds from the APSF endowment account that was made possible by the generous financial support from ASA over the past 25 years; the APSF / American Society of Anesthesiologists (ASA) Endowed Research Award (\$150,000); the APSF / Covidien Research Award, supported by a generous partial (\$100,000) grant from Covidien; and the APSF / Research Award, sponsored entirely by a grant from APSF.

In addition to the *Clinical Research and Education and Training* content that is the major focus of the funding program, APSF continues to recognize the patriarch of what has become a patient safety culture in the United States and internationally, and one of the founding members of the foundation—Ellison C. "Jeep" Pierce, Jr., MD. The APSF Scientific Evaluation Committee continues to designate each year one of the funded proposals as the recipient of this prestigious nomination, the Ellison C. "Jeep" Pierce, Jr., MD, Merit Award. The selected nomination carries with it an additional, unrestricted award of \$5,000.

APSF also has awarded **The Doctors Company Foundation Ann S. Lofsky, MD, Research Award**. This award is made possible by a \$5,000 grant from The Doctors Company Foundation that will be awarded annually for a total of 5 years to a research project deemed worthy of the ideals and dedication exemplified by Dr. Ann S. Lofsky. Dr. Lofsky was a regular contributor to the *APSF Newsletter*, a special consultant to the APSF Executive Committee, and a member of the APSF Board of Directors. Her untimely passing cut short a much-valued and meaningful career as an anesthesiologist and as a dedicated contributor to anesthesia patient safety. It is the hope of APSF that this award will inspire others toward her ideals and honor her memory.

For the year 2010 (projects to be funded starting January 1, 2011), 3 grants were selected for funding by the APSF Scientific Evaluation Committee (for names of committee members, please refer to the list in this issue). The APSF Scientific Evaluation Committee members were pleased to note that they reviewed a total of 42 applications in the first round, 12 of which were selected for final review at the American Society of Anesthesiologists' (ASA) Annual Meeting in San Diego, CA. As in previous years, the grant submissions addressed areas of high priority in clinical anesthesia. The major goal of APSF funding is to stimulate the performance of studies that lead to prevention of mortality and morbidity due to anesthesia mishaps. A particular priority continues to be given to studies that address anesthetic problems in healthy patients, and to those studies that are broadly applicable and promise improved methods of patient safety with a defined and direct path to implementation into clinical care. Additionally, APSF is encouraging the study of innovative methods of education and training to improve patient safety, and methods for the detection and prevention of medication errors.

The APSF Scientific Evaluation Committee convened during the ASA Annual Meeting on October 16, 2010 in San Diego for evaluation and final selection of the proposals. Of the 12 finalists, the members of the APSF Scientific Evaluation Committee selected the following 3 applications:



Andreas Taenzer, MD

Assistant Professor of Anesthesiology and Pediatrics,
Dartmouth Hitchcock Medical Center, Lebanon, NH.

Dr. Taenzer's Clinical Research submission is entitled, "Examination of Respiratory Rate Monitoring as a Patient Surveillance Parameter for In-Patient Populations."

Background: In-hospital general ward patients are having preventable deaths while under anesthesia care because of unrecognized changes in their physiologic state. Unrecognized physiologic deterioration is a significant precursor to morbidity and mortality for in-hospital postoperative patients. Consequently, the authors' multidisciplinary team has been studying patient surveillance methods to detect deterioration, increase patient safety, and prevent adverse events. The author and his colleagues implemented a Patient Surveillance System on several wards at Dartmouth-Hitchcock Medical Center, where patients' vital signs are continuously monitored and stored in a clinical archival system. This automated approach is unique in that it provides continuous surveillance (1-second intervals), as compared with intermittent nursing checks, intermittent data sampling, or averaging via an electronic medical record system. To date, only hard limits on heart rate and oxygen saturation have been used as a threshold to detect deterioration using continuous surveillance methods. These limits are set to minimize nuisance and false alarms, which can overburden clinical staff.

Aims: In this study, the authors will add a third variable for deterioration detection using continuous surveillance: respiratory rate. Respiratory rate is one of the most sensitive parameters to track respiratory status, and new technology (using acoustic sensors) makes it possible to use respiratory rate as a continuous monitor. In contrast to other respiratory rate monitors such as chest straps or nasal carbon dioxide cannulae, previous pilot studies have shown acoustic respiratory rate monitoring to be well tolerated by patients as continuous monitors.

Implications: The proposed research encompasses a) collection of an unprecedented volume of physiological data (heart and respiratory rate, oxygen saturation) from non-ICU postoperative inpatients; b) analysis of these data to determine the normal distribution of respiratory rate among a postsurgical population; c) establishment of static deterioration alarm thresholds for respiratory rate that optimize specificity and sensitivity; d) retrograde testing of these settings on an existing physiologic database (with several thousand patient-days and over 400 million data points) to determine whether adverse events would have been prevented; e) development of optimized settings for all 3 variables (heart rate, oxygen saturation and respiration) when used jointly to detect deterioration; and f) forward analysis of the addition of acoustic respiratory rate monitoring (to the existing monitoring of heart rate and oxygen saturation) using a before-and-after study design by deployment on 1 postsurgical unit while using 2 other postsurgical units as controls.

See "2011 Grants," Next Page

Taenzer Receives Ellison C. “Jeep” Pierce, Jr., MD, Merit Award

“2011 Grants,” From Preceding Page

In addition to receiving the requested funding of \$149,875 for his project, Dr. Taenzer’s application was designated as the **APSF / American Society of Anesthesiologists (ASA) President’s Endowed Research Award**. Dr. Taenzer is also the recipient of the **Ellison C. “Jeep” Pierce, Jr., MD, Merit Award**, which consists of an additional, unrestricted amount of \$5,000.



Eric You-Ten, MD, PhD.

Assistant Professor, Department of Anesthesia, Mount Sinai Hospital—University Health Network, Toronto, ON, Canada.

Dr. You-Ten’s Clinical Research project is entitled *“A Prospective Observational Study to Determine the Prognostic Value of Noninvasive Computed Tomography Coronary Angiogram for Cardiac Risk Stratification in Noncardiac Surgery – Role of the 320-Row Multidetector Computed Tomography.”*

Background: Perioperative major adverse cardiac events (pMACE) remain the major cause of mortality and morbidity in patients undergoing noncardiac surgery. Clinical experts and opinions have long advocated the inclusion of preoperative noninvasive tests with patient clinical characteristics to further delineate the cardiac risk. However, the optimal noninvasive test remains elusive, since the added value of our current best-practice cardiac test to predict pMACE is questionable. This is important, because an accurate cardiac risk stratification model can identify patients at increased cardiac risk who will benefit from medical treatments/interventions, as opposed to low risk patients who can suffer from significant adverse effects from these interventions.

Hypothesis: The authors hypothesize that computed tomography coronary angiogram (CTCA) can improve the ability to predict perioperative major adverse cardiac events and may become an important noninvasive preoperative test for cardiac risk stratification. Preliminary data from the authors’ pilot study demonstrated a potential role for preoperative CTCA in cardiac risk stratification.

Aims of the proposed study are (i) to conduct a prospective nonrandomized observational study to determine the prognostic value of CTCA as a preoperative diagnostic test for cardiac risk stratification in noncardiac surgery; (ii) to determine whether this knowledge will increase our clinical ability to predict perioperative cardiac complications to improve outcome and patient safety.

Implications: This proposal plans to improve cardiac risk stratification by assessing the degree of coronary artery stenosis with noninvasive CTCA, since the severity of coronary luminal stenosis puts patients at increased risk of suffering from pMACE. At present, invasive conventional coronary angiography (CCA) is reserved for a limited patient population. Therefore, alternative methods for assessing the coronary artery anatomy must be validated, and any such method should be accurate enough to enable therapeutic treatments and interventions to be targeted specifically to patients at risk. Only in this way can patient safety and outcome be improved. With improved CT technology that is nearly as accurate as invasive CCA, the authors propose that significant improvement in image quality with the state of the art 320-row CTCA can provide an accurate assessment of coronary luminal disease by determining the severity of coronary stenosis and plaque formation burden. At present, the prognostic value of CTCA to predict pMACE in noncardiac surgery is not known.

In addition to receiving the requested funding of \$149,586 for the project, Dr. You-Ten’s application was designated as the **APSF / American Society of Anesthesiologists (ASA) Endowed Research Award**, made possible by an unrestricted, \$150,000 grant from the American Society of Anesthesiologists. Dr. You-Ten is also the recipient of **The Doctor’s Company Foundation Ann S. Lofsky, MD, Research Award**, which consists of an additional, unrestricted grant of \$5,000.



Anne Miller, PhD (Psychology)

Assistant Professor of Nursing (Human Factors), Vanderbilt University Medical Center, Nashville, TN.

Dr. Miller’s Clinical Research project is entitled *“Embedding Safety-Related Evidence-Based Protocols into Routine Clinical Practice.”*

Background: In High Reliability Organizations (HROs), work units establish performance goals that guide the development and evolution of standardized work processes. Methods for implementing and evaluating such HRO processes in health care have not been well studied. This 18-month feasibility study will use a quasi-experimental design to evaluate whether standardized goal-directed inter-disciplinary processes and tools directed at safety-related evidence-based practices (SREBP) reduce patient length of stay in a cardiovascular intensive care unit (CVICU).

Goal-directed processes will focus on SREBP in post-cardiovascular surgery patients. The SREBP will target ventilator-acquired pneumonia, ICU delirium, and catheter-associated bloodstream and urinary tract infections. SREBP goals will include early tracheal extubation, cessation of vasopressors, sedatives, and parenteral analgesics, mobilization, enteral nutrition, intravascular and urinary catheter removal, and ICU discharge. Despite the published benefits of SREBP, sustained decreases in preventable complications have been difficult to achieve, suggesting that SREBP are not being effectively integrated into everyday practice.

Aims: 1. Develop and integrate SREBP goal-directed interdisciplinary care processes and tools into post-cardiovascular (CV) surgery ICU patient management practices; 2. Evaluate the effects of SREBP goal-directed processes and tools on CVICU and hospital length of stay (LOS); and 3. Describe factors contributing to SREBP goal (non)-compliance and patient LOS. The authors hypothesize that increased SREBP goal attainment (and, by direct intent, increased SREBP compliance) will decrease ICU and hospital LOS.

Implications: Goal-directed structured checklists will first be assessed for accuracy and reliability. After HRO process/tool implementation, the authors will collect data for 1 year to demonstrate sustained practice change. Daily global and goal specific SREBP compliance scores will be calculated from a goal-tool for each study patient, while length of stay and other patient variables will be queried from the hospital’s comprehensive electronic medical record. A piecewise linear regression model of SREBP compliance against ICU or hospital LOS, adjusting for patient pre-existing condition, surgical procedure, ICU admission acuity, and time from study start, will be used to test the primary hypothesis that there is an association between SREBP compliance and ICU and hospital length of stay. The results will inform the conduct of a planned RCT to evaluate the effect of an HRO-based goal-directed intervention on short- and long-term ICU patient outcomes and on cost of care.

See “2011 Grants,” Next Page

Hogue Explores Cerebral Autoregulation in Head-Up Cases *Relationship to Neurocognitive and Brain Serum Biomarkers Examined*

“2011 Grants,” From Preceding Page

In addition to receiving the requested funding of \$149,865 for her project, Dr. Miller’s application was designated as the **APSF / Covidien Research Award**, made possible by an unrestricted, partial \$100,000 grant from Covidien.



Charles W. Hogue, Jr., MD

Associate Professor, Department of Anesthesiology and Critical Care Medicine, The Johns Hopkins Hospital, Baltimore, MD

Dr. Hogue’s Research project is entitled “Assessing Cerebral Blood Flow Autoregulation in the Head-Up versus Supine Position during General Anesthesia and its Relationship with Postoperative Neurocognitive Changes and Serum Biomarkers of Brain Injury.”

Background: Neurologic injury under general anesthesia in the beach chair position is believed to

result from cerebral hypoperfusion. The authors hypothesize that brain hypoperfusion in this circumstance is caused by blood pressure monitoring that is not reflective of cerebral perfusion pressure. Maintenance of arterial blood pressure (ABP) above an individual’s lower limit of cerebral blood flow (CBF) autoregulation would prevent hypoperfusion and brain injury complications. Near infrared spectroscopy (NIRS) can be used to continuously monitor autoregulation with the cerebral oximetry index (COx), a moving linear correlation coefficient between cortical tissue oxygen saturation and ABP. The authors hypothesize that subjects in the beach chair position have impaired CBF autoregulation compared with subjects undergoing surgery in the lateral decubitus supine position.

Aims: 1) To compare the average COx and the percentage of time with abnormal COx between subjects in the head-up or supine position during surgery under general anesthesia; 2) To compare the range of ABP required for a normal COx between subjects anesthetized in the head-up or supine position; 3) To assess the association between impaired CBF autoregulation and postoperative neurocognitive decline and elevation of serum glial fibrillary acid protein. The authors will test their hypothesis by comparing CBF autoregulation data, including the percentage of time that patients undergoing elective surgery have abnormal autoregulation, in the beach chair position versus supine position.

Implications: The authors plan to establish the range of ABP required to maintain autoregulation in the 2 groups. CBF autoregulation results will be

assessed for a relationship with postoperative neurocognitive dysfunction and with serum glial fibrillary acid protein levels, a biomarker of brain injury. Monitoring autoregulation non-invasively with COx has the potential to improve patient safety by delineating individualized limits of safe ABP for patients at risk of neurologic injury.

In addition to receiving the requested funding of \$212,000 for his RFP project, Dr. Hogue’s application was designated as the **APSF Research Award**, made possible by an unrestricted grant from APSF.

On behalf of APSF, the members of the Scientific Evaluation Committee wish to congratulate all of the investigators who submitted their work to APSF, whether or not their proposals were funded. The Committee members hope that the high quality of the proposals, the significant amount of resources offered by APSF, and the important findings that will undoubtedly result from completion of these projects will serve as a stimulus for other investigators to submit research grants that will benefit all patients and our specialty.



Sorin J. Brull, MD
Chair, APSF Scientific
Evaluation Committee

ANESTHESIA PATIENT SAFETY FOUNDATION (APSF) 2011 GRANT PROGRAM

Announcing Guidelines for Grant Applications to be Selected on Saturday, October 15, 2011 (ASA Annual Meeting), and Scheduled for Funding Starting January 1, 2012

The *Anesthesia Patient Safety Foundation (APSF) Grant Program* supports research directed toward enhancing anesthesia patient safety. Its major objective is to stimulate studies leading to prevention of mortality and morbidity resulting from anesthesia mishaps.

To recognize the patriarch of what has become a model patient safety culture in the United States and internationally, the APSF inaugurated in 2002 the **Ellison C. Pierce, Jr., MD, Merit Award**. The APSF Scientific Evaluation Committee will designate one of the funded proposals as the recipient of this nomination that carries with it an additional, unrestricted award of \$5,000.

The APSF inaugurated **The Doctors Company Foundation Ann S. Lofsky, MD, Research Award** in 2009. This award is made possible by a \$5,000 grant from The Doctors Company Foundation that will be awarded annually for the next 5 years to a research project deemed worthy of the ideals and dedication exemplified by Dr. Ann S. Lofsky. The recipient of this nomination will receive an additional, unrestricted award of \$5,000. It is the hope of the APSF that this award will inspire others toward her ideals and honor her memory.

ANTICIPATED 2010-2011 NAMED AWARDS

APSF/American Society of Anesthesiologists (ASA) President’s Endowed Research Award (\$150,000)

APSF/American Society of Anesthesiologists (ASA) Endowed Research Award (\$150,000)

Submissions due online May 1, 2011. See www.apsf.org for full guidelines and other information.



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Scientific Papers on Patient Safety at the American Society of Anesthesiologists 2010 Annual Meeting

Steven B. Greenberg, MD, Glenn S. Murphy, MD, Jeffery S. Vender, MD

Over 1,700 abstracts were presented at the 2010 American Society of Anesthesiologists Annual Meeting in San Diego, California. As in previous years, a number of these abstracts examined issues directly related to patient safety. This brief review will highlight a few of the important abstracts discussed at the meeting.

Anesthesia & Perioperative Complications

Irita et al. from Kobe City, Japan, compared results from surveys generated by the Japanese Society of Anesthesiologists concerning critical events in the operating room (OR) from 1999-2003 (n=5,223,174) with 2004-2008 (n=5,235,940) (A927). Overall mortality from critical events in the OR decreased significantly from 5.55/10,000 in 1999-2003 to 4.32/10,000 anesthesia patients in 2004-2008. Mortality rates secondary to inappropriate airway management decreased by approximately 70%. However, 80% of overall deaths were reported to be preventable. Abstract A789 examined 129 claims from the ASA Closed Claims database involving aspiration of gastric contents and associated risk factors. The authors observed that patients with aspiration of gastric contents were older, sicker, and had more abdominal or emergency procedures. Aspiration claims had twice the amount of associated deaths as other claims.

Another study examined the incidence and complications of failed extubation (A766). A cohort of 1,400 critically ill patients who were intubated either in the field or during their hospital stay was included in the study. Thirty-two percent of these patients required reintubation. Reasons for reintubation included respiratory failure, airway obstruction, altered mental status, emergent or elective surgical procedures, and cardiopulmonary arrest. Approximately 1% of patients who were reintubated developed cardiopulmonary arrest and died (A766). Ramachandran et al. from the University of Michigan evaluated independent predictors of unplanned early postoperative tracheal intubation (UEPI) after non-cardiac surgery (A931). A total of 4,112 out of 407,231 (1.01%) patients from a NSQIP cohort required an unanticipated early postoperative tracheal intubation (within 72 hours of surgery). Independent strong predictors of UEPI were current smoking, COPD, dyspnea, preoperative sepsis, recent weight loss, cancer, alcohol abuse, emergency surgery, hypertension, liver disease, low functional status, diabetes, renal disease and prolonged hospitalization. UEPI was associated with an OR=13.5 for mortality.

Bauer et al. (A1485) at the Cleveland Clinic analyzed data on 110,618 non-cardiac surgical patients to determine the incidence of anaphylactic events during induction of anesthesia. The observed

incidence of anaphylactic reactions was 5.3/10,000 cases. The relative risk of anaphylaxis in patients given muscle relaxants was 2.1 (p=0.051). Women were twice as likely as men to experience an allergic reaction. Eikermann et al. at the Massachusetts General Hospital, evaluated the incidence and risk factors associated with postoperative hemodynamic severe adverse events (PHASE-severe bradycardia and hypotension) in 232 patients undergoing spinal anesthesia (A1533). A 5% incidence of PHASE occurred in patients recovering from spinal anesthesia. Postoperative adverse events were associated with insertion of the spinal anesthetic in the lateral position as well as postoperative opioid administration. PHASE was also associated with a 140-minute increase in recovery room stay.

Perioperative Pulmonary & Ophthalmic Complications

Kuroiwa investigated the incidence and risk factors associated with perioperative symptomatic pulmonary thromboembolism (PS-PTE) (A936). Surveys were mailed out to 3,217 institutions in Japan. Over the 3-year study period (2005-2007), 825 cases of PS-PTE were reported (incidence=2.5 cases/10,000 surgeries). This incidence significantly decreased from the previous study period of 2002-2004 (p=0.01). Risk factors associated with PS-PTE included BMI \geq 25 kg/m², prolonged immobilization for > 3 days, previous history of VTE, and surgery without prevention.

Perioperative pulmonary complications may occur more frequently in patients with sleep apnea (SA). Using the National Inpatient Sample Database (1998-2007), Bombardieri and colleagues (A772) determined that 1.49% of patients undergoing open abdominal surgery carried a diagnosis of SA (51,909/16,828,312 cases). The prevalence tended to increase over time reaching 2.8% in 2007. Patients with SA tended to be younger, male gender, and have more co-morbidities than non-SA patients. In addition, patients with SA developed aspiration pneumonia and ARDS, and required intubation and mechanical ventilation more frequently than non-SA patients. Abstract 165 reported the complication rate of patients with sleep apnea undergoing ambulatory surgery. A total of 107 patients had a preoperative diagnosis of SA or had a clinical diagnosis of SA. Fifteen patients developed intraoperative complications (i.e., difficult mask ventilation, difficult intubation, or difficulty maintaining SaO₂), while 1 patient developed a postoperative complication (difficulty maintaining SaO₂). Patients with sleep apnea may require unique perioperative anesthetic plans based on a possible increase in likelihood of developing perioperative pulmonary complications.

Two studies investigated the incidence, factors and sequelae of perioperative corneal abrasions. Real et al. (A970) from Vanderbilt University, reviewed

5000 cases over a 3-year period to determine the incidence of perioperative corneal abrasion. Corneal abrasion occurred in 0.12% of cases reviewed. Proposed risk factors for corneal abrasion in this study were prolonged anesthetic time, non-supine surgical position, head and neck surgery, difficult mask ventilation, difficult intubation, and multiple intubation attempts. Another retrospective study (A971) analyzed 78,542 procedures requiring anesthesia to determine the incidence of and risk factors for corneal abrasion. Eighty-six corneal abrasions occurred during a 1-year period of time (0.11% incidence). Statistically significant factors associated with corneal abrasion included age, same day admission, general anesthesia, eye protection by taping, large estimated blood loss, postoperative recovery in main PACU, oxygen administration in the PACU, and the Trendelenburg position. Antibiotic ophthalmic ointment with artificial tears was most commonly employed for treatment. No long-term sequelae were reported.

Three notable abstracts examined changes in intraocular pressure (IOP) during the perioperative period. Abstract A196 randomized 65 patients undergoing major spine surgery to receive either 5% albumin or lactated ringers for intra-operative volume resuscitation. The authors reported that although the IOP in the prone position during spine surgery was substantially elevated (approximately 20% of patients exceeding 50 mmHg), there was no difference in mean IOP between 5% albumin and lactated ringers groups. Fox et al. (A197) studied the IOP in 20 healthy adult volunteers exposed to a 70% N₂O/O₂ mixture. The authors observed that inhaled N₂O did not cause significant IOP changes compared to baseline in healthy adults. Abstract 195 prospectively compared the IOP in patients with preexisting eye disease undergoing Robotic Assisted Laparoscopic (RAL) surgery in the steep Trendelenburg (TBURG) position with a control group of patients undergoing open and laparoscopic cases without TBURG. Seventeen patients undergoing RAL in steep TBURG were compared to 16 patients undergoing open and laparoscopic cases without TBURG. IOP in the steep TBURG group reached twice baseline levels and represented a significant increase in IOP when compared to the control group without TBURG. Intraocular pressures were similar in each group 1 hour after the end of the case.

Anesthesia Information Systems (AIMS)

Information technologists seek to improve safety in health care. Authors of abstract (A1433) noted that less than 10% of hospitals have an electronic medical record and attempted to quantify the use of AIMS among US anesthesiologists. Six-hundred active practicing U.S. anesthesiologists responded to a survey regarding use of AIMS. Approximately 24% of the respondents are using AIMS, while another 13% have

See "Scientific Papers," Next Page

Abstracts Probe Point-of-Care Testing, Glucose Control and High FIO₂

“Scientific Papers,” From Preceding Page

plans to install AIMS in the near future. The most common barrier to implementation of AIMS was cost, lack of support from hospital administration, and lack of capability of AIMS to integrate with the existing electronic medical record. Rodriguez et al. (A179) reviewed 22,033 intra-operative records through AIMS to investigate the frequency at which anesthesia providers examined previous anesthetic records prior to present patient surgeries. Approximately 34% of patients had previous case records. Of these records, approximately 27% were reviewed in the previous 72 hours. The authors suggested that a potential advantage of AIMS is providing anesthesiologists with the ability to review previous anesthetic records.

Abstract 1432 suggested that AIMS data may be coupled with other data sources (such as laboratory and vital status) to enable risk-adjusted perioperative outcomes research. The Multicenter Perioperative Outcomes Group (MPOG) consortium was able to extract vital signs, physiologic parameters, procedures, interventions, and medications from the intra-operative period from 4 institutions. These first generation interfaces successfully extracted 500,000 operations, more than 1.5 billion vital signs, and more than 10 million medication administration events across 4 institutions. AIMS may also improve compliance of perioperative adverse event (AE) reporting as Abstract (A182) compared prior use of paper AE reporting versus computerized AE reporting. Approximately 98% of the computerized reports were recovered, where only 68% of the historical paper reports were recovered. The authors reported a more accurate retrieval of information with the computerized report.

Miscellaneous:

Accuracy of Point of Care (POC) Devices:

A few abstracts investigated the accuracy of perioperative POC devices. Ourada et al. (A1147), from the University of Chicago, enrolled 50 patients undergoing surgery to determine the accuracy of hematocrit values obtained from the i-STAT handheld device when compared to the spun hematocrit method. Results suggested that the i-STAT produced lower hematocrits than the spun hematocrits by 1.17% on average. I-STAT results appeared to be more inaccurate at lower hematocrits. This may result in unnecessary administration of blood transfusions. Abstract (A1151) compared the accuracy of SpHb (hemoglobin) derived from the (Masimo Rainbow[®] SET) and arterial blood gas (ABG) derived hemoglobin. This trial included data from 14 patients with 52 time matched SpHb to ABG Hb measurements. The mean difference of SpHb to ABG Hb for all measurements was 1.07 g/dl. However, the mean difference increased to as high as 3.3 g/dl during rapid blood loss or where the Masimo technology had a low perfusion index. The author concluded that a confirmatory ABG seems advisable prior to transfusion during the above conditions. Hipszer et al. (A1152) investigated the accuracy of POC glucose meters (Accu-Check) meter (Meter A and Meter B)

compared to venous blood sampling (using YSI 2300 STAT Plus analyzer). Fifteen subjects undergoing major abdominal surgery had a total of 225 venous samples analyzed. Twenty-four Meter A (10.9%) and 21 Meter B (9.5%) readings failed the International Organization for Standardization (ISO) guidelines when capillary blood was tested.

Glucose Control & Non-cardiac Surgery:

Two notable abstracts discuss preoperative hyperglycemia and its effect on non-cardiac surgical patients. Abdelmalak et al. (A720) investigated the relationship of preoperative glucose to both in-hospital and 1-year mortality among 61,536 ASA I-IV patients undergoing elective non-cardiac surgery. After adjusting for co-variables, composite in-hospital outcomes (in-hospital mortality and cardiovascular, neurological, pulmonary, urological, and infectious complications) did not differ between patients with and without preoperative hyperglycemia ($p=0.37$). However, patients with preoperative hyperglycemia did have a statistically significant increase in mortality at 1 year ($p<0.001$). The same group (A794) also compared the effects of preoperative hyperglycemia in diabetics and non-diabetics undergoing non-cardiac surgery. Diabetics accounted for 15.8% of the 61,536 patients analyzed. After adjusting for co-variables, the authors observed no relationship between preoperative blood glucose and postoperative complications in either the diabetic or non-diabetic groups. However, euglycemia was associated with increased long-term mortality in diabetics when compared to non-diabetics undergoing non-cardiac surgery.

High Perioperative FIO₂:

High perioperative FIO₂ has been associated with potential improved outcomes in previous studies (A1180). Wadhwa et al. (A1180) enrolled 305 morbidly obese patients undergoing gastric bypass surgery to determine the effect of inspired oxygen on postoperative outcomes. Patients were then randomized to receive either 30% or 80% FIO₂ in the immediate postoperative period until the first postoperative morning. No beneficial effects of inspired O₂ concentration were observed in the 80% FIO₂ group. Overall incidence of major complications in both groups was 14%. Another abstract (A793) assessed the association between long-term mortality and perioperative oxygen fraction in patients undergoing abdominal surgery. A total of 1,386 patients undergoing acute or elective laparotomy were randomized to receive either 30% or 80% FIO₂ during and 2 hours after surgery. After a median follow-up of 2.3 years, mortality was significantly higher in patients assigned to 80% FIO₂ compared to patients who received 30% FIO₂ (hazards ratio=1.28). The mortality risk with 80% FIO₂ was even higher in patients undergoing cancer surgery (hazards ratio=1.41).

Perioperative Beta-Blockade:

Ellenberger et al. (A781) from Toronto General Hospital utilized a propensity score matched cohort design to compare effects of chronic versus acute perioperative beta-blockade. Propensity matching

produced a cohort of 202 pairs that were all balanced for measured confounders. The composite outcome (which included myocardial infarction, non-fatal cardiac arrest, and in-hospital mortality) was seen in 4% of chronic users versus 7.5% of acute users ($p=0.048$). The same group from Toronto General Hospital compared 30-day mortality rates of surgical patients who received metoprolol vs. those receiving atenolol or bisoprolol in the early postoperative period (A1178). Data were collected retrospectively on 61,542 elective or urgent non-cardiac surgical patients. The overall mortality rate was 1.61%. After adjustment for confounding variables, the overall 30-day mortality was 1.73% in the atenolol/bisoprolol groups compared to 3.0% in the metoprolol group ($p=0.014$). These data suggest that the timing and type of beta-blockers may influence outcome.

Miscellaneous:

Abstract 728 critically reviewed studies that evaluated the effectiveness of cricoid pressure in preventing gastric inflation in children or adults. Four studies including 87 patients satisfied criteria for the review. The authors reported that cricoid pressure was effective in preventing gastric inflation in 86 out of 87 patients. Stapelfeldt et al. (A922) from the Cleveland Clinic attempted to identify optimal trigger parameters of “Triple Low” (low BIS, low MAC, low MAP) conditions for potentially improving 90-day mortality. After analyzing data from 23,999 non-cardiac surgical patients, the authors suggested that the threshold combination of MAP=75, BIS=40, and MAC=0.90, produced an overall efficiency of 70 patients alerted per potential additional life saved. Abstract 132 investigated the trends of the volume of hospitalized patients with cardiac stents using the Nationwide Inpatient Sample. The results suggested that the overall use of coronary stents declined slightly from 732,354 in 2003 to 694,399 in 2007. However, the use of drug-eluting stents increased from 32% in 2003 to 89% in 2005 before declining to 67% in 2007. The use of non-drug eluting stents fell from 492,984 in 2003 to 227,882 in 2007. These data suggest that anesthesiologists are more likely to encounter patients with drug eluting stents in future years (A132). Abstract 1532 investigated the relationship between cerebral oxygenation (SctO₂), mode of ventilation, mean arterial pressure, and end-tidal carbon dioxide (ETCO₂). Eight-two patients undergoing elective shoulder surgery in the beach chair position were monitored using cerebral oximetry. The author observed that mechanically ventilated patients were more likely to experience a decrease in their cerebral oximetry threshold when compared to patients who were spontaneously ventilating.

This brief review summarized only a small number of the important abstracts on patient safety presented at the 2010 Annual Meeting. To view other abstracts on patient safety, or to obtain further information on the abstracts discussed in this review, please visit the *Anesthesiology* web site at www.anesthesiology.org.

ASA Meeting Exhibits Highlight Patient Safety

by John H. Eichhorn, MD

Patient safety as a driving force for anesthesia research, innovation, and education again was featured prominently in both the Scientific and the Technical Exhibits at the ASA Annual Meeting in San Diego, October 16-20, 2010. There were significant patient safety concerns presented as well as proposed technical and educational improvement strategies.

Exhibit Extravaganza

In the Scientific Exhibits, safety-related topics varied widely, from some of the biggest to some others that might appear somewhat mundane but that still represent everyday hazards that persist as threats to patients.

Directly addressing one of the rare but potentially devastating threats to patients, wrong-site surgery, was an extensive exhibit from Seattle's Virginia Mason Clinic. An analytic tool with a probability model to predict the risks (most often involving failures of communication) leading to potential wrong-site accidents was presented. It incorporates points from the recently introduced World Health Organization Surgical Safety Checklist. Application of the model at that institution led to procedural changes that emphasize "second source" separate independent verification of the correct surgery and site, such as imaging, test results, or an additional member of the surgical team. Dramatic success of the changes was shown when questions about the surgical site (not adverse incidents) were reduced from 6.9/10,000 in 2009 to only 0.2/10,000 in 2010.

A global perspective was featured by the Boston team that won the APSF's E.C. Pierce Award for the best safety-themed Scientific Exhibit. The subject was the World-Health Organization "Global Oximetry (GO) Project" and its instructional video intended to help introduce pulse oximetry to anesthetizing locations in the developing and underdeveloped areas of the world where pulse oximeters currently do not exist. The value of pulse oximetry as the one electronic technology most likely to help improve anesthesia safety was a prominent component of the WHO "Safe Surgery Saves Lives" global initiative (lead article, *APSF Newsletter*, Summer 2008). The WHO is working with donors and equipment manufacturers to develop and introduce robust simple oximeters that can run on batteries if necessary and are suited to the most basic of anesthetizing locations.

On the other end of the spectrum were several technical innovations intensely focused on everyday issues that have major safety implications. Noting the danger involved if an O₂ tank is emptied while transporting an O₂-dependent patient, a team from the Mass General in Boston presented a new oxygen tank regulator that also "reads" in "minutes of O₂ remaining" at the 3 common flow rates available on the regulator. This would allow simple "on the fly"

assessment of O₂ supply relative to the transport needs and decreased risk of running out. Also addressing a concern regarding supplemental O₂, a team from Belgium displayed the "Baroprevent." It is a relatively simple device that attaches to the bottom of a wall O₂ outlet and functions as pressure relief valve that will "pop off" automatically when pressure in the distal O₂ tubing exceeds 60 cm H₂O, such as might occur with a T-piece obstruction or an incorrect connection. Likewise, the same booth showed the "Safety Frog" to prevent volutrauma from an anesthesia machine. It attaches between the absorber head and the inspiratory limb of the breathing circuit, measures pressure, and both "pops off" and alarms when there is dangerously high sustained pressure.

Airway management and safety issues did not necessarily dominate the exhibits as they have in some recent years, but were certainly well represented. As often stated in this report, the induction of deep unconsciousness and muscle relaxation before genuine confirmation that a patient's airway can be comfortably managed and accessed is still (even with all the recent attention and device development) one of the least improved and most dangerous things anesthesia professionals do.

"Innovations in Airway Management" was the title of a wide-ranging multifaceted exhibit from the Cleveland Clinic. Provoked by the ideas that fiberoptic bronchoscopes may not be immediately available for an airway emergency because they are being cleaned and also the concern that the cleaning may not be completely effective, the team proposed an improvement to the sealed sheath covering with a lens at the end that covers scope and keeps them clean during use. Previously available sheaths of this type covered the scope's suction port, making it useless. Their new "Vaccu-safe" version incorporates a suction port in the sheath covering to restore that function (suction secretions or administer O₂). Also, in the same booth were demonstrated a nasal airway with an inflatable cuff, an oral airway with a suction port, and an easily malleable video intubating stylet.

A new style of airway Bougie was in an exhibit from the University of Nebraska. With depth markings throughout its impressive length, it has one malleable end that is fairly firm (enough to pick up the epiglottis – especially helpful when a video scope is employed in an extremely challenging airway) and, conversely, a special flexible soft tip at the other end. Demonstrations with airway mannequins illustrated the applications.

A different level of airway safety concern was addressed by 2 exhibits. A team from Cook County Hospital in Chicago presented the value of and strategies for "early aggressive management" of difficult airways in unstable trauma patients. Further, a team from International TraumaCare presented an exhibit targeting dangers from airway compromise during non-OR sedation with a web-based training course

entitled "SAFE" (Sedation and Airway for Everyone). While useful in any setting for anyone administering sedation, it particularly targets challenging environments, "austere or remote" locations, and education for paraprofessionals who previously had little training in sedation.

Rounding out the safety theme were a cardiac risk reduction checklist from the University of California (San Francisco); an online module to teach and assess ACLS skills from the University of Washington; a demonstration of a computerized PACU handoff report from St. Louis University; an informational and promotional update of the ASA Simulation Education Network; and an extensive exhibit from the Harvard-based Institute for Safety in Office-Based Surgery, including a checklist building on the WHO Surgical Safety Checklist. Finally, arguably the most visually appealing scientific exhibit, which came from the University of Florida, was a "mixed simulation" of central venous catheter placement that featured truly remarkable and very instructive 3-D video images of the relevant anatomy and insertion approaches.

In the Technical (commercial) Exhibits at the ASA meeting, both the expected and some new displays were presented. Interestingly, in general, the expansive exhibit extravaganza seemed at least to make a start towards recapturing some of its pre-recession grandeur. Also, prominently featured were several international exhibitors not previously seen at the ASA.

Video airway devices for the second year dominated the safety-oriented component of the Technical Exhibits. There were at least 15 exhibitors with all types and shapes of products. Small screens that clamp to an IV pole were popular. "Eye-catching," as it were, described very small (3" diagonal) screens directly on a scope in place of the traditional eye-piece lens. The multitude of shapes and sizes of video scope blades reached a new high.

Likewise, competition in the ultrasound market continues to be strong. A variety of probes have various features but the result is similar. A new product, however, is the special needle for blocks or central line insertion that has an outer wall covered with tiny geometric shapes that more effectively reflect the ultra-sound signal (something like a prism) and, thus, are significantly more visible on the screen. Also for central line placement is a tiny disposable transducer that allows guide wire advancement when venous pressure is sensed with the intension of preventing accidental arterial cannulation.

Adoption of electronic anesthesia information management systems, endorsed by the APSF as a safety-promoting concept, has been slowed in recent years by the economic recession. Many versions were still exhibited, but not with the emphasis of a few

See "ASA Meeting," Next Page

Safety Inventions Featured in ASA Exhibits

“ASA Meeting,” From Preceding Page

years ago. One new type has the image of a traditional paper anesthesia record on the screen and the ability of the practitioner to “write” on the screen with a stylus, creating a record looking like the familiar hand-written paper version, which then can be printed. That particular one does not capture, for example, vital signs into a true digital record, but a companion version with touch screen entry (like texting) instead does create a storable digital record.

There were 3 new brain function devices intended to be used as monitors during general anesthesia. A potentially related but different new product was a special sensor placed above the bridge of the patient’s nose in the medial corner of the eye socket that is advertised as directly measuring brain temperature via an anatomic “tunnel” that conducts heat from the brain to the skin. Patient warming devices were widely featured, as always. There were new types of special central venous catheters that feature heating elements and were touted as enhancing normothermia in big invasive cases. More small printers for real-time medication labels generated on the anesthesia cart from an associated bar code reader were displayed, likely inspired by the initial one 2 years ago that received significant attention at the special APSF workshop on medication safety (lead article, *APSF Newsletter*, Spring 2010). Pre-op testing for sleep apnea dangers was not quite as prominent as last year, but still clearly evident. A new activated charcoal filter was displayed that goes on both limbs of

the breathing circuit and is advertised as clearing an anesthesia machine of residual volatile agent so that it can be ready for an MH-susceptible patient in less than 1 minute. A new device for continuous cardiac output determination via sensors on the endotracheal tube cuff was displayed.

Several airway-related inventions were offered in the exhibits. An oral airway intended to help prepare for awake FOB intubation has 2 integral lumens, one for administering O₂ and the other with an internal atomizer at the airway tip for the dispersion of local anesthetic to the airway in an easier fashion than previously available. A laryngeal mask type device with a pressure sensing gauge on the cuff pilot tube was advertised as promoting better fit and less risk to airway mucosa and underlying nerves. Another new offering was an acoustic sensor affixed to the neck to detect and record respiratory rate, which was offered as an improvement for “conscious sedation” cases.

Lastly, less of a patient safety commentary than an observation on the practice of anesthesia care in this country, the ASA commercial exhibits had a record number of business and practice management exhibitors, all with even bolder new claims of improved practice profitability via enhanced revenue and reduced costs. This likely is a reflection of the economic recession that appears to have affected aspects of the lives of most people, including anesthesia professionals.

Overall, patient safety persisted as a distinct focus among both types of exhibits at the 2010 ASA Annual

Meeting. This emphasizes both continued success in improving patient safety and also the significant challenges yet remaining.

Dr. Eichhorn, Professor of Anesthesiology at the University of Kentucky, founded the APSF Newsletter in 1985 and was editor until 2002. He remains on the Editorial Board and serves as a senior consultant to the APSF Executive Committee.

Vision

The vision of the Anesthesia Patient Safety Foundation is to ensure that no patient shall be harmed by anesthesia.



Mission

The APSF’s Mission is to improve continually the safety of patients during anesthesia care by encouraging and conducting:

- safety research and education
- patient safety programs and campaigns
- national and international exchange of information and ideas.

Ellison C. Pierce, Jr., MD, Research Award for Best Scientific Exhibit



The APSF Committee on Education and Training awards the Ellison C. Pierce, Jr., MD, Research Award for Best Scientific Exhibit at the 2010 ASA annual meeting in San Diego, CA. Dr. Richard Prielpp, APSF Committee on Education and Training Chair, presents the award to the team from Boston Medical Center/Boston University School of Medicine for their exhibit entitled “Using Pulse Oximetry,” which presented a video as part of the Global Pulse Oximetry Project of the World Health Organization. This high-resolution instructional DVD/CD video is a bold initial step for the WHO project with the vision that every general anesthetic world-wide will be monitored by pulse oximetry. The video enumerates steps required to respond to low SpO₂.

Pictured in photo (left to right) are APSF Education and Training Committee members, Dr. Sem Lampotang, Susan R. Fossum, RN, John O’Donnell, CRNA, Maria Magro, CRNA, and Dr. Richard Prielpp presenting the award to Dr. Raphael Ortega, Dr. Abdel Mehio, Dr. Elena Brasoveanu, Dr. Jeanette Lee, and Dr. Paul Delonay.

Q&A

Why Should I Learn About Fire Extinguishers?

Q Dear Q&A,

Why should I learn about fire extinguishers?

A A fire extinguisher is one of those things that operating room personnel seldom think about until needed or asked about during an inspection or site visit. Choosing the correct extinguisher type for a specific fire or for purchasing can be made simple by reviewing a few basic concepts. Operating room fires occur in 3 possible locations: 1) in the airway, 2) fires in, on, or around the patient, and 3) fires elsewhere in the operating room. Guidance regarding surgical fires as a part of medical practice, such as the American Society of Anesthesiologists (ASA) *Practice Advisory for the Prevention and Management of Operating Room Fires*,¹ is usually limited to the first 2 categories as management of the latter usually varies per state or municipality, and is best left to the direction of local fire codes and National Fire Protection Agency (NFPA) codes. Fires not specifically on the patient are handled differently depending upon the presence of sprinkler or suppression systems and approaches to suppression are usually comprehensive taking into account all situations even those occurring outside of patient care.

Q How are extinguishers classified?

A Fires are categorized by the NFPA letter classification with the following designations²:

- A** Fires involving ordinary materials like burning paper, lumber, cardboard, plastics, etc.
- B** Fires involving flammable or combustible liquids such as gasoline, kerosene, and organic solvents.

C Fires involving energized electrical equipment such as appliances, electrical equipment, panel boxes, and power tools.

D Fires involving combustible metals such as magnesium, titanium, potassium, and sodium.

K Fires that occur in the kitchen.

The corresponding labeled extinguisher type should be used. An easy system for remembering these categories is

- A** for Ashes
- B** for Boiling
- C** for Current

Q In cases of airway fires, what are some important considerations?

A For airway fires the oxidizer (oxygen and nitrous oxide) concentration is usually the sole causative factor. Most endotracheal tubes are difficult to ignite and not likely to continue burning without oxidizers. This has been shown in numerous bench trials and illustrative videos. PVC tubes melt and undergo a depolymerization, which results in a taffy-like consistency but does not readily sustain the burning process.³ Silicone tubes disintegrate into an ash powder.⁴ Removal of the tube and discontinuing oxidizer flows should be carried out as soon as possible and not focused upon the order or sequence of these tasks. Fires not extinguished by the removal of the oxidizers can usually be smothered or doused with water. More persistent fires can be extinguished with nearly any type of fire extinguisher due to the relatively small size of the fire. Carbon dioxide (CO₂) extinguishers are very effective for these types of fires.



Q What are the types of fire extinguishers that are available and what are the key differences?

A **A:** Plain Water which delivers a stream of water to cool the fire. Fires extinguished with this type of extinguisher are prone to re-ignition.

AC: Water Mist which delivers a fine mist to cool the fire, safe for electrical fire because the fine dispersal of mist does not allow an arc to be formed which could result in electrocution.

BC: Dry chemical (sodium or potassium bicarbonate) or CO₂ which smother fires. Fires

See "Q&A," Next Page

Numerous questions to the Committee on Technology are individually and quickly answered each quarter by knowledgeable committee members. Many of those responses would be of value to the general readership, but are not suitable for the Dear SIRS column. Therefore, we have created this simple column to address the needs of our readership.

The information provided is for safety-related educational purposes only, and does not constitute medical or legal advice. Individual or group responses are only commentary, provided for purposes of education or discussion, and are neither statements of advice nor the opinions of the APSF. It is not the intention of the APSF to provide specific medical or legal advice or to endorse any specific views or recommendations in response to the inquiries posted. In no event shall the APSF be responsible or liable, directly or indirectly, for any damage or loss caused or alleged to be caused by or in connection with the reliance on any such information.

Q&A

Not All Fire Extinguishers Are Created Equal

“Q&A,” From Preceding Page

extinguished with dry chemical extinguishers seldom experience re-ignition due to “blanket effect” of dry chemical residue. Fires extinguished with CO₂ are very prone to re-ignition.

ABC: Dry chemical (ammonium phosphate).

Halon and Halotron: Extinguishes fires by displacement of oxygen and cooling and is very portable. Safest to use with sensitive electronic devices and is designated as a “clean agent.” Fires extinguished with this type of extinguisher are prone to re-ignition.

FE-36 (HFC-236fa): “Clean Agent,” non-toxic, no residue, and ozone safe.⁵ More expensive than other agents.

Other special use (D and K): Other extinguishers that are usually highly specific and are only kept in locations where appropriate. Examples are kitchen and combustible metal extinguishers.

Q Are there health concerns with certain types of extinguishers?

A CO₂: May result in frostbite or similar hypothermic injury if used at extremely close distances or in direct contact with skin for an extended period of time.

BC and ABC: Dry chemical dust can cause respiratory irritation resulting in the hindrance of rescue and evacuation attempts. The dust is difficult to remove from moist tissues and membrane and these agents are known to be corrosive to metals and are not benign substances. Depending upon the dry chemical suppression agent, even toxic by-products may be present when used in fire fighting.⁶

Halon: Creates sub-atmospheric oxygen concentration. Sensitizes myocardium to catecholamines and may result in lethal cardiac arrhythmias.⁷

FE-36 (HFC-236fa): Sensitizes myocardium but to a lesser extent than Halon.⁵

Q What are the reasons why the ASA, ECRI, and other organizations recommend CO₂ extinguishers over other types?

A For fires on the patient in the OR, an extinguisher should be safe during external and internal

exposure for the patient. CO₂ readily dissipates, is not toxic, and is not likely to result in thermal injury when used in an actual fire. This is due to 2 reasons, which are not readily apparent until you actually use a CO₂ extinguisher in a fire. The first is the delivery of CO₂ is self-limited because the lever and the handle become so cold, the user can actually experience frostbite. The other is the heat of the fire, which keeps you far enough away from the fire source so that thermal injury is unlikely. Since the patient's tissues would be hot (130 degrees) for a burn injury, a cold injury from application of CO₂ would also be unlikely. Du Pont's FE-36 is another safe agent but is expensive and was not readily available at the authorship of the ASA advisory. One may consider CO₂ and FE-36 as equally effective and acceptable agents as reflected by manufacturer's product information.

“A” rated extinguishers are water and not really safe for use in the OR considering the large amounts of electrical equipment. A water mist AC rated extinguisher is excellent, but it takes a while to extinguish a fire, and since you need adequate volume for multiple attempts to put out the fire and to evacuate, these are large and difficult to manage. However, they can be cheaply made in a non-ferromagnetic extinguisher, which is the best choice for MRI. Halon types, although very effective, are being phased out due to ozone issues and the resulting hypoxic atmosphere for the rescuers. Halotrons are “greener” Halon type extinguishers, which simply diminish the ozone depletion.

Q Is there a strategy in the selection and placement of fire extinguishers for the OR and surgical suite?

A First, with respect to selection, the best fire extinguisher is easy to use, readily available, economic in use, and optimal for the specific location. Other

factors to consider include are the presence of sensitive or expensive electronic equipment or computer systems, the presence of a magnetic fields such as in a MRI, and operating rooms where dry chemicals could compromise a sterile field or open surgical site.

As for placement, mounting height and locations should be consistent with NFPA guidelines and local fire codes. The NFPA recommends an extinguisher within 75 ft. of any working location.⁸ One should attempt to be consistent with the type of extinguishers in a given location (i.e., only CO₂ extinguishers in the OR) and mount in a consistent location (i.e., near the main door and on the left). What has worked well at our institution is a CO₂ in every OR and with the laser cart, an A rated extinguisher in the hall cabinets, an AC rated water mist for the MRI suite, and a Halon and CO₂ in the fire hose cabinets.

References

1. Caplan RA, et al. Practice advisory for the prevention and management of operating room fires. American Society of Anesthesiologists Task Force on Operating Room Fires. *Anesthesiology*. 2008;108:786-801.
2. National Fire Protection Association. NFPA 10, Standard for portable fire extinguishers. 2010. Chapter 5.2.
3. American National Standards Institute. American national standard for safe use of lasers in health care facilities. ANSI Z136.3 – 2005 C.9.35. Appendix: 52. 2005.
4. Ossoff RH, Duncavage JA, Eisenman TS, Karlan MS. Comparison of tracheal damage from laser-ignited endotracheal tube fires. *Ann Otol Rhinol Laryngol* 1983;92:333-336.
5. DuPont. DuPont fire extinguishants: DuPont FE-36 use as a fire suppressant in surgical operating rooms. White Paper. Jan 2005. Available at: http://www2.dupont.com/FE/en_US/products/fe36.html. Accessed January 6, 2011.
6. Amerex Corporation. ABC dry chemical fire extinguishant. Trussville, AL, June 2010. Available at: <http://www.amerex-fire.com/msds/msd/2>. Accessed January 6, 2011.
7. H3R Aviation. Halon 1211. Larkspur, CA, August 18, 2009. Available at: <http://www.h3rcleanagents.com/downloads/Halon-1211-Clean-Agents-MSDS.pdf>. Accessed January 6, 2011.
8. National Fire Protection Association. NFPA 10, Standard for portable fire extinguishers. 2010. Table 6.2.1.1.

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Letter to the Editor:

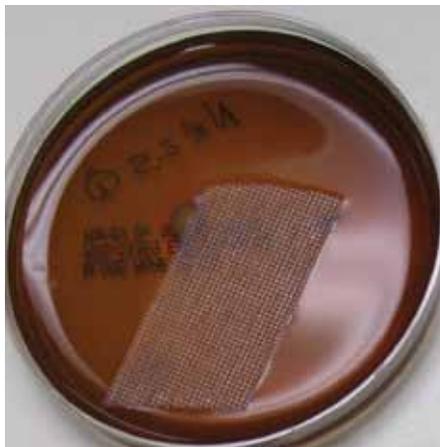
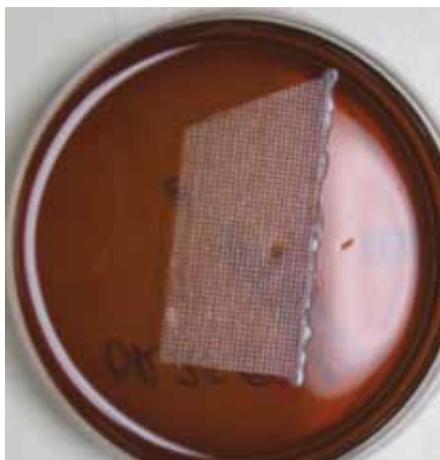
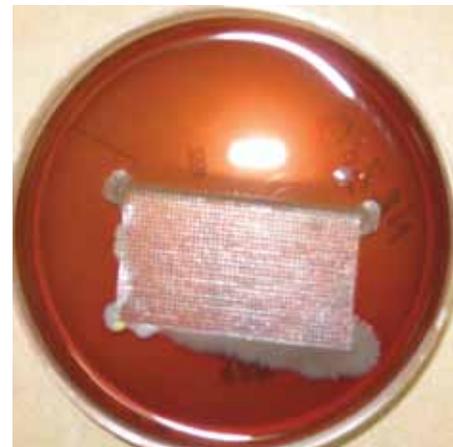
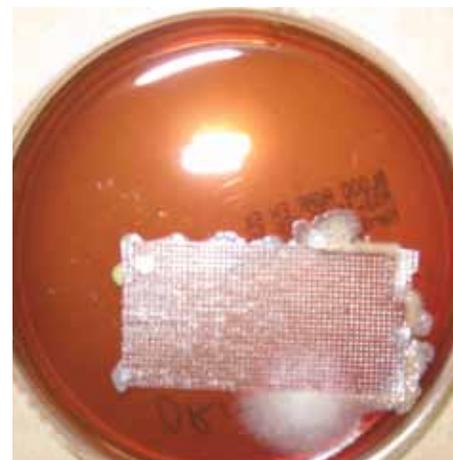
I.V. Tape: A Potential Vector for Infection

As anesthesia residents we are not taught an evidence-based method to secure peripheral intravascular catheters, whether arterial or venous. See one, do one, and teach one is the motto. Trainees and students are also challenged by teacher variability; the next person who comes along may teach you to do it differently.

I have noticed multiple practitioners splitting 1-inch tape in half to apply below the hub of a newly inserted peripheral catheter and secure it in a criss-cross or chevron pattern. It is quite common for the operating room to be stocked with non-sterile tape rolls used for multiple patients. While we would hope and expect that grossly contaminated rolls of tape would be discarded, there are no existing practices or methods to ensure cleanliness, sterility, or prevent cross contamination. This observation led to my hypothesis that tape rolls may be a vector for cross contamination and resultant infection. The potential for this to occur would likely be increased in immunocompromised patients and/or those with long indwelling catheter times.

There is sparse literature to address the infection potential of securing intravascular catheters in a non-sterile, criss-cross taping pattern. Studies have been done on central venous catheters since it is easier to track those patients in the intensive care units versus on the wards, where most individuals have peripheral intravenous catheters. As there are already standards for sterile preparation, draping, and securing of central venous catheters, the question remains why such precautions do not exist for peripheral catheters.

I performed a preliminary survey of 200 health providers at a county hospital that included nurses, physicians, and other allied health professionals who start intravascular catheters. Sixty-seven percent of those surveyed reported that they initially used non-sterile tape on peripheral catheters followed by sterile, transparent medical dressing over the catheter/tape apparatus. Thus, I performed a small pilot bench study to evaluate bacterial contamination from 1) sterile, transparent medical dressing (i.e., 3M™ Tegaderm™ dressing), 2) unused ("new"), non-sterile, 1-inch surgical tape rolls, 3) previously used ("old"), non-sterile, 1-inch surgical tape rolls. There were 2 arms to the study: a sterile setup and a non-sterile setup of tape onto sterile blood agar plates. For the sterile approach, there were 3 control plates, 3 plates with a half-piece of Tegaderm™ dressing, and 18 plates with pieces of tape from "old" and "new" non-sterile rolls. The pieces of tape were placed on the blood agar plates using alcohol and flame-sterilized forceps and scissors along with sterile gloves. The

**Figure A****Figure B****Figure C****Figure D****Figure E**

same setup was performed on another 24 plates but with a non-sterile approach without gloves, which represented the worst-case clinical scenario. All plates were observed daily while incubating at 37 degrees Celsius for 3 days. All controls showed no growth. Overall, there was bacterial growth along nearly every piece of tape regardless of whether they were placed on the agar plates in a sterile or non-sterile manner. Yet, there was more growth with the "old" or previously used, non-sterile tape compared to the "new" tape. As expected, there was also more growth on the plates in the non-sterile setup arm compared to the sterile arm. It was also easy to detect the edges that were touched on the sterile Tegaderm™ dressings in the non-sterile arm by the localized growth. The photos in this article represent some of the growth with old and new rolls in the sterile and non-sterile arms of the study. At least 14 of the agar plates were sent to our local microbiology lab for purposes

See "I.V. Tape," Next Page

Figures A thru E with 3-day growth at 37 degrees C on agar plates inoculated with the following: (A) sterilely handled new tape roll; (B) sterilely handled old tape roll; (C) new tape handled with ungloved hand; (D) old tape roll handled with ungloved hand; (E) sterile tegaderm handled with ungloved hand.

Puncture Sites Deserve Sterile Dressings

“I.V. Tape,” From Preceding Page

of speciation. The following bacterial species were identified from the agar plates incubated with tape: coagulase-negative *Staphylococcus*, *Micrococcus*, *Diphtheroids*, *Viridans streptococcus*. There were also 3 plates that had fungal growth containing the *Fusarium* and *Bipolaris* species. Although some of these microbes are considered commensal, they have the potential to be pathogenic within immunocompromised patients. Although this is an informal small pilot study, it does raise a question. **Why is non-sterile tape being used initially to secure a catheter hub at the patient’s fresh puncture wound?** An additional non-sterile arm of the study using non-sterile gloves may demonstrate an intermediate level of growth between what was found in the sterile arm and the nonsterile arm with no gloves. Further detailed studies could reveal additional data that would likely support the pilot study findings.

In my opinion, it seems that the *most efficient and sterile* manner to secure intravascular catheters (especially in a non-emergent setting *when sterile tape or securing devices are not available*) would be to

- (1) clean hands and wear sterile or new, non-sterile gloves.
- (2) wipe the area with alcohol before and after placing the catheter.

- (3) place a transparent, sterile medical dressing over the catheter hub first.
- (4) place a longitudinal piece of tape extending from the skin just proximal to the medical dressing, over the medical dressing, and onto the IV tubing just distal to the catheter hub.
- (5) place the tape transversely as needed over the tubing.

Unfortunately, utilizing the popular criss-cross taping technique could present the wound with potential pathogens if non-sterile tape is used initially. With all things considered, the above 5-step taping technique will not only help prevent the patient’s catheter from falling out, but it can potentially avoid infection at the puncture site.

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25th Anniversary Prompts 360° Assessment and Focuses Direction for the Future

“President’s Report,” From Page 46

monthly poll question related to anesthesia patient safety issues. This poll question is coordinated by Richard C. Prielipp, MD, chair, APSF Committee on Education and Training. The website also permits online donations to APSF.

Sorin J. Brull, MD, chair, APSF Committee on Scientific Evaluation continues as the Patient Safety Section Editor for *Anesthesia and Analgesia*.

An APSF-sponsored panel at the 2010 Annual Congress of the International Anesthesia Research Society reviewed the question of cerebral blood flow and perfusion pressure. This panel was organized and moderated by Richard C. Prielipp, MD, chair, APSF Committee on Education and Training. A second APSF-sponsored panel moderated by Sorin J. Brull, MD, chair, APSF Scientific Evaluation Committee was titled *Excellence in Safety Research*.

Fire Safety Video

More than 2,000 requests to receive the complimentary APSF fire safety video entitled *Prevention and Management of Operating Room Fires* have been received since the DVD became available in April 2010. More than half the requests have come from registered nurses in their roles as safety educators in the operating room. Information regarding the DVD is available on the APSF website (www.apsf.org). Portions of the fire safety video will be utilized by the American Society of Anesthesiologists and the Food and Drug Administration in their safety and educational products.

NINSS Registry

APSF has funded the creation and maintenance of the Neurologic Injury after Non-Supine Shoulder Surgery (NINSS) registry to collect and analyze adverse neurologic outcomes following shoulder arthroscopy surgery. The NINSS Registry is being coordinated by Drs. Karen Domino, Lorri Lee, and Karen Posner at the University of Washington. Cases of central neurologic injury (brain or spinal cord) occurring after shoulder surgery in the non-supine position may be submitted to <http://depts.washington.edu/asacpp/nins/index.shtml>.

Conference on Monitoring Strategies to Detect Postoperative Respiratory Depression

APSF will sponsor a 1-day conference (June 8, 2011) in Phoenix, AZ, entitled *Essential Monitoring Strategies to Detect Clinically Significant Drug-Induced Respiratory Depression in the Postoperative Period*. The goals of this 1-day conference are to define the problem and identify electronic monitoring strategies that will provide early warning of clinically significant

respiratory depression. Experts from clinical medicine (nursing and physicians), industry (manufacturers of monitoring devices), hospital administration, insurance industry, regulatory agencies and families of injured patients will provide input. At the end of the day, the intention is to propose recommendations in the form of a consensus statement for continuous electronic monitoring of oxygenation and ventilation for patients receiving respiratory depressant drugs. The hope is these changes would result in a predictable and prompt improvement in patient safety.

Financial Support

Financial support to the APSF from individuals, specialty and components societies, and corporate partners in 2010 has been most gratifying. This sustained level of financial support makes possible the undertaking of new safety initiatives, the continuation of existing safety initiatives, and funding for anesthesia patient safety research. The level of research support is particularly dependent on the level of financial support received.

Online Donations

The APSF website permits “online” credit card contributions to APSF. Go to “Donate” on the APSF home page and follow the prompts.

25th Anniversary

The year 2010 represents the 25th anniversary of the formation of APSF. APSF was officially incorporated in September 1985 and the first *APSF Newsletter* was published in the spring of 1986. In recognition of this milestone APSF conducted a workshop moderated by Jeffrey B. Cooper, PhD, APSF Executive vice president entitled *A Celebration and 360° Assessment of the First 25 Years of the APSF: How do we continue to help reduce serious adverse events in the perioperative period?* Recommendations from the attendees and speakers at the workshop included inclusion of patient advocates in the future activities of APSF and the return to hardcopy publication and mailing of the *APSF Newsletter* while continuing the electronic version.

This workshop was followed by a celebration dinner and program that included comments from the early leaders in APSF’s formation (Ellison C. Pierce, Jr., MD, E. S. Siker, MD, Mrs. J. S. Gravenstein in memory of J. S. Gravenstein, Jeffrey B. Cooper, PhD, John H. Eichhorn, MD, Burton A. Dole, James F. Holzer, JD, and Michael Scott, Esq.). A complimentary 90-minute DVD of the celebration proceedings is available upon request (stoelting@apsf.org).

Concluding Thoughts

APSF wishes to thank retiring Board of Directors members, Rodney C. Lester, CRNA, William P. Schecter, MD, Michael A. Olympio, MD, Frederick W. Cheney, MD, and Robert Clark for their years of



Dr. Robert Stoelting, APSF President

service. Dr. Olympio is the immediate past chair of the APSF Committee on Technology. Dr. Cheney has been a director since 1987. Newly elected directors to replace these retiring directors are Maria Magro, CRNA, T. Forcht Dagi, MD, Jeffrey M. Feldman, MD, and A. William Paulsen, PhD. Dr. Cheney’s successor will be named in the near future.

As in the previous annual report, I wish to reiterate the desire of the APSF Executive Committee to provide a broad-based consensus on anesthesia patient safety issues. We welcome the comments and suggestions from all those who participate in the common goal of making anesthesia a safe experience. There remains much still to accomplish and everyone’s participation and contributions are important.

Best wishes for a prosperous and rewarding year 2011.

Robert K. Stoelting, MD
President

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APSF Celebrates its 25th Anniversary at the ASA Annual Meeting in San Diego, CA.



Pictured in photo are original members of the APSF Executive Committee (left to right) Dr. Jeffrey B. Cooper, Dr. E.S. Siker, Mr. James F. Holzer, JD, Mr. Burton A. Dole, and the first editor of the APSF Newsletter, Dr. John H. Eichhorn—all were present at the APSF 25th Anniversary celebration.



The late Dr. J. S. Gravenstein was honored at this historical event. Ms. J. S. Gravenstein and son, Dr. Nick Gravenstein, were both in attendance.



Dr. Ellison C (Jeep) Pierce, Jr., MD, founding president of APSF, addressed the anniversary celebration guests by video.



John J. McFadden, CRNA, PhD, Wanda Wilson, CRNA, PhD and Paul W. Santoro, CRNA.



Steven R. Sanford, JD and Timothy W. Vanderveen, PharmD.



Drs. Carol and Alexander Hammenberg with Dr. Stoelting.



Dr. Stoelting and Dr. Shaefer.



Drs. Michael and Georgia Olympio.