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President's Message

One Person's SWOT Analysis of Our Society



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ASCCA President

This is my penultimate piece for the "President's Message" section of the *Interchange*. As such, I thought it was appropriate to provide a "one person's analysis" of where we are as a Society and what may lie ahead. I have chosen to present my thoughts in the format of a SWOT (Strengths-Weaknesses-Opportunities-Threats) analysis of the ASCCA and the landscape we reside within. The SWOT may produce some findings of concern, but it is far worse not to be prepared than it is to make an honest assessment and take stock of one's path. A SWOT analysis can be broken down into two broad categories. The Strengths and Weaknesses components serve as an internal assessment, whereas the Opportunities and Threats sections are to help assess the external environment.

Please keep several important things in mind. First, a SWOT analysis is not the problem or the solution, but merely a tool to help identify areas for improvement. There are limitations to all performance improvement approaches

(e.g., SWOT, Lean Sigma), and in this case this SWOT is also limited by being a single individual's analysis. I hope that despite this and other limitations to a SWOT approach (some find the method too simplistic), it can help the Society and the practice of anesthesia-based critical care move forward.

Strengths

We are a small Society that offers great flexibility. We have a dedicated group of leaders who come from all practice types and regions and are a microcosm of our membership. Our membership and attendance at the Annual Meeting are both growing at a time when many professional societies are experiencing declines in these areas. Our members are passionate about what they do, and therefore quite clearly our greatest strength is *you* – the membership and its diversity. The Society is dedicated to research, as exemplified by donations to FAER and APSF and our joint research grant with FAER, funded in part by Hospira, Inc. We are dedicated to scholarly activity, as evidenced by our role in helping to choose the next Critical Care, Trauma and Resuscitation section editor for *Anesthesia & Analgesia*. We keep a relatively narrow focus on educational interventions, thus allowing us to streamline what we try to accomplish. In addition to our Annual Meeting's success, we have released a third edition of the *Residents' Guide to the ICU* and plans are already in place for a fourth edition. We have grown our resident and student membership numbers over the last three to five years, the true impact of which will be assailable in the near future.

The Society has never been overly dependent on corporate support. We contract out for professional management services and thus have very limited overhead. We gain great strength through our affiliation as a component society of the ASA,

and our Annual Meeting is enhanced by its proximity to the larger ASA Annual Meeting. We have been and continue to be significant players in the determination of the critical care track during the ASA Annual Meeting. We work well with others, underscored by numerous projects with ASA (e.g., anesthesia-ACLS between the ASCCA and the ASA Committee on Critical Care Medicine) and more recently the International Anesthesia Research Society (this year, we also launched a joint membership with IARS.)

In addition, we have served on and previously chaired the Critical Care Working Group, whose membership includes the Society of Critical Care Medicine (SCCM), American College of Chest Physicians and the American Trauma Society. We have been brought to the table by ASA for discussion on Physician Quality Reporting Initiative indicators and during the preliminary discussion on the creation of the Anesthesia Quality Institute (AQI).

We have always had some degree of international contribution – posters, abstracts and presentations at our annual meeting from international practitioners of critical care medicine – but in recent years this has increased even more. Last year, we changed our membership categories and updated our bylaws so that international members have full and equal rights as active members, thereby essentially eliminating the need for an international category. We also partner with the anesthesia section within the SCCM for the Burchardi Award, which is specifically designed to acknowledge the fostering of international relationships within critical care medicine. Our involvement in the *A&A* journal, which has a decidedly international scope, is further evidence of our commitment to the international community. Finally, our investigation into

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Membership in ASCCA is open to all anesthesiologists and residents in approved anesthesiology programs. Membership applications may be obtained by contacting ASCCA at (847) 825-5586 or through the ASCCA Web site at www.ascca.org/shop/index.php.

ASCCA Dues

Dues are \$150 for active members; \$100 for affiliate members and \$20 for residents/fellows. Dues may be paid online at www.ascca.org/shop/index.php by credit card or by mailing payment to the ASCCA office at 520 N. Northwest Highway, Park Ridge, IL 60068.

Remember, payment of your dues allows you to enjoy the full privileges of ASCCA membership.

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A Note from the Editor to ASCCA Members:

If you would like to contribute a review for a Fellowship Program at your institution in a future issue of the ASCCA Interchange, please contact Chris Dionne at c.dionne@asahq.org.

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One Person's SWOT Analysis of Our Society

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a name change for the organization (**Society Of Critical Care Anesthesiologists**) also opens the door for a stronger international position.

Weaknesses

We are a small Society and so have limited resources to withstand difficult times. These include limited membership and thus limited volunteers as well as limited funds. We are dependent on volunteers stepping up and then following through despite the many pressures they find themselves facing at work and on the home front. Our past leadership is only remotely involved, and in-depth engagement doesn't typically last much beyond the past president years. In truth, our reserves are quite meager when compared to large national societies. By utilizing a part-time management approach, we have no full-time, dedicated staff or CEO to initiate or follow up on possible relationships and projects. Funding sources are drying up, while concerns regarding conflicts of interest increase.

Although there are limits on the quantity of advocacy we can engage in given our not-for-profit tax status, we do not even get close to that limit. Areas that the ASCCA is not part of, but surely would be if it were a larger society, include the CPT and RUC process for creating and valuing codes.

Our major research award is dependent on external funding and not an endowment. Given the state of affairs in health care related to corporate funding, this is a concern.

Opportunities

Our greatest opportunity for growth is in the international community. As mentioned, this is now supported by our relationship with A&A, by the bylaws change and possibly by an upcoming vote on a name change. Involvement in the World Federation of Societies of Intensive and Critical Care Medicine should be evaluated and considered. Additional growth in the student, resident and fellow domains is also possible and should be informed by the results of our

recent efforts. We need to unlock the power and wisdom of our past leaders and reinvigorate their involvement in the Society.

Stronger partnerships and new developmental relationships with the ASA are possible. The maturation of A-ACLS to a marketable product will bring additional reputation and likely some royalty funds. Updated versions of the *Residents' Guide* that make it available in multiple formats for today's tech-savvy residents need to be entertained. This Society should be the principle driver behind development of the critical care material for MOC and marketable with/through the ASA, again bringing reputation and royalty funds to the table. Educators are seeking additional education-based tools and practitioners are seeking care/performance-based tools, and so both of these domains should be investigated. New participation with the AQL, which presently does not contain critical care data fields, is warranted.

Participation in a national trials network should be reviewed and considered as an additional member benefit as well as a statement about our commitment to research driving performance improvement. Especially given the focus of the government on comparative effectiveness, such a network is sorely needed. The present USCITG should be evaluated and, if deemed appropriate, partnerships established. Other opportunities to lead through innovation should be investigated and developed.

Involvement in advocacy efforts should be reevaluated. By being at the table for things like CPT, RUC and PQRI, we help establish ourselves as a significant player in the world of critical care and a go-to society for these activities.

Threats

Our biggest threat right now is the economy. Conflict-of-interest concerns have reduced the pool of funders and stipends, and the economy has further negatively impacted these potential supporters who simply have fewer total funds to support quality educational initiatives. The negative effects also extend to exhibitors who now exhibit at fewer activities, willing to accept smaller

spaces for lower rates. Thus external funding, although never large, is at risk and really no longer serves as a potential reserve pool. Moreover, the bad economy also means that rates for space, AV and banquet services are all rising.

Difficult financial times may also affect our membership, who now may be forced to make tough decisions about which societies they will belong to and/or which annual meetings to attend. This is especially pertinent because the professional societies and journals are all considering raising their dues and fees. For instance, as you might be aware, ASA has increased its membership dues and now has late registration fees for its annual meeting – a meeting that historically was free. On top of these personal financial stressors, many of the practices and institutions we work for are being negatively impacted and are limiting funding and travel. Many practices and organizations are also increasing clinical workloads and thus curtailing the time our membership has to volunteer for society work. This in effect is a triple whammy of potentially fewer members attending and purchasing fewer services while volunteering less.

These pressures effectively make all other societies, including ASA, a potential threat to ASCCA. This is an unfortunate circumstance that we must be aware of and manage carefully.

As my two-year term as your president approaches its last three months, I am encouraged that ASCCA will not only survive but will continue to thrive in the future. There is a strong leadership team in place dedicated to the mission of this Society. That team is interested in getting more of you involved. Simply contact the president-elect, and he will help guide you onto appropriate committees. Through mechanisms such as this SWOT analysis and greater engagement of the members, the leadership is looking ahead and working to ensure that we have a strong future not only as a professional organization and an educational resource, but as a Society dedicated to improving the care of the critically ill and injured worldwide.

Perioperative Management of a Patient With Nasopharyngeal Cancer and Internal Carotid Artery Erosion Undergoing Embolization of Internal Carotid Artery



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Introduction

Nasopharyngeal carcinoma is a malignant neoplasm that originates in the mucosal epithelium of the nasopharynx. These tumors necrotize easily and have an increased risk of local infiltration and invasion of adjacent structures, including the carotid artery. Treatment of these tumors includes chemotherapy and radiation therapy. The latter is usually used as an adjuvant to chemotherapy and might increase the risk of local tissue necrosis and damage to adjacent structures. In this report, we discuss the perioperative management of a patient with a nasopharyngeal tumor that had invaded the internal carotid artery.

Case Report

A 72-year-old woman with a history of nasopharyngeal tumor, which was diagnosed in 2001 and treated with chemotherapy and radiation, presented to another hospital with pulsatile bleeding from the right ear and oral

cavity. She received stabilizing treatment in the form of compressive dressing to the right ear and transfusion of 8 units of packed RBCs over 48 hours through a left subclavian central catheter. During her hospitalization at the other hospital, she also had an angiogram of the carotid circulation, which showed ulceration and pseudo-aneurysm of the distal right cervical internal carotid artery. She was transferred to our hospital for definitive treatment of the bleeding by our interventional radiology (IR) department. Upon presentation to our emergency department, the patient was still pale. She was responding appropriately but feeling weak and lethargic. Her pulse was 80/min and Blood pressure 84/53 mmHg. She was in no respiratory distress, breathing spontaneously with supplemental oxygen via nasal cannula with an oxygen saturation of 98 percent. Her hemoglobin was 8.8 g/dL and hematocrit 27 percent. Her right ear dressing was changed, and she was admitted to the medical-surgical intensive care unit (MSICU) for further treatment and monitoring where she received two more units of PRBCs, which increased her hematocrit to 33.7 percent. She was seen and evaluated by

the IR department, and the plan was to perform urgent angiogram and embolization of the right internal carotid artery.¹ In preparation for the planned interventional procedure, a right radial arterial catheter was inserted under local anesthesia. A fiberoptic examination by ENT revealed a patent airway, with normal larynx and no evidence of bleeding.

Anesthesia consult was requested for pre-operative assessment and plan. On pre-anesthetic assessment, the patient was alert, responsive and had a compressive dressing over the right ear. Her pulse was 86/min, blood pressure was 104/62 mm Hg, height 5' 2" and weight 52 kg. Oral cavity examination revealed no mass with Malampatti grade of II. Clots were noted in both nostrils. Chest was clear and heart sounds were normal. The plan was to perform general anesthesia with invasive monitoring of blood pressure and CVP via existing catheters. Informed consent was obtained, and the patient was transferred to the IR suite for the procedure. Factors influencing the decision about airway management included the possibility of bleeding from soft tissue during laryngoscopy, hypertension-induced bleeding during laryngoscopy, and limited soft tissue displacement due to previous radiation therapy to the neck. Therefore, the plan was to perform asleep fiberoptic intubation with meticulous blood pressure control.

In the IR suite, standard ASA monitors were applied. The patient's initial blood pressure was 108/62 mm Hg, and her heart rate was 82/min. A nitroglycerin (NTG) infusion was prepared in order to treat any hypertensive episode during intubation. Intravenous versed 1 mg and fentanyl 50 mcg were given immediately pre-induction. Anesthesia induction was performed with intravenous lidocaine 80 mg and propofol 100 mg. After confirming the adequacy of mask ventilation, muscle relaxation was provided with intravenous rocuronium 40 mg. Fiberoptic scope was inserted orally, no oral airway was placed to avoid any trauma, the tongue was



Figure 1: Angiographic Visualization of the Right Internal Carotid Artery

pulled out by an assistant, fiberoptic scope was advanced, resulting in easy visualization of vocal cords, and an endotracheal tube size 6.5 ID was placed into the trachea atraumatically and positioned above the carina. During fiberoptic intubation, blood pressure was maintained between 100 and 110 mm Hg with the use of NTG infusion for less than one minute. Anesthesia was maintained with inhalational sevoflurane in a mixture of oxygen and air (50:50), plus intermittent doses of intravenous fentanyl (200 mcg total) and rocoronium (30 mg total).

The procedure consisted of trans-femoral access to the right internal carotid artery, angiography [Figure 1], detection of bleeding in the cervical internal carotid artery and control of bleeding by inserting multiple coils [Figure 2]. Further angiography of the circle of Willis revealed patent anterior and posterior communicating arteries. Early during the procedure, bleeding was noted from the right ear and mouth, which was treated with oral packing and compressive dressings to the ear. Total estimated blood loss during the procedure was 900 ml, and the patient was transfused four units of PRBCs. In view of continuous oozing from the ear and mouth, two units of fresh frozen plasma and one unit of platelets were transfused.

Because of the presence of airway packing, it was decided to keep the patient intubated in the immediate postoperative period. The patient was transferred back to the MSICU intubated and sedated. Due to concerns over the risk of stroke due to coil-occlusion of the right internal carotid, triple-H therapy (hypervolemia, hemodilution and hypertension) was initiated postoperatively in order to improve collateral perfusion through the circle of Willis. Systolic blood pressure was kept in the range of 160-200 mmHg with the help of norepinephrine infusion. In addition, to reduce cerebral metabolic rate of oxygen (CMRO₂), mild active hypothermia was utilized to keep the patient's core temperature around 35°C using a cooling blanket. Postoperatively, the patient was kept sedated for two days using



Figure 2: Coiling of the Right Cervical Internal Carotid Artery

infusions of propofol (75-100 mcg/kg/min) and fentanyl (75 mcg/h) with daily interruption of infusion for neurological examination. On postoperative day number two, the patient was noted to have left hemiplegia, and it was decided to perform a CT angiogram to detect the adequacy of collateral circulation. The CT angiogram revealed a right temporo-parietal hypodensity with relative hypoperfusion of the right frontal lobe consistent with ischemic stroke. The patient was kept intubated two more days, and on the fourth postoperative day the patient was extubated after confirmation of adequate respiratory parameters (rapid shallow breathing index [RSBI, respiratory rate/tidal volume in liters] = 60-70 and a negative inspiratory force [NIF] = -20 cm H₂O). The left hemiplegia persisted, and the patient was transferred on postoperative day seven to the neurology service for further care and subsequently was transferred to a rehabilitation facility.

Discussion

Embolization of a major artery can be performed under local anesthesia with sedation and monitored anesthesia care (MAC) or

general anesthesia. Factors influencing the choice of anesthesia include the patient's condition, procedure duration and complexity, and the experience of the interventional radiologist. Performing the procedure under local anesthesia carries the advantage of observing neurologic changes during the procedure. In our patient, using local anesthesia without airway control would have been unsafe because the patient was at high risk for airway compromise due to oral bleeding. The safest option in our patient was to use general anesthesia.

Anesthetic goals during carotid vascular procedures include precise control of blood pressure, ensuring patient immobility and comfort, and allowing perioperative neurological evaluation of the patients.² Pre-operatively, baseline blood pressure should be documented as a reference for tolerable range of blood pressure changes intraoperatively. Invasive monitoring of arterial blood pressure is required for accurate and continuous measurement of blood pressure. In the case that radial artery access is not possible, blood pressure can be directly monitored via the femoral introducer sheath. Blood products should be available for transfusion as needed. Wide-bore intravenous catheters are required for fluid resuscitation, and a central venous catheter is required for infusion of vasopressor drugs.

To avoid the risk of bleeding or ischemia, blood pressure fluctuations should be minimized by having rapidly acting vasopressor and vasodilator drugs readily available. In our patient, nitroglycerin infusion coupled with fiberoptic intubation was used to minimize the risk of bleeding and potential airway compromise. Before embolization, blood pressure should be kept relatively low, which in our case was achieved using inhalational anesthesia. Nitrous oxide should be avoided to minimize the risk of enlargement of air bubbles that might occur during injection of contrast.

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PRO: The Resuscitation is Going Well: Does My Patient Need a Central Line?



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There have been significant improvements in overall mortality and morbidity from severe sepsis and septic shock in the past decade. These gains can be attributed to a number of interventions, including the surviving sepsis guidelines for guiding initial resuscitation in the septic patient.¹

Assessing the volume status and responsiveness of the critically ill patient in any clinical condition, excluding pink froth or sweating dist, is very difficult. Using the CVP can help optimize cardiac filling pressures in the hyperdynamic state of septic shock and improve overall cardiac function and tissue perfusion. Rivers showed that using goal-directed therapy that includes CVP and CvO₂, improved overall mortality in patients in septic shock.²

In addition to assessing volume status, the placement of a central line allows the delivery of vasopressors and inotropes, for which peripheral I.V.s are unsafe.³ The absence of a central line may negatively influence the decision to initiate vasopressors.

The use of ultrasound significantly decreases complications of line placement, and it improves the chances of success.⁴ Additionally, the implementation of an evidence-based intervention decreases the risk of central line-associated blood stream infections in the ICU.⁵

Caring for the patient with severe sepsis or septic shock is complicated, and clinicians need all the help they can get. Central lines help to guide fluid management, deliver vasoactive medications, and technology makes their

insertion safer, which makes them a valuable tool for the critical care physician in treating the septic patient.

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ASCCA-FAER-HOSPIRA PHYSICIAN SCIENTIST AWARD

The ASCCA is pleased to announce that one of the 2009 ASCCA-FAER-Hospira Physician Scientist Award winners, Jennifer Lee, M.D. (Johns Hopkins University), has been named an International Anesthesia Research Society clinical scholar research award winner as well for her work, "Non-Invasively Monitoring Cerebrovascular Autoregulation After Pediatric Cardiac Arrest."

CON: The Resuscitation is Going Well: Does My Patient Need a Central Line?



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Critically ill patients often receive invasive monitoring with the goal to optimize cardiac output by maintaining adequate pre-load.¹ The question arises, “Do I need a central line to do that?” BP, UO, mental status, lab values, and systolic pressure variation via arterial line can guide management, and 15 percent of central catheters are complicated by infection and vascular injury.²

Central access may be beneficial in some cases, but the astute physician knows how CVP values suffer in the settings of right heart failure, pulmonary hypertension, tricuspid regurgitation, abdominal distension, and positive pressure ventilation.^{3,4} If the practitioner can elucidate the value of a CVP data point in this environment, the same practitioner can guide resuscitation based on clinical criteria. Trials

and errors have topped the Swan.⁵ Why does CvO₂ trump the intensivist now? If the question is fluids versus pressors, data reinforce the utility of pulse pressure variation for fluid responsiveness.⁶ The arterial line may be as useful as that central line, but more than a standard deviation safer.

Data clearly define risks surrounding central access. Assuming the benefit of 3D or real-time ultrasound, the risk of access is not zero.⁷ Even if cutting-edge multidimensional-guided central access makes placement safe, catheter-associated bloodstream infections are waiting to ruin a perfectly good resuscitation.

“Even if cutting-edge multidimensional-guided central access makes placement safe, catheter-associated bloodstream infections are waiting to ruin a perfectly good resuscitation.”

Protocol-driven care describes value in numbers. While blood pressures and urine output are numbers with a great margin of safety, CVP and CvO₂ have biphasic risk profiles. These profiles are manageable by pulse pressure variation via arterial line. Physicians can drive protocols to goals with safer numbers. The septic patient is sick enough.

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PRO: The Flip Side of Prone Ventilation



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Benefits of prone positioning during hypoxic respiratory failure include improved oxygenation and a decreased incidence of ventilator-associated pneumonia.^{2,6,10,12-20} Oxygenation improvement, due to better ventilation perfusion match, is observed as an increase in PaO₂/FiO₂ ratio in one to three days, especially in the first hour of prone maneuver.⁷ This improvement is believed to be higher when prone positioning is done earlier and provided in longer durations.^{5, 20} Despite the relatively high rate of complications, prone positioning was considered safe by several studies, due to reversibility.^{7,15,20} Decreased incidence of VAP was attributed to better drainage of respiratory secretions and minimizing aspiration in prone position.^{14,18}

Except a few studies,^{5,9,20} prone positioning during mechanical ventilation has failed to show any significant reduction in mortality rates. This failure is attributed to ventilator-associated lung injury (VILI) masking the improvement from oxygenation. Gattinoni et al. recently showed that PaO₂ responders (P/F ratio increase > 20

mmHg) and PaO₂ non-responders did not show any mortality difference from prone ventilation, whereas PaCO₂ responders (PaCO₂ < 1mmHg by proning) had improved survival.⁹ This finding also supports the view that, without controlling VILI, benefits from prone positioning may not have long-term influence.

A recent Prone Supine II study detected a 10-percent reduction in six-month mortality among the severely hypoxic patient subgroup (P/F<100).¹⁰ However, this finding was insignificant due to underpowered study population. According to several editorials¹⁻¹¹ prone positioning should be tried as a last resort on severely hypoxic patients. Although prone positioning does not promise anything further than better oxygenation, improved oxygenation during prone ventilation may still contribute to short-term improved outcome by providing time for recovery.

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CON: The Flip Side of Prone Ventilation



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There is no doubt that proning has physiological benefits, including improved oxygenation in 70 percent of patients by enhancing ventilation-perfusion matching. It improves lung protection, increases alveolar recruitment, improves pulmonary compliance and helps mobilize secretions.

However, clinical studies have failed to convincingly reveal a clinical benefit in outcomes despite physiological benefits. Furthermore, many studies have been methodologically flawed and underpowered and limit our ability to apply results to patient care. The most recent randomized study by Taccone et al. in *JAMA* in

November 2009 stratified patients with moderate ($100 >P/F < 200$) versus severe hypoxemia ($P/F < 100$). Neither group revealed a survival advantage, although there was a non-significant trend toward lower mortality in the severe hypoxemia group, but complications were increased in the prone group.

Furthermore, studies of prone positioning have not achieved mechanical ventilation with tidal volumes of 6 ml/kg, a strategy shown to have a significant mortality benefit by the ARDS network investigators in 2000. Failure to achieve this mechanical ventilation lung protective strategy invites doubt to any positive

illness polyneuromyopathy and delirium, respectively. Prone positioning increases worker requirements and increases cost. Safe proning requires a commercially-designed device, and there is not enough evidence to support the purchase of these expensive beds by hospitals. Finally, there is little guidance by proponents of prone positioning with regard to the dose and duration of proning.

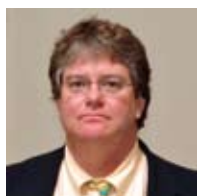
Despite the physiologic benefits of prone positioning, there is little supportive evidence of clinical benefit to support the use of proning in moderately and severely hypoxemic patients with ARDS.

“Prone positioning is associated with complications, including facial edema, dislodged intravascular catheters, dislodged tube thoracostomies, inadvertent extubations, pressure ulcers, vomiting and endotracheal tube obstruction.”

result from prone positioning studies unless this low tidal volume lung protective strategy is achieved during the prone studies.

Prone positioning is associated with complications, including facial edema, dislodged intravascular catheters, dislodged tube thoracostomies, inadvertent extubations, pressure ulcers, vomiting and endotracheal tube obstruction. Also, prone positioning is associated with greater use of pharmacologic paralysis and sedation, increasing the risk of critical

Critical Care Fellowship Review: Massachusetts General Hospital



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The Anesthesia Critical Care Fellowship at Mass General Hospital (MGH) boasts a strong emphasis in acute care surgical patients, particularly trauma, major vascular, thoracic and general surgery. Participating fellows have backgrounds rooted in anesthesia, surgery and emergency medicine. The ABA and RRC-approved fellowship lasts 12 months. The current class of fellows comprises four anesthesiologists, two surgeons and one emergency medicine physician. The surgeons get certified in critical care medicine through the ACS, but the American College of Emergency Medicine currently does not grant a certificate of added qualification for graduates of the MGH fellowship.

The two key leaders of this effort are Fellowship Director Ed Bittner, M.D., Ph.D., and the director of the SICU section in the Department of Anesthesia and Critical Care (DACC) at MGH, Ulrich Schmidt, M.D., Ph.D. More than a dozen faculty trained in either anesthesia, acute care surgery or emergency medicine provide a multidisciplinary approach to conducting rounds and leading the didactic mission of the fellowship. Two critical care teams during the day round with one attending and one fellow, covering 10 patients each. At night, providing 24-hour coverage, there is a different in-house attending and fellow with residents completing the call team. Patients are presented by the residents on rounds, which opens a discussion of management, facilitated either by fellows or attendings.

The formal didactic program is comprehensive: Faculty members give morning lectures to the house staff and fellows daily. They may also present to the DACC at large during Departmental Case Conferences (these are interesting cases with a critical care focus.) There is a lunchtime lecture once or twice weekly from the FCCS curriculum, a trauma lecture once weekly, and a bedside trauma lecture weekly. Daily radiologist rounds are conducted to review all films. There is an integrated ethics component to the didactic lectures in the form of a bi-weekly ethics rounds. Monthly morbidity and mortality rounds discuss reintubations, readmissions, near misses and mortality.

Fellows participate by presenting several lectures throughout the year to the DACC or to a combined pulmonary-anesthesia critical care audience. Topics the fellows present are either interesting cases or reviews of broad critical care topics (sepsis guidelines, hypothermia, glycemic control, etc.). The fellows also organize and present two or three journal clubs throughout the year.

The fellowship is largely clinical. The strongest component, or emphasis, is in the surgical ICU, where fellows are encouraged to act as junior faculty by leading rounds while both supervising and teaching residents. While not in the SICU, fellows have the opportunity to spend time learning from clinicians in other departments, such as in the neuro ICU, MICU, radiology suite, renal medicine department, ID department, transfusion lab, palliative care service, pulmonology/bronchoscopy suite, percutaneous tracheostomy service, burn unit, and in the ventilating Respiratory Acute Care Unit (RACU). The experience in the RACU allows fellows to learn about complicated pulmonary mechanics and other unusual pulmonary presentations and care for patients who ordinarily would be transferred to LTAC or rehabilitation facilities.

To augment the in-house rotations, MGH has arranged for fellows to spend a month in the cardiac SICU at Beth Israel Deaconess Hospital in the Longwood Medical Area, near Harvard

Medical School and a host of other medical and biotechnological institutions. The primary objective of this rotation is to learn TTE. The BID rotation has gotten rave reviews, and the fellows are now doing surface echo on all patients with confusing clinical pictures in their own SICU.

Although individual fellows are encouraged to participate in the huge and varied ongoing research projects at MGH, the fellowship year has no required research component. The primarily clinical emphasis may seem paradoxical, given the incredible strength and expertise in research at the MGH campus – specifically within the department of critical care – and the surrounding Boston metropolitan region: Longwood Medical Area, Harvard Medical School and Harvard University's College of Arts and Sciences, Massachusetts Institute of Technology, and many, many biotechnology and information technology concerns, small startups, and also big pharma research laboratories and major private institutes (e.g., Novartis, the Broad Institute and the Whitehead Institute in Cambridge, and Merck Laboratories in Boston' Longwood Medical Area). Fellows have four weeks' vacation to access what the area offers, with an additional week for attending a national conference such as the SCCM's.

MGH's anesthesia CCM fellowship is indisputably one of the best. But alongside all this intramural activity are the city of Boston, Cape Cod, Martha's Vineyard and Nantucket Island. To mention only one site: One may, routinely, on a lunch or afternoon coffee break, have a seat in the MGH Bulfinch Building's Ether Dome and ponder the imposing historical atmosphere of the room. But there may be a lecture going on inside; the Ether Dome is still on-line as a lecture hall for the *New England Journal of Medicine's* Case Records and other lectures. The mix of historical site and ongoing day-to-day activity is always an interesting surprise to the Boston newcomer.

Critical Fellowship Review: Mayo Clinic Anesthesiology



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The Anesthesiology/Critical Care Medicine service at the Mayo Clinic <http://www.mayo.edu/msgme/criticalcare-rch.html> was a pioneer in establishing intensive care units in the institution in the middle part of the last century. Since then, we have provided state-of-the-art care for thousands of critically ill medical and surgical patients and trained scores of fellows in critical care medicine.

We are an ACGME-accredited anesthesiology/critical care fellowship located in Rochester, Minnesota. Most of the training takes place at the two Mayo Clinic hospitals in Rochester: Saint Marys Hospital and Rochester Methodist Hospital. Between these two hospitals, there are just over 200 critical care beds providing ample learning opportunities and experience in critical care medicine. Fellows are also able to complete elective rotations at Mayo Clinic Florida or Mayo Clinic Arizona.

Our program prides itself on the multidisciplinary training we offer. Fellows gain a wide range of critical care experience in both medical and surgical intensive care units, including opportunities in the trauma ICU, cardiac care unit, the cardiac surgery ICU and the pediatric ICU. In these places, fellows learn clinical features and physiology of disease states that lead to acute, life-threatening illnesses, pharmacology of therapeutic agents used in critical care medicine, technical skills involved in monitoring, airway maintenance, and mechanical ventilation and the theory and practical management of invasive and noninvasive monitoring systems

and a twice monthly clinical pathologic case conference. Fellows also participate in resident education both at the bedside and in daily didactic sessions.

Fellows are encouraged to complete a project for submission to a peer-reviewed journal. All fellows present at the annual fellows' research conference held each spring. At the start of the academic year, fellows receive instruction in basic research design and biostatistics. Once their research interest is identified, a research mentor is chosen to assist with their project. Mayo Clinic has an extensive and well-developed electronic medical record that not

“We have a state-of-the-art simulation center that opened in 2005 that not only provides training opportunities with high-fidelity simulators but also the chance to design and implement simulation training programs in the experiential education elective.”

We also offer dedicated specialty training in a variety of related fields, including bronchoscopy, infectious diseases, nephrology and nutrition. Fellows have the opportunity to pursue further elective training in various disciplines such as echocardiography, research and neuro-critical care. We have a state-of-the-art simulation center that opened in 2005 that not only provides training opportunities with high-fidelity simulators but also the chance to design and implement simulation training programs in the experiential education elective.

In addition to extensive clinical experience, we offer a solid didactic experience as well. A fellows' core curriculum conference is given one to two times a week covering core critical care topics. In addition, there is a fellows' journal club, weekly critical care grand rounds

only facilitates patient care but also provides ample data for clinical research studies.

Rochester, Minnesota is a safe, clean and livable city in the upper Midwest. It is family-friendly with good schools and affordable housing. Rochester International Airport provides convenient airline service to Minneapolis-Saint Paul and Chicago. Minneapolis and Saint Paul are a short drive away and offer the attractions of a larger city.

The Anesthesiology/Critical Care fellowship at Mayo Clinic provides an outstanding training opportunity in critical care medicine in an ideal location. Interested applicants should contact the fellowship at CCMEDCOORDINATORS@mayo.edu for more information.

Multidisciplinary Fellowship in Critical Care Medicine at the University of Washington, Department of Anesthesiology and Pain Medicine



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Fellow, Anesthesiology Critical
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Steven Deem, M.D.
Associate Professor of Anesthe-
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Pulmonary and Critical Care)
Program Director, Critical Care
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University of Washington
Harborview Medical Center
Seattle, Washington

Fellowship Review: Introduction

The University of Washington (UW) Department of Anesthesiology and Pain Medicine offers a one-year ACGME-accredited fellowship in critical care medicine. Additionally, the department offers a five-year combined residency/fellowship track for those who will be entering anesthesiology training through the Match. The fellowship program works in collaboration with the Pulmonary and Critical Care program and the Trauma and Surgical Critical Care program. Fellows rotate through a broad mix of ICUs within the UW system in a schedule that is integrated with the Pulmonary Critical Care fellowship. The Critical Care Division of the Anesthesiology Department includes 12 faculty who are trained in critical care medicine and who contribute to the education of critical care fellows.

Rotations

Fellows split their time between three clinical sites within Seattle, with the majority of time spent at Harborview Medical Center and the University of Washington Medical Center (UWMC). The UWMC offers fellows several ICU services. The medical ICU service cares for a variety of patients, including post-operative liver transplant and long-term lung transplant patients as well as more “routine” medically ill patients. The fellow guides a team of housestaff

composed of interns and internal medicine R2s. Oversight is provided by faculty from pulmonary and critical care. The fellow takes calls for outside transfers from throughout the Pacific Northwest and is responsible for triaging transfers. The surgical ICU service cares for post-operative surgical patients from general surgery, neurosurgery, ENT, urology, plastics, orthopedics and some obstetrics. The fellow oversees a group of housestaff from anesthesiology, surgery and emergency medicine. Critical care faculty on this service are from general surgery, anesthesiology, and pulmonary critical care. Call for fellows on these services is from home. Additionally, at UWMC fellows rotate on the Seattle Cancer Care Alliance service. Fellows work one-on-one with a pulmonary critical care attending in a co-management role with the hematology/oncology teams. Patients on this service are a mix of bone marrow transplant and solid organ malignancy patients requiring ICU care. This service provides a great opportunity to work with a unique patient population and provides an opportunity to become facile with bronchoscopy as a tool for the evaluation of immunocompromised patients. Finally, fellows spend a month on the heart failure cardiology service. This service cares for severe heart failure patients, pre- and post-cardiac transplant patients and patients preparing for ventricular assist devices. Coverage is arranged so fellows have ample time to perform right-heart catheterization in the cath lab and perform and interpret transthoracic echocardiograms.

Harborview Medical Center is the hospital for King County, and it is also the only level one trauma center in a five-state region (Washington, Wyoming, Alaska, Montana and Idaho, or “WWAMI”). The hospital is owned by the county but managed by the University of Washington. Fellows rotate on three services at Harborview. The neurocritical care service is directed by the department of anesthesiology and provides care for neurosurgical trauma patients with isolated spine and head injuries and for patients

with a variety of neurovascular problems such as subarachnoid hemorrhage. Fellows work with housestaff from anesthesiology, emergency medicine and neurosurgery, and faculty from anesthesiology and pulmonary critical care. Fellows also rotate on the trauma/surgical ICU service. This service manages a large volume of trauma patients from throughout the region, in addition to general, vascular and thoracic surgical patients in a “closed” ICU model. Residents on the service come from anesthesiology and surgery, and critical care faculty are from anesthesiology, pulmonary critical care and trauma surgery. Finally, the busy Harborview MICU service cares for critically ill patients with medical problems from the surrounding area and WWAMI region. Residents on this service are from internal medicine, and faculty are from pulmonary critical care. Like the UWMC, call for fellows on Harborview ICU services is from home.

The third site is the Veterans Affairs Puget Sound Health Care System, where fellows rotate through the surgical ICU service. This service cares for a variety of postoperative patients, including post-cardiac surgery patients. This service is directed by the anesthesiology department. Residents on this service are from anesthesiology and surgery, and faculty are predominantly from anesthesiology and surgery as well.

Education

A variety of structured educational opportunities exist in addition to ongoing clinical education. The anesthesiology critical care division holds a quarterly journal club meeting for faculty, fellows and combined program trainees. Fellows also take part in the pulmonary division’s weekly Chest Conference, a CPC-type format where fellows present teaching cases for attendings to discuss. This conference is followed by a didactic session each week as well.

Continued on page 13

Perioperative Management of a Patient With Nasopharyngeal Cancer...

Continued from page 12

Each rotation also has specific didactics, and a weekly multidisciplinary critical care journal club takes place at Harborview. An extensive array of research-based journal clubs and conferences are available through the fellowship.

Research Opportunities

Harborview Medical Center and the University of Washington have an illustrious history of leadership in research in critical care medicine. The Critical Care Division of the Department of Anesthesiology and Pain Medicine is actively involved in outcomes-based research at Harborview Medical Center, providing opportunities for critical care fellows to gain exposure to clinical research. For trainees interested in more in-depth research training with the intent to pursue an academic career, several opportunities exist. The department offers a two-year research fellowship in basic science or clinical research for trainees interested in focused research training. Another mechanism for research training is present in the form of research “faculty-fellowships” that combine clinical work with basic science or clinical research training.

Summary

Overall, the fellowship offers training in a great variety of ICU settings, with an equally diverse patient population. The exposure to faculty and fellows from several departments, including anesthesiology, pulmonary critical care and surgery is also a great strength of the fellowship. Exposure to research and additional research training are available to interested trainees. For more information about the fellowship, please contact:

Steven Deem, M.D., Program Director, at sdeem@u.washington.edu.

Kati Kosvegvari, Program Coordinator, at katibell@u.washington.edu.

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A bladder catheter is needed to monitor urine output since large amount of heparinized saline can be infused by the radiologist in addition to intravenous fluids and blood products and due to the need of promoting diuresis to excrete the injected contrast media.

Vascular rupture can occur during angiogram and coiling. In such a case, the IR team can attempt to control the rupture site endovascularly while the anesthesiology team can transiently induce hypotension in addition to reversing heparin action with protamine. Other possible complications include displacement of coil, coil fracture, thromboembolism, arrhythmias, contrast-induced allergic reactions and nephropathy, and groin or retroperitoneal hematomas.³ Postoperatively, the risk of stroke can be minimized by deliberate hypertension to improve collateral perfusion, avoidance of hyperthermia, therapeutic hypothermia to reduce CMRO₂,⁴ controlling blood sugar, maintaining hematocrit around 30-34 percent and avoiding any shivering response to avoid increased oxygen consumption. In elective cases, a carotid artery occlusion test can be performed beforehand to assess the adequacy of collateral circulation. This was not feasible in our patient due to the urgency of the case.

Conclusion

Anesthetic considerations during embolization of internal carotid artery lesion by IR include:

1. Wide-bore intravenous access, arterial catheter and possibly central venous catheter.
2. Precise control of blood pressure and an immobile, pain-free patient.
3. Low blood pressure before embolization (in the low range of baseline blood pressure).
4. Being prepared to induce hypotension as part of the treatment of vascular rupture.

Postoperative considerations include:

1. The use of triple-H therapy (hypertension, hypervolemia, hemodilution) to improve collateral perfusion.
2. Neuroprotection by avoiding any factor, which may increase CMRO₂, such as fever, shivering or convulsion.
3. Strict blood sugar control.
4. Frequent neurological examination.

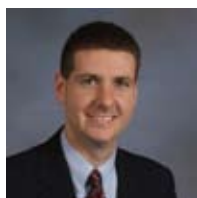
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Literature Review: Prophylactic Intravenous Magnesium Sulfate for Treatment of Aneurysmal Subarachnoid Hemorrhage



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Article:

Westermaier T, Stetter C, Vince GH, Pham M, Tejon JP, Eriskat J, Kunze E, Matthies C, Ernestus RI, Solymosi L, Roosen K. Prophylactic intravenous magnesium sulfate for treatment of aneurysmal subarachnoid hemorrhage: a randomized, placebo-controlled, clinical study. *Crit Care Med.* 2010; 38(5):1284-1290.

Literature Review:

The prevention of cerebral vasospasm after aneurysmal subarachnoid hemorrhage (SAH) remains an important medical problem as it may result in significant additional neurologic injury. Magnesium therapy has been previously studied as an adjunct therapy to prevent post-SAH cerebral vasospasm; however, its effect has not been conclusively demonstrated in a large, prospective study. Based on previously published animal studies and the known variability in serum levels with fixed dosing regimens, Westermaier and colleagues investigated the effect of a targeted serum magnesium level

to assess the role of magnesium administration to prevent post-SAH cerebral vasospasm.

One-hundred seven patients with SAH were prospectively randomized to receive either standard management plus a magnesium-infusion titrated to a targeted serum level (2.0-2.5mmol/L) or to the control group. The control group received angiography and aneurysm treatment as appropriate per the attending neurosurgeon, additionally being managed with target hematocrit 33-35 percent, CVP 10-12mmHg, and MAP 90-100mmHg (standard management). The primary outcome measured was delayed ischemic infarction, while delayed ischemic neurologic deficit and vasospasm were also measured. With minimal side effects, the authors demonstrated a significant reduction ($p=0.002$) in delayed ischemic infarction (51 percent to 21 percent) and in Doppler-detected/angiographic

This study adds to the growing body of evidence that suggests that magnesium therapy may have a role in the reduction of morbidity associated with aneurysmal SAH. Limitations to this study include the recruitment of patients from only a single institution and treatment duration of only 10 days (followed by a taper). It is worth noting that therapy-limiting side effects of magnesium infusion, such as severe bradycardia and hypotension, were not significantly observed in this study. While further and larger evaluations of magnesium's role in this setting are still needed, in a culture of increasing emphasis on cost control and a world of limited access to care, magnesium therapy may represent an inexpensive, easily accessible mode of therapy to reduce the severe morbidity associated with aneurysmal SAH.

“This study adds to the growing body of evidence that suggests that magnesium therapy may have a role in the reduction of morbidity associated with aneurysmal SAH.”

vasospasm. It was also noted that patients who received magnesium therapy and developed vasospasm demonstrated a lower rate of delayed cerebral infarction, possibly signifying a neuroprotective effect of magnesium. The incidence of delayed ischemic neurologic deficit trended toward a nonsignificant reduction. Clinical outcome, as assessed by six-month Glasgow outcome scale, showed a nonsignificant trend toward improvement as well.



PROGRAM HIGHLIGHTS

Obstetrical Critical Care Update

Obesity in the ICU and Postoperative Care for the Bariatric Patient

ICU Pharmacology: What's New in 2010?

FAER Grant Recipient Lecture: "Molecular Mechanisms of Regional Lung Dysfunction in Ventilator- Associated Lung Injury"

Luncheon Lecture: "Regional Anesthesia in Austere Environments and Battlefields. Lessons Learned From Iraq and Afghanistan"

Ethics Debate: Interactive Session on Donation After Cardiac Death (DCD)

Infectious Disease Update

Perioperative Care of the Patient for Pulmonary Thromboembolism

Education and Competencies in the ICU

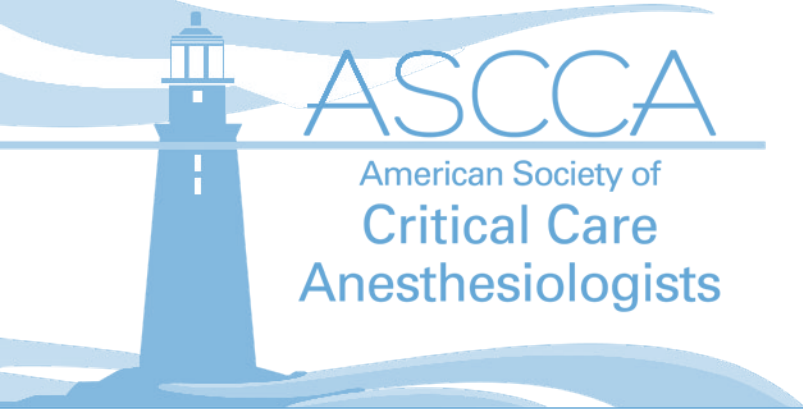
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