N E W S L E T T E R

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President's Column

Brenda G. Fahy, M.D., F.C.C.M.

SOCCA members are well aware of the opportunities and challenges associated with the practice of critical care medicine – as well as the value of combined anesthesiology and critical care medicine training to critically ill patients. At the same time, some anesthesia colleagues have suggested there are limited roles for critical care anesthesiologists. Critical care physicians, with their specialized training and abilities, will be needed to treat the highest-acuity patients whether in a "traditional" intensive care unit or other hospital setting. In the United States and elsewhere, this demand for critical care physicians is predicted to continue to increase with a resultant shortage of critical care physicians.

The unique skills of critical care anesthesiologists provide value added within hospital systems and thus further increase the demand for critical care anesthesiologists. The practice of critical care anesthesiology involves immersion in the high-acuity hospital setting and thus entails more than daily "rounds" in an intensive care unit. Critical care anesthesiologists manage critical care units and thus critical care resources. The intensive care units consume a large portion of hospital resources, with critical care anesthesiologists responsible for utilizing these resources appropriately within their hospital settings. As a result, critical care anesthesiologists are by the nature of their roles intimately involved in hospital functions. These include quality-of-care initiatives and patient safety, processes to improve the delivery of care, approaches to improve efficiency of care, and development of clinical protocols and guidelines, among others. The key contributions of critical care anesthesiologists within their institutions and the experience and exposure gained through these efforts prepare and poise them for health care leadership roles. The background provided by the continuous interactions with other services and hospital functions while caring for critically ill patients provides an understanding of the perioperative flow of patients through the enterprise.

As a result of the roles assumed by and the value critical care anesthesiologists provide to the institution, they are in a good position to provide career guidance and mentoring to anesthesia residents. Most critical care anesthesiologists have diverse experiences in the care of patients in the operating room as well as the ICU and can provide a broad perspective of career opportunities in anesthesiology, including, but not limited to, critical care medicine.

Critical care anesthesiologists can serve as mentors for anesthesiology residents and encourage medical student interest to consider anesthesiology and critical care medicine as career options. In this capacity, they can ensure that trainees are cognizant of the wide range of options offered by anesthesiology and critical care medicine with extensive career paths, including diverse clinical practice opportunities, as well as the ability to have administrative, education and other leadership roles within either academic or community settings.

This issue of the newsletter highlights the SOCCA Annual Meeting scheduled for October 11, 2013 in San Francisco with an optional ultrasound workshop available the preceding day on October 10. Heightening awareness of this upcoming meeting at this early juncture will hopefully encourage residents and critical care fellows to attend this and submit their scholarly activity for consideration as an abstract presentation. The abstract submission site will go live in mid-April, with an abstract

"Critical care anesthesiologists can serve as mentors for anesthesiology residents and encourage medical student interest to consider anesthesiology and critical care medicine as career options."

Continued on page 3

CONTENTS

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Membership in SOCCA is open to all anesthesiologists and residents in approved anesthesiology programs. Membership applications may be obtained by contacting SOCCA at (847) 825-5586 or through the SOCCA website at **www.SOCCA.org/membership.php**.

SOCCA Dues

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

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

EDITORIAL NOTES

Editorial Policy

The opinions presented are those of the authors only, not of SOCCA. Drug dosages, accuracy and completeness of content are not guaranteed by SOCCA.

A Note from the Editor to SOCCA Members:

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

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President's Column Continued

Continued from page 1

submission deadline of June 10, 2013. Details concerning the meeting and abstract submission are located on the SOCCA website at **www.socca.org**.

SOCCA continues to offer a mentoring program for current anesthesiology residents interested in the field of critical care anesthesiology. The core anesthesiology program directors annually receive an invitation to identify an anesthesiology resident with an interest in critical care and sponsor that resident to attend the SOCCA Annual Meeting. This mentoring program involves pairing the interested anesthesiology resident with a SOCCA member actively practicing critical care anesthesiology. This pairing provides the resident a structured setting to spend time with a critical care anesthesiologist from another institution. Such a pairing allows discussion to be focused on topics of interest to the resident while providing information of options afforded by a critical care anesthesiology career. I would encourage those SOCCA members who have an interest in participating as mentors to contact Christine Dionne at **c.dionne@asahq.org** and show appreciation for those SOCCA members who have served as mentors in the past and continue to volunteer to participate in this valuable role. The SOCCA meeting affords anesthesiology residents and fellows the opportunity to meet and converse with leaders in the field of critical care anesthesiology. The poster rounds moderated by an expert in critical care provide another forum for discussion and represent another opportunity whether as a poster presenter or as an attendee to interact with leaders in the field of critical care anesthesiology. The collegial and constructive environment created by the poster facilitators offers a unique setting to practice presentation skills and receive feedback on projects presented.

I hope to see all of you in San Francisco at the SOCCA meeting!

Case Report: 'Rough Travels Ahead'

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Mr. S. is a 48-year-old man with obstructive sleep apnea, hypertension and a 20-pack-per-year smoking history. He recently began to develop a cough and a progressive feeling of chest pressure. Physical exam was unrevealing, but chest X-ray showed a widened mediastinum. Computed tomography (CT) of the chest showed a 3 x 4 x 7 cm mass in the anterior mediastinum. There were no symptoms to suggest myasthenia gravis or other paraneoplastic syndromes, and serum levels of alpha-fetoprotein (AFP) and beta-human chorionic gonadotropin (bHCG) were normal. The patient underwent a mediastinal biopsy, which only revealed poorly differentiated cells suggestive of a malignant neoplasm. He was brought to the operating room for tumor resection via a midline sternotomy.

Induction of anesthesia and intubation proceeded without incident. However, after the sternum was opened, the tumor was found to be encasing the aortic arch and innominate vein. Dissection of the tumor was complicated by heavy bleeding (EBL 1,200 mL) and the tumor was eventually debulked but could not be completely resected. The patient received a total of 7 L of crystalloid, 4 units of packed red blood cells, 2 units of fresh frozen plasma and 1 unit of platelets. He was kept intubated and brought to the cardiothoracic intensive care unit (CTICU) for further management. Initial pathology confirmed a poorly differentiated nonseminomatous germ-cell tumor.

On the morning of POD #1, sedation was weaned off, and the patient began to wake up and follow commands. Drainage from the mediastinal and pleural drains was minimal. He was placed on spontaneous ventilation with minimal pressure support and PEEP. Arterial blood gas (ABG) revealed pH of 7.45, PCO2 of 36, and PO2 of 94 on 40 percent FiO2. The patient was extubated without incident. He initially did well, but 3 hours later abruptly sat straight upright in bed and began to complain of worsening shortness of breath and anxiety. Heart rate (HR) had increased to 125 bpm from 100 and blood pressure (BP) had increased to

155/85 from 107/68. Respiratory rate (RR) was 34. SpO2 dropped from 96 percent on 4LNC to 91 percent despite changing to 100 percent O_2 by non-rebreather mask (NRB). Chest tubes appeared to be patent with no acute increase in drainage and a stat chest X-ray revealed mildly increased vascular markings bilaterally but no infiltrate, pneumothorax or collapse. Hemoglobin was 9.1 g/dL, only mildly decreased from an initial post-op value of 10.3. Repeat ABG showed pH of 7.49, PCO2 30, and PO2 68 on 100 percent NRB. The patient began to have worsening respiratory distress and was urgently intubated using propofol and rocuronium. After intubation, HR declined to 100 and he had precipitous hypotension progressing to pulseless electrical activity (PEA) requiring 1 mg of epinephrine and a brief round of chest compressions.

Despite mechanical ventilation with 100 percent FiO_2, the patient's oxygenation remained poor and he was hemodynamically unstable despite multiple vasopressors. Numerous fluid boluses and pushes of epinephrine were given to maintain BP. Urine output remained borderline but adequate at 20-40 mL/hr. Arterial lactic acid level was 3 mEq/L and troponin was 0.67. Electrocardiogram showed sinus tachycardia with some non-specific T-wave flattening in II, III and aVF but no clear ischemic changes. At this point, the differential diagnosis focused more tightly on pulmonary embolism (PE), with coronary ischemia as an alternate possibility. The patient was deemed too unstable to be transported for CT angiography of the chest, and d-dimer was not sent as it was thought that the test would not be useful in the context of the patient's malignancy and recent surgery. An emergent transesophageal echo (TEE) was performed.

TEE revealed a hyperdynamic left ventricle with an ejection fraction of 70 percent. The right ventricle was mildly dilated and hypocontractile. No regional wall-motion abnormalities were appreciated. There was moderate tricuspid regurgitation and mild pulmonary hypertension (PA systolic pressure in 40s). Flow in the main and proximal right and left pulmonary arteries displayed no turbulence and there was no thrombus visible. Unfortunately, no baseline echocardiogram was available for comparison.

Continued on page 5

Case Report: 'Rough Travels Ahead'

Continued from page 4

Because the patient remained unstable despite medical therapy, and could not be transported safely for further diagnostic studies, he was brought emergently to the O.R. where his sternotomy was reopened and he was placed on cardiopulmonary bypass. The pulmonary artery was opened and a three-inch-long thrombus was removed from the right PA using a Fogarty balloon catheter. Weaning from cardiopulmonary bypass proceeded smoothly with the aid of inhaled nitric oxide and the patient returned to the ICU on low-dose vasopressors. He was extubated 3 days after his embolectomy and had a relatively uncomplicated postoperative course thereafter.

Discussion

Pulmonary embolism, despite a high level of awareness, remains one of the most feared complications of the postoperative period, with a mortality rate that has been estimated at 9 percent and a comparable rate of morbidity. Prophylaxis can decrease this risk but does not eliminate it and is not always feasible due to the risks of bleeding and other complications. However, most surgical patients with PE do well if they receive prompt treatment. Traditionally, the gold standard for diagnosis of PE was pulmonary angiogram; however, spiral CT angiography, which is easier to obtain and has good sensitivity and specificity, has now largely supplanted it. Ventilation-perfusion imaging is another useful modality, particularly in patients who cannot receive iodinated contrast, although it loses accuracy in patients with preexisting lung disease. Unfortunately, all of these techniques require that a patient be stable enough for transport out of the ICU and are thus not always feasible.

Echocardiography is a useful modality for hemodynamic assessment in unstable patients: it can be done at the bedside, does not require administration of contrast and provides more information than filling pressures regarding cardiac structure, regional wall motion and valvular function. It can also be used to look for signs of severe pulmonary embolus in unstable patients, such as right ventricular dysfunction, dilatation or hypokinesis, as well as pulmonary hypertension. Thrombus may be directly visualized in the main and lobar pulmonary arteries in up to 80 percent of cases of hemodynamically significant PE. However, this is slightly less than the rate of central emboli detected with spiral CT.

In the above case, while TEE findings were suspicious for PE, it was unclear if the patient's baseline smoking and sleep apnea alone could be responsible for the abnormalities seen. No embolus could be visualized in the pulmonary circulation, and this presented a clinical dilemma. Although this patient had several risk factors for PE (malignancy, surgical stress), the diagnosis could not be definitively made. However, TEE, and for that matter, CT and V/Q scanning, are not 100 percent accurate in diagnosing PE. In the perioperative period, other tests such as d-dimer may not be accurate, and troponin cannot distinguish between PE and a primary cardiac event. Therefore, the diagnosis of PE in an unstable postoperative patient is often uncertain, and the risks and benefits of anticoagulation, thrombolysis and surgical embolectomy must be weighed carefully. While IVC filter placement may be an attractive alternative, it can only prevent further emboli, and this is not a useful approach in an individual with persistent hemodynamic instability. Therefore, management decisions must be made with the understanding that resultant complications may be unavoidable. Here, the results were good, but the patient just as easily could have been subjected to an unnecessary surgery with cardiopulmonary bypass. Despite great advances in imaging, clinical diagnosis remains an art, not a science, and it is important to remember its limitations.

"Pulmonary embolism, despite a high level of awareness, remains one of the most feared complications of the postoperative period, with a mortality rate that has been estimated at 9 percent and a comparable rate of morbidity."

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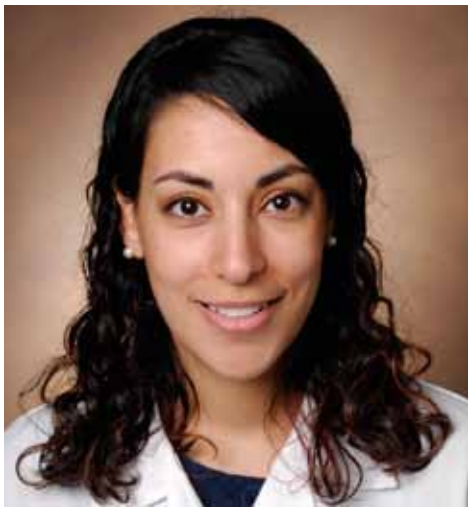
PRO: Rapid Response Therapy



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The November 1999 Institute of Medicine (IOM) report *To Err is Human: Building a Safer Health System* reported that there are an estimated 98,000 preventable patient deaths in hospitals every year.[1] Large amounts of variability exists across both quality and safety in health care today, as was noted in the second white paper, *Crossing the Quality Chasm: A New Health System For The 21st Century*, from the IOM in 2001, which proclaimed that the health care system is poorly organized and unable to appropriately care for chronic conditions that lead to disability and death.[2] In 2002, the Institute for Health Improvement (IHI) outlined six steps to improve patient care in the U.S. to reduce morbidity and mortality. One of the steps was to deploy rapid response to bring a team of clinicians with critical care expertise to the bedside of patients who are clinically deteriorating.[3] The incorporation of IHI-driven hospital process improvement has led to the accelerated growth of RRTs as hospitals strive to meet quality metrics.

In "Failure to Rescue" studies it has been recognized that patients often exhibit signs and symptoms of physiological instability for extended periods of time prior to cardiac arrest.[4-5] It is the mismatch of resources to acute clinical decompensation that puts patients at risk for untoward outcomes. Clinical caregivers can be trained to recognize this early instability and activate an RRT to respond and intervene prior to cardiac arrest.[6] It has been proven in multiple studies that rapid-response teams significantly decreased the rate of unexpected out-of-ICU death.[7]

A study of a 350-bed community hospital demonstrated that within five months of implementing a rapid-response team lead by physician assistants, the incidence of cardiac arrest decreased by more than half and unplanned ICU admissions went down from 45 percent to 29 percent. Overall hospital mortality the year before the rapid-response system was 2.82 percent and decreased to 2.35 percent after rapid-response teams were used.[8] Furthermore, a five-year time series analysis demonstrated that a primary team-based implementation of a rapid-response system was independently shown to lower the rate of unexpected mortality by 65 percent.[1] This study was unique as it relied on providers already involved in the patient's care, rather than a designated ICU-based rapid-response team, which helps to minimize staffing and resource costs in an institution.

Acute cardiac events are one of the more serious adverse outcomes that are usually preceded by signs of clinical instability. A rapid-response-team approach to criteria involving respiratory status, hemodynamic instability and altered consciousness can be used to significantly improve mortality rates. Early intervention by a medical emergency team was show to reduce the incidence of unexpected cardiac arrest from 77 percent to 55 percent.[7]

The positive outcomes of rapid-response teams is not limited to adult populations; it has been proven to be effective in decreasing mortality rates in pediatric inpatient groups as well. A Stanford University cohort study reported fewer inpatient days, less mortality, and a decrease of more than 71 percent in code rates when rapid response was implemented in a pediatric hospital.[9] In the pediatric population, the institution of RRTs was associated with a decrease of 37.7 percent of non-ICU cardiopulmonary arrests and an overall 21.4 percent reduction in hospital mortality. The perceived benefit of RRT in the pediatric patient may be because respiratory conditions are usually the cause for cardiopulmonary arrest in children, and thus with fewer cardiac co-morbidities they are more likely to survive their acute deterioration with an early ICU intervention (mechanical ventilation).

The effectiveness of RRTs in creating improvements in process and outcome of care with fewer out-of-ICU cardiac arrests,

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Continued on page 7

PRO: Rapid Response Therapy

Continued from page 6

decreased postoperative emergency ICU transfers and deaths, and fewer arrests prior to transfer to the ICU is now well established.[7,10,11]

Rapid-response teams are only as effective as the trigger that activates them, thus when looking at the effectiveness of these teams, hospitals need to address and implement some fundamental processes, including a detection mechanism (RRT trriggers – see included example), a standardized response to these triggers with an effective team (make-up of RRTs is variable across hospitals, which may impact results) and an administrative reporting structure for the patient outcomes to feed back to the hospital, which will allow identification of systems-based problems, which can then be corrected as a component of hospital process improvement.

Implementing early intervention by trained providers decreased hospital inpatient days, cardiac events and all over mortality, which is the ultimate goal of rapid-response teams.[12]

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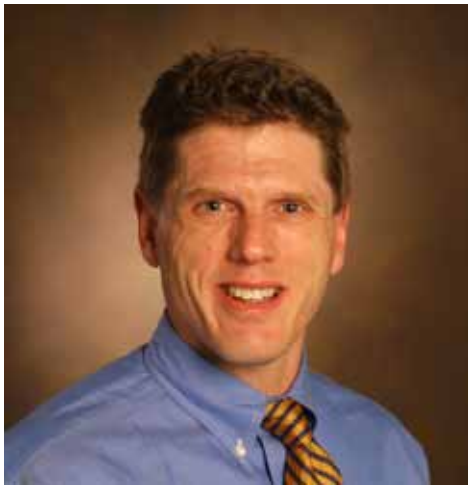
If the patient displays any of the following "EARLY WARNING SIGNS," **Call 1-1111 and request the Rapid Response Team without delay.** Then call the patient's primary team physician.

Staff Concerned/Worried	"THE PATIENT DOES NOT LOOK/ACT RIGHT," gut instinct that patient is beginning a downward spiral even if none of the physiological triggers have yet occurred
Change in Respiratory Rate	The patient's RESPIRATORY RATE is less than 8 or greater than 30
Change in Oxygenation	PULSE OXIMETER decreases below 90%
Labored Breathing	The patient's BREATHING BECOMES LABORED
Change in Heart Rate	The patient's HEART RATE changes to less than 40 bpm or greater than 120 bpm
Change in Blood Pressure	The patient's SYSTOLIC BLOOD PRESSURE drops below 90 mmHg or rises above 200 mmHg
Hemorrhage	The patient develops uncontrollable bleeding from any site or port
Decreased LOC	The patient becomes SOMNOLENT, DIFFICULT TO AROUSE, CONFUSED, or OBTUNDED
Onset of Agitation/Delirium	The patient becomes AGITATED OR DELIRIOUS
Seizure	The patient has a SEIZURE
Other Alterations in Consciousness	ANY OTHER CHANGES IN MENTAL STATUS OR CNS STATUS such as a sudden blown pupil, onset of slurred speech, onset of unilateral limb or facial weakness, etc.

CON: Rapid Response Teams are Going Nowhere Fast



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In the mid-1990s, the concept of the medical emergency team (MET) was developed and implemented in several Australian hospitals.[1] Initial published reports showed a dramatic decrease in the number of in-hospital cardiac arrests, among other metrics. Though usually flawed, these reports led medical centers in other countries to adopt either the rapid-response team (RRT) or MET model. More data also began to emerge that quality of life and mortality were improving.[2,3] Buist and colleagues of the University of New South Wales found that the death rate fell from 56 percent to 26 percent after the MET intervention was implemented.[7] Thus, while compelling, even the authors concluded that their results were likely skewed by 1) the Hawthorne effect and 2) the presence of the study personnel, who may have non-verbally prompted staff to make MET calls. Even the Institute for Healthcare Improvement advised to "deploy rapid response teams… at the first sign of patient decline" as part of its 5 Million Lives Campaign.[4]

Despite such accolades, in the late nineties, Australian researchers began to scrutinize the MET model. Daly and colleagues could not conclude that MET teams improved care.[5] Furthermore, Bristow performed a cohort comparison study of three Australian public hospitals (one had a MET team, the other two "standard care"). They showed that there was no difference in the death rates or code events between the three hospitals.[6]

Paradoxically, as more and more hospitals started early warning systems, MET or RRTs, more data emerged showing that these interventions were ineffective. One of only *two* known randomized controlled trials on METs, the MERIT study, randomized 23 Australian hospitals to 1) usual care or 2) a MET system. The authors were able to conclude that having a MET increases calls to the MET team but that the teams themselves did not statistically decrease cardiac arrests, ICU admission or unplanned deaths.[8] In 2009, a Cochrane review of "early warning systems" found only two studies of over 6,000 identified that warranted analytical consideration and concluded that MET teams have no substantial quality data to support them.[9]

These findings beg the question: Why we should have RRTs at all. Dr. Eugene Litvak and Dr. Peter Pronovost, noted researchers in patient safety, posed this question in a 2010 commentary. Their answer was not encouraging. The authors posit that RRTs are attractive because they act as band aids for poorly-managed health care systems.[10] In some hospitals, for example, RRTs act as physician team extenders when their own resources are overstretched or patients are not appropriately triaged. The authors argue that the number of "lives saved" for RRTs would increase exponentially if we admit patients on the parking deck and then deploy a RRT to rescue them. The fundamental error (inappropriate admission "unit") would still exist despite the MET intervention. Although theirs is a Swiftian argument, it underscores the need to fix our broken health care systems that rely on RRTs as a safety net rather than pay clinical teams to be on standby waiting to avert the next disaster. They are needed more at the bedside.

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Critical Care: Your Guide to the Online World of Critical Care Medicine

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Did you make those New Year's resolutions again? Not the diet and exercise ones... the ones where you decided 2013 is the year you're going to keep current on emerging literature, become active in the critical care community or use that shiny new iPad more often. If you've made these resolutions before - only to become overwhelmed by the e-journal articles piling up faster than you can read, or isolated trying to piece together what-exactly-does-goal-directed-resuscitation-mean-at-the-bedside-anyway - social media may hold the solutions you need.

Much more than just pictures of your coworkers' kids and pets, social media includes a wide variety of collaborative online projects, blogs, applications, networking sites and content communities. High-quality medical content is increasingly available and can help link doctors across training level, practice type and specialty. (Think of it as a massive, global, year-long conference brimming with fresh ideas). If you're not sure where to get started, read on for a crash course in social media in critical care.

Podcasts

Similar to traditional lectures or radio shows, these audio episodes are a great introduction to Web-based medical content. Archived sessions are available for download and off-line playback, making them perfect for listening while exercising or commuting. Episode formats vary from educational monologue to an interview with a study author about his or her new publication.

The ICU Rounds collection (available through iTunes) is popular with trainees and provides focused teaching on many ICU topics. The critical care physician looking to stay current in the field should browse the MedScape Critical Care podcasts (available through iTunes) and the SCCM podcasts (through iCritical Care app for iOS or Android).

> "If you are looking for breaking news, want to see the community's reaction to a newly released guideline, wonder what's must-see at a conference or crave more personal interaction with your colleagues, it's time to get started with Twitter."

Tip: Use a podcasting app to always keep your device stocked with the latest one or two editions, or get started as fast as possible by accessing content through an app (such as iCritical Care) that uses a built-in player.

Blogs

The self-publishing potential of the Internet is best realized in the themed collection of entries, or "posts," that comprise a blog. Initially conceived as an online diary, modern medical blogs may be written by one or many authors and serve a variety of functions, from chronicling a junior doctor's journey through training, to providing a practical guide to becoming an excellent teacher on the wards, to summarizing the most relevant literature published during a given week. In fact, blogs cover so much ground they can be difficult to describe, so let's take a look at a few examples.

http://pulmccm.org/main/ The PulmCCM site's mission is to help clinicians stay up to date in pulmonary and critical care medicine as efficiently as possible. The blog authors scour medical journals then summarize and link to articles they find to be especially important.

http://emcrit.org/ The EMCrit Blog, run by Dr. Scott Weingart (@emcrit), strives to bring the best evidenced-based critical care, trauma and resuscitation practices to the ED. Trainees benefit from blog entries in the form of podcasts, articles, videos and tutorials, while veteran docs frequently hash out the finer points of airway management and resuscitation physiology in comment-based discussions after each entry.

http://hollos.net/ While updated less often, the Anaesthesia - Critical Care Blog is a well-categorized collection of entries summarizing literature relevant to the anesthesiology-based intensivist.

Tip: Keep up routinely with your favorite blogs by "subscribing" to them in an aggregator such as Google Reader. Individual posts from many sites will be merged into a stream that you can scroll or flip through quickly, eliminating the need to bookmark and navigate to every blog separately.

Continued on page 10

CriticalCare: Your Guide to the Online World of Critical Care Medicine

Continued from page 9

"It's truly remarkable to me just how durable the "silo-ing" of our residency training is - how firmly it persists throughout our careers. Surgeons, anesthesiologists, EM physicians, and internists practicing critical care have much to gain from listening to each other, both in person and in our specialties' literature. However, there seems to be almost no cross-pollination of good ideas and best practices. Blogs are a forum where our specialties can share ideas and gain from each others' knowledge set and perspectives."

-Matt Hoffman, M.D. (@pulmccmcentral) pulmonologist/intensivist in Atlanta, GA and founder of **www.pulmccm.org**

Twitter

If you are looking for breaking news, want to see the community's reaction to a newly released guideline, wonder what's must-see at a conference or crave more personal interaction with your colleagues, it's time to get started with Twitter. The scientific and medical education communities are cutting-edge in harnessing the power of this unique format.

But first, a brief primer: Twitter (**www.twitter.com**) is a free online universe where users (identified by "@", followed by a unique name) communicate via short messages called tweets. A tweet may include text, reference to another user, or a shortened link to a website or image. Tweets may be composed as a reply to another tweet, and sequential tweets between two or more users may resemble a publicly-viewable conversation. After establishing your Twitter account, the Tweets of users you chose to "follow" will be compiled for you to view. You may also see a tweet from an account you aren't following if someone "retweeted" it (similar to forwarding an email, or "sharing" an item on Facebook). The 140-character limit for each tweet helps keep messages short, sweet and easy to scan.

Ready to sign up? Try following @MedscapeICU, @SCCM, your hospital's Twitter account, or others mentioned in this article.

Users can identify and group topics by prefacing any word or phrase with the hashtag (#) symbol. This allows for searching of all public tweets by the hashtag, which can help bring order to the chaos of millions of tweets. Where #SOCCA2013 may see heavy use for a day or two by attendees at next year's conference, #criticalcare might identify Tweets relevant to the specialty for years to come. Hashtags may be suggested by meeting organizers or spread informally from user to user.

How does a hashtag work? Search #overlyhonestmethods for an amusing collection of confessions from researchers across disciplines, or #FOAMed to access free, miniature medical education lessons.

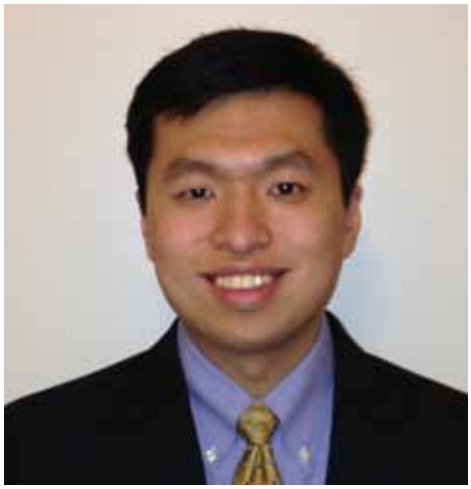
Tip: Twitter's abbreviated format matches perfectly with busy schedules - install the app on your phone and scroll through a few lines of your content "feed" next time you have a few seconds to spare.

SOCCA Resident's Guide to Learning in the Intensive Care Unit

Newly revised, the Society of Critical Care Anesthesiologists (SOCCA) Resident's Guide to the ICU – 2013 Edition is intended as a "pocket guide" rather than a textbook, allowing residents to easily find the key clinical points while on rounds or call. Organized by system and problem, this outline-style guide focuses on diagnostic and management pearls with references and questions to facilitate further learning.

The guide may be purchased at **socca.megahosters.com/residents-guide.php**.

Literature Review: Daily Interruption of Sedation



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Article: Mehta S, Burry L, Cook D, Fergusson D, Steinberg M, Granton J, Herridge M, Ferguson N, Devlin J, Tanios M, Dodek P, Fowler R, Burns K, Jacka M, Olafson K, Skrobik Y, Hebert P, Sabri E, Meade M. Daily sedation interruption in mechanically ventilated critically ill patients cared for with a sedation protocol. *JAMA*. 2012; 308: 1985-1992.

Sedation is a cornerstone of mechanical ventilation (MV) in the intensive care unit (ICU) with the benefits of patient comfort, decreased agitation, improved ventilator synchrony and reduced risk of device dislodgement.[1-3] Yet, continuous intravenous sedation of intubated patients has also been shown to increase the duration of MV as well as ICU and hospital length of stay when compared to bolus administration.[4]

In 2000, a randomized controlled trial involving 128 adults randomized to Daily Interruption of Sedation (DIS) or continuous sedative infusions found DIS reduced MV by four days (P=0.004), median ICU length of stay by 3.5 days (P=0.02), and necessitated less diagnostic testing (p = 0.02).[5] The Awakening and Breathing Controlled Trial evaluated 336 patients randomized to DIS followed by a spontaneous breathing trial (SBT) compared to sedation per usual care with a daily SBT. Patients in the DIS group were discharged from the ICU at a median of 9.1 days compared to 12.9 days in the control group (P=0.01) and had a statistically significant survival benefit one year after enrollment with a number needed to treat of seven. [6] As such, in 2002, the Society of Critical Care Medicine recommended "daily interruption with re-titration to minimize prolonged sedative effects" (Grade A)[3] and the 2008 Surviving Sepsis Campaign further ratified this sedation strategy (Grade 1B).[7] However, research on whether a daily interruption of sedation (DIS) improves patient outcomes continues to be a topic of interest.

In this randomized control trial, Mehta et al. study DIS among 430 patients across 16 tertiary care medical and surgical ICUs.[8] Included were patients expected to require MV for greater than 48 hours after enrollment and for whom the ICU had decided to begin continuous benzodiazepine and/or opioid infusions. Those that had sustained traumatic brain injury or cardiac arrest, were unlikely to receive maximal care, or were receiving neuromuscular blocking agents were excluded. The subjects were randomized to protocolized sedation with or without daily interruption.

Patients were titrated hourly to a Sedation-Agitation Scale score (SAS) of 3 to 4 or a Richmond Agitation Sedation score (RASS) of -3 to 0 with most sedation assessments being made by their nurses, not research team members. The DIS group had their sedatives halted daily and were assessed for wakefulness and the ability to follow simple commands. Restarting the sedatives required the agreement of the bedside nurse and physician.

Mehta's trial showed the same median time to extubation (seven days) in both groups (CI: 0.86-1.35; P = 0.52). Furthermore, differences in ICU days (p = 0.36), ICU mortality (p=0.72), neuroimaging in ICU (p = 0.53 for CT, 0.64 for MRI), and need for tracheostomy (p = 0.46) were all statistically insignificant. Despite daily interruption, sedative doses were greater in the DIS arm with higher benzodiazepine use (p = 0.04) and higher fentanyl use (p < 0.001). In their subgroup analysis, DIS did show a favorable outcome in time to extubation among surgical and trauma patients (6 vs. 13 days, 95% CI: 1.40 – 4.55 days) as opposed to medical patients (9 vs. 8 days, 95% CI: 0.72 – 1.18).

Mehta's study, however, is not alone in showing a lack of benefit to DIS. A study of 74 patients randomized to DIS or standard algorithms was terminated prematurely due to increased mortality and increased duration of MV in the DIS arm, despite no causal connection being identified.[9] Moreover, a meta-analysis of five randomized controlled trials composing 699 patients showed DIS reduced the risk of tracheostomy, but had no benefit on one-year mortality or hospital length of stay.[10]

Continued on page 12

Literature Review: Daily Interruption of Sedation

Continued from page 11

A notable difference between Mehta's study and those noting a benefit to DIS is the dosages of sedatives used. Unlike the previous studies that showed increased sedative usage in the control arm,[5,6] Mehta's study and others showing no benefit have more sedatives being used in the DIS arm.[8,11] Since lighter sedation is becoming more commonplace in ICUs,[12-13] it may be possible that reduced sedative dosing, not DIS, is associated with its previously attributed benefits.[8]

Another notable difference is the study design. Unlike the positive studies that utilized intensive research personnel for sedation interruption and management decisions, Mehta's study protocol was directed entirely by ICU staff.[8] The pragmatic challenges of DIS adoption in ICUs have been well documented. Nursing comfort and experience[1,14] and lack of understanding among hospital staff have led to divergent practices in DIS.[1,15] A 2006 survey of Canadian practitioners found only 40% of intensivists practicing DIS[16] while a recent survey of US practitioners found only 66% practicing DIS.[17] As a result, there may be differences in results when DIS is being carried out by researchers as opposed to the busy everyday practitioners of the ICU.

Perhaps the trend towards targeting lighter sedation in the ICU has already captured the benefits of DIS that were found by Kress and Girard.[5,6] It is wise to remember that studies on ICU associated delirium have changed the sedatives of choice in many ICUs from benzodiazepines to sedative-hypnotics like propofol and dexmetatomadine. One wonders if it is more important for care givers to wake-up to the idea that lighter sedation may be more important than it is for patients to wake-up daily.

While initial research was favorable toward DIS, Mehta's work and other recent studies have not replicated those findings and some have even demonstrated the potential for harm. This trial showed that in a setting where sedation is carefully titrated to comfort and arousability, DIS is not associated with improved patient outcomes and may require increased sedative dosing. Given the conflicting data on outcomes, it is difficult to recommend DIS as a guideline for mechanically ventilated patients, especially for patients with poor ventilator synchrony. However, unless there are patient specific contraindications, it may be prudent to adopt an approach that reduces cumulative sedative usage while balancing comfort in the mechanically ventilated patient. Sedation interruption is an area of critical care that needs more research and larger randomized controlled trials to delineate which subgroups and protocols will lead to improved outcomes and survival.

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Fellowship Review: UTMB Anesthesia Critical Care

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The ACGME-accredited Anesthesia Critical Care program at UTMB, the oldest medical school in Texas, has an extraordinary faculty that promotes collegial and patient-centered care. Our program, whose alumni are practicing nationwide, has been accredited since 1995. Fellows embarking on a career in academics or in private practice benefit from the comprehensive and innovative training program we offer. One such innovative feature is our multidisciplinary journal club, in which fellows from accredited Surgical and Pulmonary Critical Care programs present contemporary articles and promote interdisciplinary education. In addition to the more traditional Anesthesiology applicant, we also have Maternal-Fetal-Medicine fellows, and we are receptive to the ABA plan to include emergency medicine physicians, all of whom would be eligible to attain board certification.

During the year -long program, fellows manage patients from a wide variety of clinical, surgical, and medical subspecialties including transplant, trauma, neurosurgery and neurology, cardiothoracic, vascular, and ob/gyn, among others. Fellows have the opportunity to work with professionals at the highest level of training in this multidisciplinary environment. In addition, UTMB is designated as a Level I Trauma center; our nursing team boasts Magnet status; we have an exceptional Respiratory Therapy program; and our fellows collaborate closely with PharmD fellows, nutritionists, primary teams, etc. in our semi-open ICU setting. Further, we encourage the use of ultrasound and the most up-to-date monitoring devices in the management of the unit, and we foster a familiarity with vascular devices, such as ECMO, LVAD, IABP, etc. in our CT ICU. Finally, we place primary emphasis on evidence-based practices.

Similar to the majority of the other 51 accredited critical care programs, we plan to participate in the *San Francisco Match,* as the AASSPD will likely adopt this matching program in July of 2014. The common application used by a majority of the programs can be found on the SOCCA website. Our program is accredited for two fellows and, on occasion, may accommodate off-cycle applicants.

The first MOCA-certified simulation center is on campus and is available to fellows throughout the 12-month training program. The simulation center will be working on developing critical care scenarios to enhance education and hands-on training for many critical care devices, such as LVAD, IABP, ECMO, ventilators, etc. To further enhance education and cooperative learning we offer a weekly departmental M&M in both surgery and anesthesiology. Our educational curriculum also offers a research elective in which fellows have the opportunity to participate in one of the following:

The investigational intensive care unit, funded by NIH and DOD, headed by Perenlei Enkhbaatar, M.D., Ph.D., is a 24/7 ICU for Translational Research Studies, where state-of-the art medical techniques and novel treatment strategies are developed for the critically ill patient.

The molecular pharmacology laboratory, headed by Dr. Csaba Szabo. This laboratory, funded by the NIH, JDRF and the ADA, focuses on the molecular pathogenesis of critical illness, with special emphasis on vascular dysfunction and cellular metabolic failure and employs state-of-the-art tools of cell biology, molecular biology, molecular pharmacology and cell-based screening.

Resuscitation Research Laboratory, directed by George Kramer, Ph.D., funded by NIH, U.S. Army, Office of Naval Research and industry, conducts clinical, animal and engineering efforts into smart “decision support” and autonomous care resuscitation systems for trauma and critical care. **www.utmb.edu/rrl**

For further information please contact our coordinator at **hdalexan@utmb.edu.** Our ACCM fellow website will be available through our anesthesiology home page **anesthesia.utmb.edu**.