N E W S L E T T E R

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President's Message

Why Should You Come to SOCCA's Annual Meeting?

Michael F. O'Connor, M.D., F.C.C.M.
President, SOCCA

There are many good reasons to come to SOCCA's Annual Meeting, including seeing old friends, making new ones, and interacting with your national and international colleagues.

To attend our first-ever course on perioperative ultrasound, and learn about perioperative/ICU ultrasound from Michael Wall, M.D., Danny Talmor, M.D., Matthias Merkel, M.D., Chad Wagner, M.D., Ben Kohl, M.D., Charl de Wet, M.D., Michael Woo, M.D. and Thomas Comfere, M.D. Space is limited, so if you are interested, be sure to register early.

To hear Cliff Deutschman, M.D. overturn much of what you thought you knew about sepsis, and explain how this perspective will shape future research.

To hear Hannah Wunsch, M.D. explain how and why long-term assessments of outcome are likely to supplant raw mortality as the relevant outcome in critical care.

To hear Jan Bakker, M.D. describe a completely different approach to resuscitation in sepsis.

To hear Carlee Clark, M.D. and Joe Meltzer, M.D. engage in a spirited conversation about the limitations of clinical trials in critical care medicine.

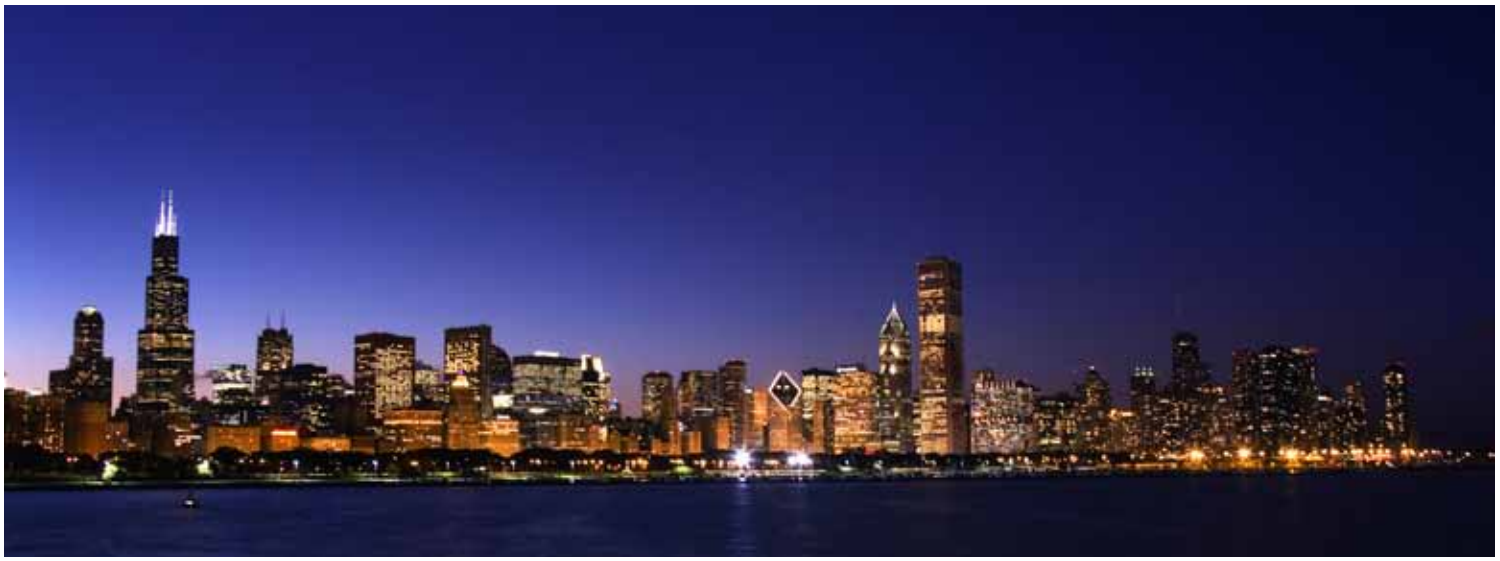
To hear Todd Carter, M.D. talk about disaster management in the civilian world.

To watch Doug Coursin, M.D. and Aaron Joffe, D.O. exchange opinions about how changing learning styles among students and residents will transform education and its tools. Will it be better? Will it be worse? We will know more at the end of their session.

To hear Avery Tung, M.D. talk about educational strategies, Michael Wall, M.D. talk about ultrasound, and Steve Lisco, M.D. talk about using simulation to train for rare events.

To seize this chance to visit Chicago, one of the nicest cities in the U.S. and the world. To see the Art Institute, the Field Museum of Natural History, and eat at any of a number of great restaurants.

In summary, come to the SOCCA Annual Meeting to learn what your peers believe is the state of the art, what the future might hold, and what they think.



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Dues are $150 for active members; $100 for affiliate members and $20 for residents/fellows. Dues may be paid online at **www.SOCCA.org/shop/index.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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Ultrasonography in Critical Care Medicine Series:
Implementing a Critical Care Ultrasound Educational Program in a Teaching Institution

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It takes a village to raise a child

– African Proverb

Vision

Only three years ago, the main use of ultrasound in surgical intensive care units (ICUs) at Johns Hopkins Hospital was to assist with obtaining central venous access. The ultrasound machine was antiquated and rarely used for functions beyond vascular access. Following the exponential interest in critical care ultrasound both nationally and internationally, combined with technological advancements, we began to develop our own critical care ultrasound program at Johns Hopkins Hospital.

Departmental Support

Initially, we discussed the program development and time frame of implementation during our business meetings. We worked through a rigorous selection process to identify an ultrasound machine that would best meet our needs. Unfortunately, it took over two years until the machines were acquired in their full functionality, and further upgrades in the software are an ongoing process. The process of purchasing the machines was delayed by an overall decrease in departmental funding and a low initial stratified priority for the purchase in the context of multiple other departmental commitments. Initially, the acquired machines were only suited with linear array probes, limiting their clinical applications. The functionality was further expanded later on with acquisition of phased array probes. With ultrasound machines dedicated to each ICU, we started performing a larger volume of focused assessments and, subsequently, a broader range of ultrasound exams, including transthoracic echocardiograms, pleural/lung ultrasound and various ultrasound-guided invasive bedside procedures. The use of technology was further confounded by variable levels of interest among faculty, which led to highly variable and inconsistent practices of ultrasound skills. Currently, the department has prioritized the development of the critical care ultrasound program, leading the multidisciplinary effort in this area in the institution; an educational grant was obtained that allowed further expansion of possibilities in training.

Formal Training

Following the acquisition of the physical resources, the next challenge was the creation of a formal education program. The primary hurdle in this process was related to the lack of ultrasound educators in the department. We identified departmental champions who would lead the effort; two of our faculty attended structured critical care ultrasound courses, and one has become a testamur in perioperative transesophageal echocardiography. During the ultrasound machine selection and acquisition process, we concurrently created the ultrasound curriculum in collaboration with the Interventional Pulmonology Division and our medical ICU faculty. An initial series of lectures on the basics of ultrasound and echocardiography were then offered to the critical care fellows. Currently, we are enriching the curriculum for faculty and incoming fellows by developing workshops that teach the basics of critical care ultrasound. To facilitate a standardized reporting process and an organized collection of studies, we created a report card and a case logbook. We then arranged for access to a central shared memory drive to serve as a database for studies. This database will not only store studies, ultimately serving as a quality assurance (QA) platform in the future, but will also host educational resources for fellows and faculty.

Sustainable Platform

Establishing a collaborative relationship with the cardiology and radiology departments has been an ongoing process. We have prioritized collaborative relationships with both departments, as we view both traditional ultrasound specialties being vital during the initial stages of the program in both education and QA process. The development of national/international guidelines could assist in these negotiations by establishing a functional platform in the field.

Future

A QA program is paramount to the successful development of a critical care ultrasound course. Accuracy of image acquisition and interpretation can be achieved by storing images for later review with an ultrasound faculty certified by the institution. Departmental policy is now in the process of defining fellow and faculty roles in image acquisition, interpretation and education. The aforementioned-shared drive will serve as an essential depository for images, reports and logbooks for ongoing review and QA. During the infancy stage of the

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PRO: Pulse Contour-based Cardiac Output (Noncalibrated) Monitors Should Supplant the Pulmonary Artery Catheter

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The pulmonary artery catheter (PAC) has long been scrutinized for its lack of efficacy, failure to improve major clinical outcomes and morbidity when used in critically ill patients.[1-3] Readers are referred to an excellent pro/con discussion regarding PAC use by Dr. Osorio in a 2010 issue of the *Interchange* (Vol. 21, No. 2). In many clinical circumstances, traditional monitoring of vital signs is unreliable and may lead to imprecise interventions. Cardiac output is the "most important upstream hemodynamic parameter" measured in ICU patients, and recent advances in minimally invasive pulse contour-based technology permit accurate measurement of this variable.[4]

Pulse contour analysis relies on an analysis of the pulse pressure waveform. The area under the systolic portion of the arterial pressure waveform can be measured, and with advanced algorithms, automatic compensation for continuously changing vascular tone can be calculated. Sophisticated proprietary formulae are applied to calculate cardiac output based on the analysis of the pulse contour.[4] One of the most common devices presently used for pulse contour cardiac output measurements is the Vigileo™FloTrac™ system (Edwards Lifesciences, Irvine, CA). This device requires only an existing peripheral arterial line and can provide dynamic measurements of cardiac output, stroke volume and stroke volume variation. $ScvO_2$can also be measured when used in conjunction with a specialized central venous oximetry catheter. This device does not require external calibration since patient variables such as gender, height, weight and age are used to calculate correction factors for vascular compliance.

Emerging data continue to demonstrate the utility and validity of non-calibrated pulse contour cardiac output monitors. These devices are particularly useful for optimizing fluid administration and achieving goal-directed hemodynamic endpoints. Kotake et al. published a small study comparing the Vigileo™ with Doppler during anesthetic induction for patients undergoing abdominal aortic surgery and found the device to compare favorably during transient hypotension.[5] When compared with another minimally invasive monitor (LiDCO plus™, Cambridge, UK) and PAC cardiac output measurements, both minimally invasive devices showed moderate agreement with the PAC.[6] Zimmerman et al. performed synchronized measurements of cardiac output comparing the Vigileo™ system with a PAC and found that the Vigileo™ system was sufficiently accurate when using a +/- 30% deviation in a Bland-Altman method of analysis.[7]

When used to guide goal-directed therapy, some studies have demonstrated improved outcomes and fewer complications in surgical patients. Benes et al. showed that when using pulse contour cardiac stroke volume variation to optimize fluids in high-risk patients undergoing major abdominal surgery, patients in the goal-directed group had fewer hypotensive events, lower lactate levels and fewer complications after surgery.[8] In a prospective study involving 237 mechanically ventilated patients in shock, use of pulse contour-based cardiac output monitoring was associated with a statistically significantly lower odds of ICU mortality (OR, 0.37; 95% CI, 0.18,0.77) and 28-day mortality (OR, 0.43; 95% CI, 0.22,0.85).[9]

While it is true that only limited data suggest a benefit from using pulse-contour-based cardiac output monitors, this technology has fewer risks than PA catheterization and is associated with greater ease of use. It should be noted that when the PAC was first introduced, there were no clinical trials to justify its benefit for critically ill patients. Minimally invasive technologies, such as pulse contour-based cardiac output monitors, require further validation for use in the critically ill and hold promise as a safer and more feasible technology to improve patient outcomes.

Note: I do not have any significant financial interest or other relationship with the manufacturers of any of the abovementioned products.

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CON: Minimally Invasive Cardiac Output Monitors Cannot Replace the Pulmonary Artery Catheter

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While contemporary use of the PAC continues to be surrounded by controversy, it remains the standard of care when used in the appropriate patient population. Initial studies on minimally invasive cardiac output technologies are promising, but more studies are required before the pulmonary artery catheter should be "pulled"[1] in favor of other less proven and costly technologies.

For every article published on the accuracy of pulse contour-based cardiac output monitors (i.e., the Vigileo™/FloTrac™ device), there seems to be another study that is contradictory. Most studies use either PA catheterization or echocardiography as a gold standard by which to compare other technologies. Minimally invasive pulse contour-based monitors have not been shown to be consistently accurate for achieving goal-directed hemodynamic endpoints across all patient populations. Moreover, for uncalibrated systems, the assumptions made about vascular compliance, as calculated based on anthropomorphic and other factors, may introduce significant inaccuracy in patients with unstable hemodynamics.

In septic patients, minimally invasive pulse contour-based monitors have not been validated. Machare-Delgado et al. compared the Vigileo™ monitor to M-mode echocardiography in a population of septic medical ICU patients who were in shock.[2] Cardiac output, stroke volume variation (SVV) and stroke volume index were compared with changes seen in the inferior vena cava (ΔIVC)with echocardiography to assess fluid responsiveness. The correlation between ΔIVC and SVV was fair with an r^2 value of .51 and a receiver operating curve (ROC) of .81, while the correlation between ΔIVC and SVI was even worse with an r^2 of .12 and ROC curve of .57. Another study by Sakka et al. studied 24 patients in septic shock and receiving mechanical ventilation.[3] The Vigileo monitor was compared with transpulmonarythermodilution, as measured with the PiCCO™ plus system (Pulsion Medical Systems, Munich, Germany). Compared to the PiCCO™ system, the Vigileo™ underestimated cardiac output.

In other patient populations, the validity of this technology has been questioned. When used in liver transplant patients, the Vigileo™ demonstrated poor performance in detecting increases in cardiac index, and the LiDCO™ Plus device did not fare any better in this study.[4] Both devices were compared to PAC thermodilution. In a small study comparing the Vigileo™ to transesophageal echocardiography (TEE) during laparoscopic colorectal surgery, measurements varied widely among the two modalities, with a 40% average measurement difference (range 27% to 50%).[4]

The use of minimally invasive pulse contour-based cardiac output monitors in high-risk medical and surgical patients cannot be endorsed based on current literature. It is true that occult hypoperfusion and volume overload are associated with increased morbidity and mortality in critically ill patients, but to optimize cardiac performance, minimally invasive methods remain unproven as evidenced by the disparate results obtained in the limited data across different patient populations. The PAC, as well as emerging data supporting ultrasound and echocardiography, should remain the front-line modalities for assessing and modulating hemodynamics in the critically ill.

Note: I do not have any significant financial interest or other relationship with the manufacturers of any of the abovementioned products.

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Thymoglobulin-Induced Anaphylactic Shock in a Patient Undergoing Cadaveric Renal Transplantation

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Introduction

Thymoglobulin is an anti-thymocyte globulin derived from rabbits immunized with human T lymphocytes. Since its introduction in the U.S. in 1999, it has become the common therapy used for prophylaxis and treatment of acute rejection in renal transplant patients.[1] Adverse events include fever, chills, leukopenia, headache, abdominal pain, diarrhea, hypertension, nausea, thrombocytopenia, peripheral edema, dyspnea, asthenia, hyperkalemia, tachycardia and infection.[2] There have been no reports of thymoglobulin-induced anaphylaxis. We report a case of intraoperative anaphylactic thymoglobulin-induced anaphylaxis, whose diagnosis was confounded by a complicated intra-operative course in a patient undergoing cadaveric renal transplantation.

Case Description

A 39-year-old woman with end-stage renal disease (ESRD) presented to our medical center for cadaveric renal transplantation. Her ESRD was due to hypertensive nephrosclerosis, which was being treated with amlodipine. She also had an episode of deep vein thrombosis, which was being treated with coumadin. She had no known drug allergies. Preoperative physical examination was unremarkable, except for multiple non-functioning arterial-venous grafts in bilateral upper extremities and a functional hemodialysis vascular access in her right lower extremity.

In the operating room, after application of standard anesthesia monitors, anesthesia induction was performed using the following medications: midazolam (2 mg), fentanyl (200 mcg), lidocaine (100 mg), propofol (200 mg) and cis-atracurium (16 mg). These medications were administered via a 20-gauge intravenous (I.V.) catheter on the patient's left arm. Intubation was easy and uneventful. After induction of anesthesia, one gram of cefazolin (the patient had numerous exposures to cefazolin during prior surgeries, with no documented adverse reactions) was administered over 10 min via the 20-gauge I.V., followed by 250 mg of methylprednisolone. The patient was hemodynamically stable while being maintained on oxygen 40%, nitrous oxide 59% and 1% isoflurane.

In preparation for central venous pressure (CVP) catheter placement, scout ultrasonography of the neck was performed and showed a non-viable right internal jugular vein for cannulation. This was probably due to previous multiple cannulations for placement of hemodialysis catheters. Therefore, it was decided to cannulate the left internal jugular vein (LIJV) vein for placement of a CVP catheter. The attempt to cannulate the LIJV was unsuccessful and complicated by inadvertent left carotid artery cannulation using a 7 french CVP catheter. This problem was managed by removal of the catheter and application of direct pressure for 10 minutes over the site as recommended in surgical literature.[3]

A 16-gauge I.V. was placed in the right arm in lieu of the CVP. An infusion of thymoglobulin was then started (125 mg to be infused over 4 hours) via the 16-gauge I.V. Within about 5 minutes after thymoglobulin administration, there were sudden drops in end-tidal carbon dioxide ($ETCO_2$) from normal value of 34 mmHg to 10-15 mmHg and in oxygen saturation from 100% to 60%-70% coupled with a dramatic increase in peak airway pressures from 23 mmHg to 60-70 mmHg. On auscultation, there were no breath sounds heard on the left side of the chest and there was poor air entry on the right. Inhalation anesthetic agents were immediately discontinued and the patient was maintained on 100% oxygen, administered by manual positive pressure ventilation. The initial impression was that the patient had a complication due to attempted CVP catheter placement such as left pneumothorax, hemothorax or even cardiac tamponade. A chest tube was inserted on the left side of the chest, which revealed no air or blood. Pericardiocentesis revealed no fluid in the pericardium. This was also confirmed by transthoracic echocardiography (TTE).

The patient subsequently became bradycardic and pulseless. Cardiopulmonary resuscitation (CPR) was immediately initiated while the surgical site was closed. Intravenous fluid resuscitation, atropine (0.4 mg) and epinephrine (1 mg) were administered. After the third dose of epinephrine (1 mg), air entry improved and wheezing was noted on all lung fields. Urticaria was also noted on the whole extent of the right arm radiating from the 16-gauge intravenous site. Within a few minutes of above therapy, the patient recovered

normal sinus rhythm and normal blood pressure without inotropic or vasopressor support. However, because of such a complicated intraoperative course, it was decided to keep the patient intubated (and sedated as needed) and transport her to the post-anesthesia care unit (PACU) for further overnight monitoring. The patient had a stable overnight course in the PACU and was extubated the following day without any neurologic sequelae. She was discharged home on postoperative day five. A blood tryptase level, which is a specific marker of mast-cell activation and plays a part in the pathophysiology of anaphylaxis, was drawn one hour after the event and showed a level of 123 ng/ml (normal range 2-10 ng/ml).

Discussion

Intra-operative anaphylactic and anaphylactoid reactions are rare occurrences. The reported incidence ranges from 1:4000 to 1:25,000.[4] The most common offending agents are muscle relaxants, antibiotics, opioids, hypnotics and latex. To the best of our knowledge, there has been no published report of intra-operative anaphylaxis or anaphylactoid reaction stemming from thymoglobulin.

Anaphylaxis is an IgE-mediated reaction. Anaphylactoid reactions produce the same clinical picture as anaphylaxis but are not IgE mediated. The clinical picture of a severe anaphylactic/anaphylactoid reaction is that of an life-threatening reaction with respiratory, cardiovascular, cutaneous and/or gastrointestinal manifestations resulting from exposure to an offending agent.[5] Examination may reveal urticaria, angioedema, wheezing or airway edema. Redness and swelling along a venous route suggest the portal of entry of the causative agent. Delay in the recognition from initial signs and symptoms can result in a fatal outcome either because of severe respiratory compromise, vascular collapse or both. General anesthesia may mask the clinical signs and symptoms of anaphylaxis/anaphylactoid reactions. Differential diagnosis includes shock, asthma, airway obstruction, pneumothorax or other entities that cause cardiopulmonary collapse. In this case, the inadvertent carotid cannulation confounded the differential diagnosis.

Once recognized, the initial management of anaphylaxis includes cardiopulmonary resuscitation in addition to discontinuing the suspected causative agent. Resuscitation consists of establishing a patent and protected airway, ventilation with 100% oxygen and administering intravenous fluids and epinephrine (or other vasopressors such as dopamine or norepinephrine) to support blood pressure. Continuous re-assessment should be maintained throughout the resuscitation period, even with initial recovery since symptoms may recur during the acute recovery phase.

Additional treatment of respiratory distress and wheezing include nebulized beta-adrenergic agents (such as albuterol) or intravenous (such as epinephrine).[6] Intravenous antihistamines may reduce the severity of general symptoms of anaphylaxis. Combining H2-blockers (such as ranitidine or famotidine) and H1-blockers (such as diphenhydramine) may be superior to using H1-blockers alone. The benefits of a short course of corticosteroids may not be realized for six to 12 hours, so they are used mainly to prevent recurrence or progression of anaphylaxis. A commonly used regimen of corticosteroids would consist of methylprednisone 1mg/kg I.V. every four hours, although doses as low as 10 mg and as high as 250 mg have been used.

After the acute resuscitation and stabilization period, tests of immediate hypersensitivity, in vitro-specific IgE or challenge tests may help in detecting the cause of anaphylaxis. Measuring serum levels of histamine or tryptase is not specific for anaphylaxis, but may support the diagnosis.[7] In our case, the elevated tryptase levels were consistent with anaphylaxis/anaphylactoid reaction. The occurrence of the reaction within minutes after administration of the thymoglobulin and the presence of cutaneous manifestations along the site of its I.V. administration indicated that thymoglobulin is the most probable causative agent. A skin test would have been ideal to confirm this, but was not done during the hospitalization of this patient.

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Anesthesiology Critical Care Medicine (ACCM) Fellowship at Columbia University Medical Center (CUMC)

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The Anesthesiology Critical Care Medicine (ACCM) Fellowship at Columbia University Medical Center (CUMC) offers a unique, 12-month, ACGME-accredited training program in one of the world's greatest cities.

CUMC is a part of the larger New York Presbyterian Hospital (NYPH) group, and serves as the teaching hospital for the College of Physicians and Surgeons of Columbia University. It is one of the largest tertiary care facilities in New York City, whose main campus encompasses nearly 20 acres and 16 city blocks, with over 800 adult and 200 pediatric beds and more than 38 operating rooms. There are five adult and two pediatric ICUs, including the cardiothoracic intensive care unit (CTICU), surgical intensive care unit (SICU), medical intensive care unit (MICU), neurologic intensive care unit (Neuro-ICU), coronary care unit (CCU), pediatric intensive care unit (PICU) and neonatal intensive care unit (NICU).

The Division of the Critical Care Medicine of the Department of Anesthesiology is responsible for providing critical care services for the 27-bed CTICU and 16-bed SICU. The CTICU includes a new Heart Center CTICU (HC-CTICU) that added an additional six beds to the existing 21 in the original CTICU in February 2010; it is very likely that four more beds will open in HC-CTICU before the end of 2011, bringing the total number of dedicated cardiac surgical ICU beds to 31. The CTICU and SICU are run as closed units in that all orders must be written by the ICU team, but with an open and collaborative relationship with our surgery and medicine colleagues. Robert Sladen, M.D., FCCM, is the ACCM Program Director; Vivek Moitra, M.D., is the Associate Program Director, and there are fifteen additional anesthesiology faculty who are trained in Critical Care Medicine (CCM) that provide direct supervision of the ACCM Fellows.

The current ACCM Fellowship was established by Dr. Sladen on his arrival at CUMC in 1997, and since then has grown steadily from one to nine ACGME-approved positions. Two fellows a year are accepted into a contiguous second year adult cardiothoracic anesthesiology (ACTA) fellowship. Over the past 14 years we have trained 59 ACCM Fellows, and this number will increase to 67 at the end of the 2011-12 academic year. All but one of our trainees have been anesthesiologists; one is an obstetrician-gynecologist who practices surgical critical care. Of our graduates, 45 are faculty in academic medical centers, 30 are CCM board certified, 14 are anticipated to take the exam within the next year, and 3 are international graduates who have returned to their home country.

Our ACCM Fellows' year is divided into rotations lasting two to four weeks at a time, and varies between intense clinical coverage, less intense consultative time, and diverse elective time.

The Fellows spend approximately half their year on separate 2-4 week rotations on clinical service in the SICU and CTICU. The SICU accepts about 800 admissions per year and serves a very busy liver transplantation service (about 130 cases per year), kidney-pancreas transplants, complex pancreatic surgery, acute care surgery, thoracic surgery (including pneumonectomy, esophagogastrectomy and lung volume reduction surgery), major vascular surgery, and any subspecialty service (with the exception of neurosurgery) that requires postoperative intensive care. CUMC is also a placenta accreta referral center.

CUMC is a major heart failure center and has the second largest heart transplantation census in the world. The CTICU accepts about 1450 admissions a year, of which about 90 cases are heart transplants, 60-70 cases ventricular assist device (VAD) implantations and 50 cases lung transplantation. There are also busy services in aortic reconstructive surgery, transapical aortic valve replacement (there are two dedicated cardiac hydrid ORs) and adult congenital cardiac surgery.

In the SICU and CTICU the ACCM Fellows work closely with the ICU faculty to lead teams that consist of anesthesiology and surgery residents, physician assistants (PAs), and acute care nurse practitioners (ACNPs). The ACCM Fellows provide 24/7 in-house coverage in SICU and CTICU, averaging about one call per week and one night float week in seven or eight. As such our Fellows play a central role in coordinating critical care and procedures, and are relied upon by our nursing staff, house staff, PAs, ACNPs and surgical and medical colleagues alike.

About a quarter of the year is spent on rotations as the Consult Fellow. This fellow assists with daily triage and evaluates possible ICU admissions from the OR, PACU and step down units. However, this rotation also allows time for study, educational projects, and clinical or laboratory research. Another quarter of the year provides Elective Rotations of the fellows' own choosing – in fact, we have encouraged our fellows to explore creating their own electives. The most popular include the Neuro-ICU, MICU and CCU, but our fellows themselves have helped set up electives or preceptorships in infectious disease, heart failure and transplantation, liver transplantation, hematology, nephrology, ethics, palliative care, nutrition, and interventional radiology. An elective in bedside ultrasonography,

including transthoracic and transesophageal echocardiography (TEE), is an option as well.

Our ACCM Fellows receive a minimum of four hours of didactic education every week. There is a weekly joint tutorial with the ACTA Fellows on TEE that is led by Jack Shanewise M.D., who is the Chief of the Division of Cardiothoracic Anesthesiology. There is a weekly Journal Club that covers classic and late-breaking papers, led by the fellows with input from the ICU faculty. There is a weekly Fellows' Conference, which consists of lectures given by a wide variety of consultants (pulmonary, nephrology, cardiology, infectious disease etc). The Neurocritical Care and Pulmonary Critical Care Fellows also attend many of these conferences. We have a weekly multidisciplinary Critical Care Grand Rounds, in which presentations are given by faculty and fellows from all eight of our ICUs, as well as prominent intensivists from around the globe. Three days a week we conduct "ICU 101", core lectures in critical care for our residents and medical students. In the second half of the year the ACCM Fellows take over these lectures from the ICU faculty, and so get an opportunity to hone their teaching skills.

There are opportunities for ACCM Fellows to become involved in research projects during their year. Our research efforts are led by Hannah Wunsch, M.D., M.Sc., whose training and interests are in ICU outcomes, and Gebhard Wagener, M.D., whose research focuses on biomarkers of injury and perioperative outcome in liver transplantation. Our Fellows are provided an academic allowance to attend major critical care meetings and are fully supported if they are presenting their own scientific work.

Columbia University Medical Center has the good fortune to be located in Washington Heights, the highest ridge in Manhattan, with glorious views of the George Washington Bridge and the Hudson River (had we not been busy with our patients, we would have had a grandstand view of Captain Sully Sullenberger's miracle landing). New York is a metropolis with few peers. Nearly 1.6 million people live on Manhattan's 23 square miles, with over eight million souls when all five boroughs (Manhattan, Bronx, Brooklyn, Queens and Staten Island) are combined. New York's array of cultural, culinary, and ethnic diversity provides unique opportunities. The multitude of neighborhoods and easily accessible suburbs in New York, New Jersey, and Connecticut contain housing of all types – studios to houses – for a variety of budgets and with schools of exceptional quality. New York's subway system and commuter bus and rail system obviates the need for a car for many, but inexpensive onsite parking is available at CUMC.

For more detailed information on the fellowship, please check out our website at **http://www.cumc.columbia.edu/dept/anesthesiology/education/fellowship/critical.html**

To initiate the application process, e-mail our Division Administrative Assistant, Ms. Anke Freude, at **af2409@columbia.edu**, or call her directly at (212) 305-8633.

CUMC ACCM Fellowship Faculty: Robert Sladen M.D., FCCM (Program Director); Vivek Moitra M.D. (Associate Program Director); Tricia Brentjens M.D.; Matthew Coleman M.D.; Brigid Flynn M.D.; Sumeet Goswami MD; Jonathan Hastie M.D.; May Hua M.D. (from Jan 2012); Desmond Jordan M.D.; Steven Miller M.D.; Joseph Rumley M.D.; Peter Salgo M.D.; Julia Sobol M.D.; Gebhard Wagener M.D.; Staffan Wahlander M.D.; Brian Woods M.D.; Hannah Wunsch M.D., M.Sc.

Ultrasonography in Critical Care Medicine Series
Implementing a Critical Care Ultrasound Educational Program in a Teaching Institution

Continued from page 3

critical care ultrasound program, we've decided to uniformly supplement our bedside exams with full echocardiography exams performed by trained sonographers and interpreted by qualified cardiologists. We expect further future collaboration with the cardiology and radiology departments to enhance our QA effort, thus providing high-quality service to our patients and supporting ongoing education of critical care providers.

Conclusions

Our program has certainly seen many achievements and setbacks in the initial stages of the development of a critical care ultrasound curriculum. With time, there appears to be an evolving interest in the program, with which comes greater institutional support. Our goal is to become a fully developed program within the next year. Additional areas of interest involve the use of simulation in critical care ultrasound and the development of scheduled formal workshops available to critical care providers both institutionally and regionally.

Literature Review: Recruitment Maneuvers for ALI and ARDS Patients

Kevin W. Hatton, M.D.
Assistant Professor of Anesthesiology and Surgery
University of Kentucky College of Medicine
Lexington, Kentucky

Article:

Iannuzzi M, De Sio A, De Robertis E, Piazza O, Servillo G, Tufano R. Different patterns of lung recruitment maneuvers in primary acute respiratory distress syndrome: effects on oxygenation and central hemodynamics. *Minerva Anestesiol.* 2010; 76(9):692-8.

Literature Review:

Recruitment maneuvers (RMs) are used by many critical care physicians to improve oxygenation in patients with acute lung injury (ALI) and acute respiratory distress syndrome (ARDS). RMs are designed to maintain an increased airway (and, therefore, alveolar) pressure for a period of time to facilitate recruitment of atelectatic alveoli. RM are not only widely used in the care of patients with ALI/ARDS, but are frequently used in other types of hypoxemia due to alveolar collapse. The use of RM has also recently been published as an integral component of mechanical ventilation for this patient population.[1,2] Although their importance as an adjunctive and supportive therapy has been reasonably well-established, the optimal way to provide a RM remains unanswered, and the authors of this study have attempted to shed some light on this question.[3]

In this prospective, randomized controlled trial, the investigators evaluated the effect that two different RM had on alveolar recruitment, intrathoracic vascular pressure and flow, cardiac function and ventricular filling in patients with primary ARDS. Forty patients with primary ARDS due to hospital-acquired bacterial pneumonia were randomized within 48 hours of admission to the intensive care unit to receive either a recruitment maneuver with a sustained inflation (SI-RM) or with pressure controlled ventilation (PCV-RM). Both these RM strategies were designed to ensure a similar "pressure time product" was achieved.

At the completion of the trial, the investigators noted a statistically significant increase in PaO2, P/F ratio, and respiratory system compliance (Table 1) in the PCV-RM arm; whereas in the SI-RM there was only a non-statistically significant trend toward improvement in these findings (Table 1). In terms of hemodynamic variables, PCV-RM was associated with no statistically significant negative change in CVP or CI; whereas there was a trend toward increased CVP and a statistically significant decrease in cardiac index. On echocardiographic evaluation, there was also a statistically significant decrease in left ventricular end-diastolic and end-systolic area seen with the SI-RM only.

The results of this study suggest that PCV-RM may be equal (or better) to SI-RM with respect to alveolar recruitment (as evidenced by the improvement in oxygenation) with a more stable hemodynamic profile in patients with primary ARDS. It is interesting that the P/F ratio remained less than 300 mmHg in both groups, suggesting that full recruitment (and therefore an incomplete respiratory goal) was not achieved with either strategy. It is unclear whether the use of either an increased pressure or a prolonged time at that pressure would have resulted in improved (or full) recruitment and whether those changes would have changed the outcome of this study.

Despite that limitation, the use of PCV-RM instead of a SI-RM should be considered in patients with ARDS/ALI. It should also be noted that this work does seem to be in line with other previously published studies in somewhat different populations, namely cardiac and neurologic surgery (subarachnoid hemorrhage) that demonstrate similar findings. For now, it seems that PCV-RM may be considered as the preferred method to provide RM, but a larger, more robust study would add considerable weight to this argument.

Table 1: Respiratory System Variables Before and After the Recruitment Maneuver

	SI-RM (PRE)	SI-RM (POST)	PCV-RM (PRE)	PCV-RM (POST)
PAO2 (MMHG)	86.3 ± 23.7	105.2 ± 31.5	88.2 ±20.2	157.6 ± 61.5*
P/F RATIO (MMHG)	141.8 ±40.7	165.7 ±44.4	155 ± 30.8	238.8 ± 86.5*
CRS	32.0 ±11.1	48.0 ± 5.1	30.0 ±9.4	62.0 ± 12.5*

* denotes P<0.05. Adapted from reference 3.

Table 2: Hemodynamic Variables Before and After the Recruitment Maneuver

	SI-RM (PRE)	SI-RM (POST)	PCV-RM (PRE)	PCV-RM (POST)
HR	85.1 ± 15.4	84.3 ± 14.3	86.0 ± 10.5	84.5 ± 13.1
CVP	17.4 ± 2.5	20.4 ± 2.7	18.1 ± 1.8	19.7 ± 2.0
C.I.	3.3 ± 0.9	2.0 ± 0.8*	3.2 ± 0.5	3.4 ± 0.8
PAOP	21.4 ± 2.5	28.4 ± 2.7*	20.4 ± 2.3	19.7 ± 2.0*

* denotes P<0.05. Adapted from Reference 3.

References:

1. Esan A, Hess DR, Raoof S, George L, Sessler CN. Severe hypoxemic respiratory failure: Part 1—Ventilatory strategies. *Chest*. 2010; 137(5):1203-16.
2. Raoof S, Esan A, Hess DR, Sessler CN. Severe hypoxemic respiratory failure: Part 2—Nonventilatory strategies. *Chest*. 2010; 137(6):1437-48.
3. Iannuzzi M, De Sio A, De Robertis E, Piazza O, Servillo G, Tufano R. Different patterns of lung recruitment maneuvers in primary acute respiratory distress syndrome: effects on oxygenation and central hemodynamics. *Minerva Anestesiol*. 2010; 76(9):692-8.

Question

In the study by Iannuzzi and colleagues, a pressure-controlled type of recruitment maneuver was associated with a statistically significant increase in which one of the following:

a. The central venous pressure
b. The P/F ratio
c. The cardiac index
d. Left ventricular end-diastolic area

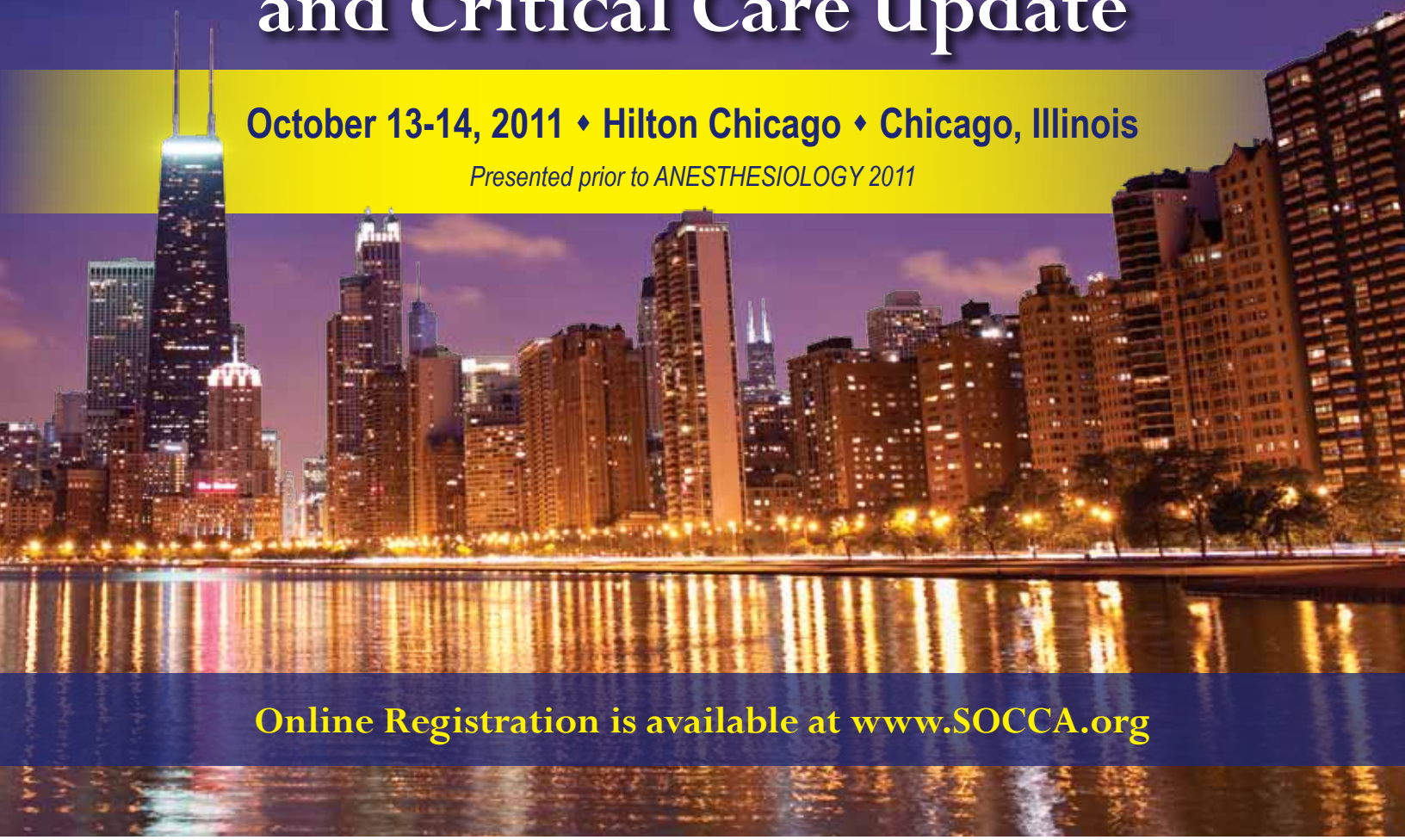
Answer: B

Society of Critical Care Anesthesiologists

24th Annual Meeting and Critical Care Update

October 13-14, 2011 • Hilton Chicago • Chicago, Illinois

Presented prior to ANESTHESIOLOGY 2011



Online Registration is available at www.SOCCA.org

Hotel and Travel Information

Hilton Chicago
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Chicago, Illinois 60605
Phone: (312) 922-4400

The host hotel for the SOCCA 24th Annual Meeting and Critical Care Update is the Hilton Chicago. Please secure your guest room, airline, and rental car reservations through **http://www.Anesthesiology2011.org**

Pre-Meeting Workshop

Perioperative Ultrasound Workshop

Faculty:

Moderator/Introduction
Michael H. Wall, M.D., FCCM

Basic Evaluation of LV and RV Function
Matthias Merkel, M.D., Ph.D.

Basic Evaluation of Aortic and Mitral Valve
Chad E. Wagner, M.D.

Evaluation of Plural Space
Daniel S. Talmor, M.D., M.P.H.

Vascular Access
Benjamin A. Kohl, M.D.

Rescue TEE
Charl A. de Wet, M.D.

Hands-On Faculty
Michael C. Woo, M.D.
Thomas B. Comfere, M.D.

Thursday, October 13, 2011
1:00 - 5:00 p.m.
Hilton Chicago

This hands-on workshop will consist of brief introductory lectures on the use of ultrasound in perioperative medicine, ultrasound for vascular access, basic evaluation of the left and right ventricles, aortic and mitral valves and basic valuation of the pleural space. Following the lectures, participants will have an opportunity to practice basic ultrasound skills on live models using state-of-the-art imaging systems. ***(Limited to 42 registrants)***

Learning Objectives

Upon completion of this workshop the participants should be able to:

1. Describe potential uses of ultrasound in the perioperative setting;
2. Identify normal RV and LV function;
3. Identify normal aortic and mitral valve function;
4. Recognize normal thoracic ultrasound images;
5. Apply ultrasound for vascular access.

SOCCA Breakfast Panel at the ANESTHESIOLOGY 2011

"Hemodynamic Monitoring and Management in 2010"

Sunday, October 16, 2011, 7:00 - 8:15 a.m.

Hyatt McCormick Place – Regency A

Objectives: Upon completion of this learning activity, participants should be able to: 1. Review and critically assess recent literature on the clinical value of hemodynamic monitoring; 2. Identify gaps between literature findings, hemodynamic theory, and clinical practice; 3. Explore alternate theories and strategies to reconcile hemodynamic theory with current literature; 4. Develop a clinical approach to hemodynamic management of critically ill patients.

Reconciling Traditional Hemodynamic Theory with Current Literature

Avery Tung, M.D.
University of Chicago
Chicago, Illinois

In Defense of Traditional Hemodynamic Monitoring: CVP, PAC, CO, DO2

Jeffery Vender, M.D.
Evanston Northwestern Healthcare
Chicago, Illinois

The Widening Gap Between Hemodynamic Theory, Literature and Practice

Vivek K. Moitra, M.D.
College of Physicians and Surgeons
New York, New York

Meeting Schedule

Thursday, October 13, 2011

11:00 a.m. - 3:00 p.m. **Registration for the Perioperative Ultrasound Workshop**

1:00 - 5:00 p.m. **Perioperative Ultrasound Workshop**

Friday, October 14, 2011

6:30 a.m. - 5:30 p.m. **Registration**

7:00 - 7:25 a.m. **Continental Breakfast – Exhibits Open**

7:25 - 7:30 a.m. **Welcome and Introduction**
Vivek K. Moitra, M.D., Ronald Pauldine, M.D.

SESSION I - Multiple Organ Dysfunction Syndrome 2011 (Challenging Conventional Wisdom)

7:30 - 7:40 a.m. **Introduction/Overview of Session**
Vivek K. Moitra, M.D.

7:45 - 8:15 a.m. **Pathophysiology of Sepsis and ARDS: Have We Finally Gotten it Right?**
Clifford S. Deutschman, M.D.

8:15 - 8:45 a.m. **Long-term Outcomes After MODS/Chronic Critical Illness**
Hannah Wunsch, M.D., M.Sc.

8:45 - 9:15 a.m. **Nitroglycerin and Lactate Guided Resuscitation in Sepsis**
Jan Bakker, M.D., Ph.D.

9:15 - 9:45 a.m. **Break and Exhibits**

9:45 - 10:30 a.m. **PRO: ICU Trials Show Progress**
Carlee A. Clark, M.D.

CON: ICU Trials Are Equivocal
Joseph S. Meltzer, M.D.

10:30 - 11:00 a.m. **Rethinking MODS and Concluding Remarks**
(Maybe the Disease Isn't All We Believed It To Be)
Clifford S. Deutschman, M.D.

11:00 - 11:25 a.m. **Young Investigator Award and Presentation**
"The Frank-Starling Relationship is Absent in Patients with Pulmonary Hypertension: A 3-Dimensional Transesophageal Euchocardiographics Study in Patients Undergoing Cardiac Surgery"
Recipient: Daniel S. Rubin, M.D.
Presenter: Brenda G. Fahy, M.D.

11:25 - 11:30 a.m. **Introduction of ASA President-Elect**
Michael F. O'Connor, M.D.

11:30 - 11:50 a.m. **ASA President-Elect Address**
Jerry Cohen, M.D.

11:50 a.m. - 1:00 p.m. **Lunch and Lifetime Achievement Award Presentation**
"An Unfocused Path"
Recipient: Stanley H. Rosenbaum, M.D.

SESSION II - Lessons Learned from Military Critical Care

1:00 - 1:45 p.m.	**Rethinking Civilian Critical Care 2011** Todd E. Carter, M.D.
1:45 - 2:25 p.m.	**Moderated Poster Session**
2:25 - 2:40 p.m.	**Break and Exhibits**
2:40 - 3:00 p.m.	**SOCCA-FAER- Hospira Physician Scientist Award Lecture** ***"Cerebrovascular Autoregulation After Pediatric Cardiac Arrest"*** Jennifer K. Lee-Summers, M.D.

SESSION III: Education and Technology

3:00 - 3:45 p.m.	**PRO: My Generation is Better (What Has Worked Well in Medical Education)** Douglas B. Coursin, M.D.
	CON: My Generation Rocks (Does Generation Y Learn Differently?) Aaron M. Joffe, D.O.
3:45 - 5:15 p.m.	**Learning From Diversity: How Do We Teach, Learn, and Get Better if Everybody Does It Differently** Avery Tung, M.D.
	Ultrasonography – Replacing Our Stethoscope! How Do We Get It Done Michael H. Wall, M.D., FCCM
	Role of Simulation/learning Skills for Rare Events Steven J. Lisco, M.D.
5:15 - 6:00 p.m.	**SOCCA Annual Business Meeting**
6:00 - 7:45 p.m.	**Welcome Reception**

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* NOTE: This committee consists of the Immediate Past President (Chair of the Committee), the President and the President-Elect and at least one Director.