N E W S L E T T E R

Society of Critical Care Anesthesiologists SOCCA

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President's Column

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Recognizing the need to streamline and simplify the process of matching fellows with fellowship programs, the Society of Critical Care Anesthesiologists (SOCCA) has sponsored the first match program for critical care since 2013, using San Francisco Match. The SF Match Program alleviates the pressure of coordinating interviews and forced early decisions by coordinating all appointments between applicants and Program Directors.

Critical care fellowship programs are closely tied to the mission of SOCCA to foster and nurture the education of anesthesiologists in the care of critically ill patients. SOCCA believes in helping anesthesia residents find the right fit for their fellowship – the place where he or she can find the guidance and mentorship they need to build the knowledge needed to be successful in his or her practice of critical care medicine. This is one of the many reasons that SOCCA continues to champion this fellowship match program each year.

The Critical Care Anesthesiology Fellowship Match, organized by Dr. Miko Enomoto, takes place in May and is used to process all applicants who want to start their fellowship training in July of the following year. This program includes a minimum of 12 months of training with at least nine months of training focused on the care of critically ill patients in the ICU. An anesthesia resident may enter the match after completing a minimum of four months of critical care training during the 48-month continuum training. Each fellowship program application and interview process varies.

Since SOCCA first sponsored the Critical Care Anesthesiology Fellowship Match Program in 2013, the number of participating programs has increased from 47 in 2014 to 54 in 2016 from 27 different states in the U.S. as well as the District of Columbia. In 2014, 196 anesthesia residents applied to the Critical Care Fellowship Match, 150 positions were offered and 127 were placed in a participating fellowship program. In 2015, 189 anesthesia residents applied, 167 positions were offered and 137 positions were filled. SOCCA is confident that the success of this program will increase as programs and participants increase and information on the program's benefits continue to be shared. New programs continue to join the SF Match. University of Arizona signed on in February of this year.

In addition to this match program for critical care, SOCCA also launched a Program Directors List Serv where Critical Care Program Directors can meet and discuss pressing issues of the moment and share strategies for improving their programs. SOCCA's committee structure supports fellowship training and provides a forum annually for a Fellowship Directors' Breakfast that takes place the morning after the SOCCA Annual Meeting.

SOCCA will continue to support programs like the Critical Care Anesthesiology Fellowship Match which help early-career critical care residents and fellows in anesthesia grow and better navigate their careers with the guidance, mentoring and access to the resources they need to be successful.

To learn more about the Critical Care Anesthesiology Fellowship Match Program, click here. The complete list of participating fellowship programs, including contact information, may be found on the SOCCA website here.

Match Programs for Critical Care Fellows

See Page 2 for Participating Programs in the Critical Care Anesthesiology Fellowship Match Program

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President's Column – Match Programs for Critical Care Fellows

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Current Fellowship Programs in San Francisco Match as of February 2016 Include:

Alabama:
- University of Alabama Medical Center Program, University of Alabama at Birmingham

Arizona:
- University of Arizona – joined on February 23

California:
- University of California (Irvine) Program, University of California (Irvine) Medical Center
- University of California (San Diego) Program, University of California (San Diego) Medical Center
- Stanford University Program, Stanford University School of Medicine
- University of California (San Francisco) Program, University of California San Francisco
- Loma Linda University Program, Loma Linda University
- UCLA Medical Center Program, UCLA Department of Anesthesiology

Colorado:
- University of Colorado Program, University of Colorado School of Medicine

Florida:
- Jackson Memorial Hospital / Jackson Health System Program, University of Miami, Miller School of Medicine
- University of Florida Program, University of Florida Medical Center

Georgia:
- Emory University Program, Emory University Hospital
- Medical College of Georgia

Illinois:
- McGaw Medical Center of Northwestern University Program, Northwestern University Feinberg
- University of Chicago Program, University of Chicago

Iowa:
- University of Iowa Hospitals and Clinics Program, University of Iowa Hospitals and Clinics

Kentucky:
- University of Kentucky College of Medicine Program, University of Kentucky

Maryland:
- National Capital Consortium Program, Walter Reed National Military Medical Center
- University of Maryland Program, University of Maryland Medical Center
- Johns Hopkins University Program, Johns Hopkins Hospital

Massachusetts:
- Beth Israel Deaconess Medical Center Program, Beth Israel Deaconess Medical Center
- Massachusetts General Hospital Program, Massachusetts General Hospital
- University of Massachusetts Program, University of Massachusetts Medical School
- Brigham and Women's Hospital Program, Brigham and Women's Hospital

Michigan:
- University of Michigan Program, University of Michigan Health System

Minnesota:
- College of Medicine, Mayo Clinic (Rochester) Program, Mayo School of Graduate Medical Education

Missouri:
- Washington University/B-JH/SLCH Consortium Program, Washington University Medical Center Campus

Nebraska:
- University of Nebraska Medical Center Program, University of Nebraska Medical Center Department of Anesthesiology

New Hampshire:
- Dartmouth-Hitchcock Medical Center Program, Dartmouth-Hitchcock Medical Center

New York:
- Columbia University Medical Center at New York Presbyterian Hospital Program, College of Physicians & Surgeons of Columbia University
- New York Presbyterian Hospital Weill Cornell Medical Center (Weill Cornell Program)
- University of Rochester Program, University of Rochester Medical Center
- SUNY Health Science Center at Brooklyn Program, SUNY Health Science Center at Brooklyn
- Icahn School of Medicine at Mount Sinai, Mount Sinai Hospital

North Carolina:
- Duke University Hospital Program, Duke University Medical Center

Ohio:
- Ohio State University Hospital Program, Ohio State University
- University Hospital/University of Cincinnati College of Medicine
- Case Western Reserve University, University Hospitals of Cleveland
- Cleveland Clinic Foundation Program, Cleveland Clinic Foundation-G58

Oregon:
- Oregon Health & Science University Program, Oregon Health & Science University – 2 specialty programs offered (critical care and neocritical care anesthesia)

Pennsylvania:
- University of Pennsylvania Program, Hospital of the University of Pennsylvania
- UPMC Medical Education Program, University of Pittsburgh Medical Center

South Carolina:
- Medical University of South Carolina Program, Medical University of South Carolina

Tennessee:
- Vanderbilt University Program

Texas:
- Texas A&M/Scott & White Healthcare
- University of Texas Health Science Center at San Antonio Program, University of Texas Health Science Center
- University of Texas at Houston Program, Univ of Texas Med Sch Houston
- University of Texas Medical Branch Hospitals Program, University of Texas Medical Branch
- University of Texas Southwestern Medical School Program, University of Texas Southwestern Medical School

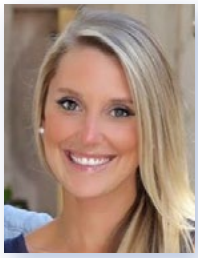
Virginia:
- University of Virginia Critical Care Anesthesia Fellowship, University of Virginia Dept of Anesthesiology

Washington:
- University of Washington Program Harborview Medical Center

Washington, DC:
- George Washington University Program, George Washington University Hospital

Wisconsin:
- University of Wisconsin Program, University of Wisconsin School of Medicine and Public Health B6/319 CSC
- Medical College of Wisconsin Affiliated Hospitals Program, Froedtert Memorial Lutheran Hospital

Anesthesiology Critical Care Medicine Fellowship at the University of California San Diego – A unique educational experience in America's Finest City!



Kimberly A. Pollock, MD
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The Department of Anesthesiology at the University of California San Diego (UCSD) offers a unique and exciting critical care training experience for its fellows, with specific emphasis on the management of cardiac surgery patients and perioperative echocardiography training.

UCSD currently provides critical care services and education at three clinical sites, with a fourth to open in 2016. The majority of fellowship training takes place at the Sulpizio Cardiovascular Center Intensive Care Unit (CVC ICU) in La Jolla. This unit has 12 ICU beds for patients who have undergone complex cardiovascular procedures, including heart and lung transplants, ventricular assist device placement, heart valve replacement, coronary artery bypass grafting, and trans-catheter aortic valve replacement. Additionally, fellows become proficient at managing the intricacies of extracorporeal membrane oxygenation (ECMO) and caring for patients who have undergone major thoracic and vascular procedures. Fellows participate in multidisciplinary rounds each morning with representatives from heart failure cardiology, CT surgery, inpatient pharmacy, and social work. Critical care fellows have the unique opportunity to work closely with cardiothoracic surgeons and anesthesiologists in the perioperative period. There is a mutually respectful, cooperative relationship between our teams, which makes the environment both amicable and conducive to learning. Our Anesthesiology Critical Care Medicine (ACCM) Service oversees all surgical patients in the Cardiovascular Intensive Care Unit 24 hours a day and provides 24-hour airway management for the hospital.

The Thornton Hospital Intensive Care Unit (TICU) located next door to the Sulpizio CVC in La Jolla, cares for patients who have undergone neurosurgical, general surgical, urologic, gynecologic, and orthopedic procedures. Medical ICU patients are also admitted here, under the care of Pulmonary Critical Care Medicine.

Top: Sulpizio Cardiovascular Center,
Bottom: UCSD Medical Center Hillcrest

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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: jbrandmd@gmail.com.

Anesthesiology Critical Care Medicine Fellowship

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Our faculty are also active in the 20 bed Surgical/Trauma ICU and the Neurosciences Critical Care Unit, both of which are located at UC San Diego Medical Center Hillcrest. Examples of cases seen here include liver, kidney, and pancreas transplants, trauma, orthopedic, general surgical, urologic, high-risk obstetric, and complex neurosurgical procedures. Fellows have the opportunity to rotate through these ICUs, as well as through the Burn ICU and Medical ICUs. A unique opportunity that this fellowship offers is the experience to rotate through our Neurosciences Critical Care Unit. UCSD is a certified comprehensive stroke center that cares for a wide variety of complex critically ill patients including those suffering from hemorrhagic and embolic strokes, seizure disorders, and encephalopathies. Our fellows receive broad training from neuro-intensivists with both medicine as well as anesthesia backgrounds.

Additional opportunities for expansion of our critical care services include Jacobs Medical Center (below), which will be opening in La Jolla in 2016.

Elective opportunities are abundant and well supported by faculty members. Each fellow is granted approximately 3 months of dedicated research/elective time. There are new opportunities beginning in 2016 to work with Interventional Pulmonary Medicine, where fellows can gain experience placing thoracostomy tubes and performing bedside percutaneous tracheostomies and endobronchial ultrasounds/biopsies with certified Interventional Pulmonologists. Fellows can also rotate with the cardiothoracic surgeons in the operating room to gain exposure to some of the procedures they will manage post operatively. Specific rotations in echocardiography, as well as FAST exam training, are also available, and fellows have access to state-of-the-art bronchoscopy and echocardiography simulators 24 hours a day. UCSD serves a unique population

of patients with chronic thromboembolic pulmonary hypertension (CTEPH) and rotating with the Pulmonary Hypertension Service can offer invaluable experience in managing postoperative pulmonary thromboendarterectomy patients. Other more traditional electives are also available to fellows including, but not limited to: palliative care, renal, infectious disease, and transplant medicine. The opportunities are endless and the schedule allows for much personal autonomy and growth. Fellows are required to complete an academic project, as well as a quality improvement project, for which the faculty provide mentorship. Our critical care faculty are engaged in multiple ongoing research projects and provide opportunities for interested fellows to become involved in whatever capacity they desire.

San Diego is an undeniably beautiful city with a plethora of activities to enjoy outside of the hospital. Thornton Hospital is located less than 5 miles from the beach and is situated just south of Torrey Pines State Natural Reserve which offers panoramic vistas as well as hiking trails leading down to the sandy shore of the Pacific Ocean. Whether you enjoy surfing, hiking, biking, or just a warm walk in the sunshine, San Diego has something to offer everyone. San Diego is a city filled with breathtaking views, down to earth people, perfect weather, as well as an opportunity for those interested to receive one of a kind training in Critical Care Medicine.

Our fellowship program is an ACGME-accredited, one-year program, with eleven active faculty. We have three positions starting each July. If you are interested in becoming part of our team, please contact our Fellowship Program Director, Dr. Kimberly Robbins, at **krobbins@ucsd.edu**, or our Fellowship Program Coordinator, Ms. Julie Nguyen, at **junguyen@ucsd.edu**. Please also visit our website at **http://goo.gl/is7Tdx**.

Register by April 18 *and* Save!

SOCCA 29th Annual Meeting and Critical Care Update
May 20, 2016 • San Francisco, California

Join the Leaders in Critical Care Anesthesiology on Friday, May 20 in San Francisco!

The SOCCA 29th Annual Meeting and Critical Care Update offers a stimulating program where attendees will discuss the latest updates in the practice of critical care medicine, review original investigations and research, and examine recent cutting-edge discoveries.

Register for the SOCCA 29th Annual Meeting and Critical Care Update and Stay An Extra Day for the SOCCA Focus on Critical Care Day on Saturday, May 21!

Take advantage of the SOCCA Focus on Critical Care Day sessions and the new Aligned Meeting Day on Saturday, May 21 at the IARS 2016 Annual Meeting. SOCCA full registrants attend these sessions as part of their SOCCA registration fee!

Society of Critical Care Anesthesiologists
SOCCA

For updated information and to register today, visit **www.socca.org**.

SOCCA 29th Annual Meeting and Critical Care Update
May 20, 2016 | San Francisco, California

Friday, May 20, 2016 • Program Schedule*

7:00 am – 5:00 pm	Registration
7:00 am – 8:00 am	Continental Breakfast with Exhibitors
8:00 am – 8:30 am	Welcome Address
8:30 am – 10:30 am	**Education Session I** ***The Anesthesiologist-Intensivist and the Current Era of Healthcare Reform*** **Presenters:** **Daniel R. Brown, MD, PhD, FCCM,** *Mayo Clinic, Rochester, Minnesota* **David L. Reich, MD,** *The Mount Sinai Hospital, New York, New York* **Avery Tung, MD, FCCM,** *The University of Chicago, Chicago, Illinois*
10:30 am – 11:00 am	Break with Exhibitors
11:00 am – 12:00 pm	**Education Session II** ***Big Data in Critical Care*** **Presenters:** **James M. Blum, MD,** *Emory University School of Medicine, Atlanta, Georgia* **Jesse M. Ehrenfeld, MD, MPH,** *Vanderbilt University Medical Center, Nashville, Tennessee* **Daniel S. Talmor, MD,** *Beth Israel Deaconess Medical Center, Boston, Massachusetts*
12:00 pm – 12:30 pm	*SOCCA Lifetime Achievement Award Presentation*
12:30 pm – 1:30 pm	Lunch Syposium (non CME)
1:45 pm – 3:00 pm	**Education Session III** ***Trials You Should Be Aware Of: An Update From the Critical Care Research Networks*** **Presenters:** **Raquel R. Bartz, MD,** *Duke University School of Medicine, Durham, North Carolina* **Shahzad Shaefi, MD,** *Beth Israel Deaconess Medical Center, Boston, Massachusetts* **Hannah Wunsch, MD,** *University of Toronto, Toronto, Ontario, Canada*
3:00 pm – 3:15 pm	*SOCCA Young Investigator Award Presentation*
3:15 pm – 4:00 pm	Moderated Poster Session
4:00 pm – 4:15 pm	Break with Exhibitors
4:15 pm – 5:15 pm	**Education Session IV** ***Update on Devices for the Failing Organ in the ICU*** **Presenters:** **Joseph S. Meltzer, MD,** *UCLA Medical Center, Los Angeles, California* **Peter von Homeyer, MD,** *University of Washington, Seattle, Washington* **Gebhard Wagener, MD,** *Columbia University, New York, New York*
5:15 pm – 5:30 pm	Closing Remarks
5:30 pm – 6:15 pm	SOCCA Annual Business Meeting
5:30 pm – 6:30 pm	Resident/Fellow Program
6:15 pm – 7:30 pm	SOCCA Reception with Exhibitors

Preliminary schedule.* **Check back at www.socca.org for continued updates to the Education Program.

A Brief Conversation with…Dr. Philip Boysen

Philip G. Boysen, MD
Medical Director, Patient Safety Education Co-Director Surgicial ICU
Ochsner Health System
New Orleans, Louisiana

Dr. Philip Boysen, MD is the 2015 Society of Critical Care Anesthesiologists Lifetime Achievement Award recipient. In addition, he is an integral part of the Anesthesiology Faculty at Ochsner Medical Center in New Orleans, LA and is previous Chair of the Department of Anesthesiology at the University of North Carolina in Chapel Hill, NC.

1. What have been the most important contributors to your long term success?

For me, balancing life, family and a career to achieve my short and long term goals has always been the foundation for my success. There have, obviously, been bumps and disappointments along the way but I have found ways to capitalize on these so-called learning opportunities. In this, I have had, I think, four essential mentors in my life, each playing their own individual role in my life and sharing much-needed advice at very specific times and at different seasons of my life. I doubt I would have been able to achieve my personal or professional successes without the wisdom that each one of these people provided me.

2. It sounds like your mentors were very important to you. How do you think a junior faculty member or critical care medicine fellow should find their first mentor?

Many people confuse the roles that a coach and a mentor play in your life. A coach is focused on your work organization or the completion of specific goals and tasks that are necessary as part of your job. Coaches help you to focus on ways to work harder, smarter, or better toward the overall goals that are set by you or your boss. A mentor, on the other hand, is concerned with the development of those goals and the overall advancement of your career. Frequently, this person is considered an outsider to the organization and may exist outside of your department, your college or your university. A mentor does not see or care about the specific short-term goals of the organization and should never be a direct (or even indirect) report for you. Many of the suggestions that a mentor provides may even be in direct conflict with the suggestions that a coach would make in the same situation—highlighting the different roles that coaches and mentors play in your life.

It seems that sometimes we want a mentor … but find a coach. Sometimes, we want a coach…but find a mentor. Understanding the roles that both mentors and coaches play in our lives and aligning those roles with the desired outcome is the best first step for junior faculty. Essentially, you need to answer the question: do you want this person to be a coach to help you do your job better or do you want him or her to be a mentor to help you understand what you will need to do in the long term to be successful? Coaches can be assigned by the organization or your boss…you can even be your own coach. Mentors, on the other hand, should never be assigned, they have to be found, the relationship must be cultivated and they can only accept the responsibility for challenging their protégé to become something more.

3. You described a setback earlier in this conversation. How did that setback help you to succeed in ways that you would not have succeeded if you had not encountered that setback?

Of several, the one that comes to mind most readily occurred early in my career, when I was fortunate to work for a chair (in medicine) who allowed me to pursue my interests in anesthesiology and complete my anesthesiology residency. From this, I built a career within the Department of Anesthesiology and the Division of Critical Care Medicine. Unfortunately, when the time came to choose a new anesthesiology chair within the institution, I did not succeed in my bid to become chair of that department. This felt like a setback in my career; however, it drove me toward additional options and careers outside of the comfortable confines of my home institution. After additional consideration, I realized that I needed to revise what I needed in my life and what I needed from a Dean of the medical school if I was truly going to be successful as a department chair.

4. You were the Chair of Anesthesiology for 12 years. During that time, you were instrumental in building up the Department of Anesthesiology within the University system. What attributes did you find most important as chairmen of that department?

Again, the mentors that I had found and that I would continue to find helped me to grow into a successful chairman. I developed a fantastic relationship with the chair of surgery, realizing that the clinical mission of the department (and the hospital) cannot be met without the mutual co-dependency of the departments of surgery and anesthesiology. As a way to grow this connection, I maintained an active clinical commitment in the midst of my administrative responsibilities. Finally, I always attempted to recruit the best people, then retain them and keep them productive. This was not always easy to do and I may

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not have always been as successful as I had wanted to be, but it was always a goal I had as chairman.

5. **Are there any last thoughts you might have for junior faculty members and critical care medicine fellows?**

   Take the opportunities that come along… because sometimes those opportunities pay off…and sometimes in ways that you might never expect. Also, don't be so concerned about your early academic rank and the sense of urgency to move your life forward. Those feelings probably don't help and may actually keep you from reaching your goals in the long term. Stay close and connected to your family. To this day, I remain very close to my children (and, now, my grandchildren) and am happy that I always made this a priority. Lastly, find smart people around you that care about you and that will help you think both about the clinical problems that you encounter but also about the world around you.

This interview was conducted by:
Kevin W. Hatton, MD, FCCM
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Associate Editor, SOCCA Interchange

PRO: Extracorporeal Membrane Oxygenation (ECMO) In Cardiac Arrest

Gurbinder Singh, MD
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Sudden cardiac arrest is responsible for roughly five to six percent of total deaths in developed countries.[1] In the United States alone, there have been around 450,000 deaths annually due to sudden cardiac arrest. Despite to date advances in advanced cardiac life support (ACLS), emergency medical services (EMS), and wide-spread basic life support (BLS) training, the outcome after cardiac arrest remains poor; survival to discharge for out of hospital arrest has been found to be as low as eight percent.[2]

Extracorporeal cardiopulmonary resuscitation (ECPR) is the rapid deployment of veno-arterial extracorporeal membrane oxygenation (VA ECMO) or cardiopulmonary bypass, to provide immediate cardiovascular and ventilator support for patients who develop cardiac arrest unresponsive to conventional CPR measures. ECPR has received much attention in the last decade with more some promising results in adults and children.

Extracorporeal cardiopulmonary resuscitation utilizes VA ECMO in patients who do not return to spontaneous circulation with traditional CPR in a reasonable amount of time. The improved metabolic profile that comes with improved circulation can improve the chances of successful defibrillation. It can also prevent the incidence of subsequent arrests by off-loading the heart and decreasing the myocardial oxygen requirement. Most importantly, it provides the opportunity to correct the underlying cause of the arrest such as to perform percutaneous coronary intervention or saddle pulmonary embolus extraction, or to enable successful defibrillation secondary to intoxication and hypothermia. In cases where a poor neurological outcome is confirmed (brain death), VA ECMO can help perfuse the organs prior to procurement.

"Research over the last decade has found some promising results with ECPR studied in patients after in-hospital cardiac arrest (IHCA) and out-of-hospital cardiac arrest (OHCA)."

The first NIH-sponsored RCT for the use of ECMO in adults dates from the 1970s where VA ECMO was compared to standard of care, conventional mechanical ventilation in patients with refractory respiratory failure. Results in the VA ECMO treated group were no different than the conventional treatment group, with a mortality of 10%.[3] The early attempts at using VA ECMO were associated with a greater incidence of bleeding complications secondary to higher anticoagulation targets. Outcomes were believed to be worse due to patient selection and different perfusion and ventilation techniques compared to current recommended practices. Reported long term complications with bypassing the lung circulation via VA ECMO are believed to include pulmonary micro-thrombosis and fibrosis, an effect of prolonged time spent on VA ECMO. Overall, less complications with ECPR have been observed when patients receive shorter courses (less than a week) of VA ECMO.[4,5]

Research over the last decade has found some promising results with ECPR studied in patients after in-hospital cardiac arrest (IHCA) and out-of-hospital cardiac arrest (OHCA). Thiagarajan et al. showed a 27% survival in adults for cases where ECPR was used to support resuscitation. This data was extracted and analyzed from the extracorporeal life support registry (ESLO), collected from (1992-2007). Variables used in the authors' analysis included patient age, diagnosis, procedure codes, type and duration of ECMO support, pre-ECMO mechanical ventilator and patient support details, lowest pre-ECMO arterial blood gas value, ECMO complications, and in-hospital mortality. Location of arrest (in- or out-of hospital) and other confounding factors were not specified in this study.[4] In a 2008 observational study, Chen and colleagues showed a statistically significant difference in mortality for in-hospital cardiac arrest: 32.6% survival to hospital discharge in the ECPR group compared to 17.4% in the conventional CPR group.[6] In a retrospective study by Jung et al, fifty-two percent of patients were successfully

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PRO: Extracorporeal Membrane Oxygenation (ECMO) In Cardiac Arrest

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weaned off ECMO after receiving it during CPR for in-hospital cardiac arrest; thirty day survival rate was twenty-three percent and good neurological outcome was present in fifteen percent of these patients.[7]

In a recently published single center prospective observational study (CPR, Hypothermia, ECMO and Early Reperfusion-CHEER Trial), a protocol was instituted by critical care physicians for refractory cardiac arrest in selected patients after IHCA and OHCA. A total of 26 patients were eligible, 11 with OHCA, 15 with IHCA, between 38–60 years of age. Percutaneous coronary intervention was performed on 11 (42%) and 1 patient had a pulmonary embolectomy. Return of spontaneous circulation (ROSC) was achieved in 25 (96%) patients, 2 of whom had ROSC prior to ECMO being instituted. Median duration of ECMO support was 2 (1–5) days, with 13/24 (54%) patients successfully weaned from ECMO support. Survival to hospital discharge with full neurological recovery, cerebral performance category (CPC) score 1 occurred in 14/26 (54%) patients. The study conclusions were that the CHEER protocol appears to be a successful approach for the management of selected patients with refractory OHCA and IHCA.[8]

The probability of return to spontaneous circulation decreases significantly with the length of cardiopulmonary resuscitation.[9] Due to the low success rate of traditional CPR and its frequent inability to provide a sufficient time period to correct the underlying etiology of the cardiac arrest, ECPR is now considered a viable option to provide a bridge to recovery or intervention.

In conclusion, although RCTs are needed, the potential benefits suggested by observational studies in selected patients in a number of different clinical settings argue that ECPR should be available as part of cardiopulmonary resuscitation. In the process of deciding whether to offer this modality, likelihood of organ recovery should be considered. The time limit for organ recovery on ECMO represents an ongoing ethical question for care teams, patients and families.[10] Continued work in this area will hopefully address some of the challenges with VA ECMO such as thrombotic and bleeding complications, cost-benefit analysis, as well as encourage widespread institutional readiness to enable establishment of ECPR as a standard therapeutic modality in the cardiac arrest algorithm.

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Visit the SOCCA website at:
www.SOCCA.org

Membership

Membership in SOCCA is open to all anesthesiologists who have an interest in critical care medicine; non-anesthesiologist-physicians and scientists who are active in teaching or research relating to critical care medicine; residents and fellows in approved anesthesiology programs; and full-time medical students in an accredited school of medicine.

SOCCA Annual Dues

Active Membership: $160
Affiliate Membership: $110
Educational Membership: $25
Medical Student Membership: Free

Dues may be paid online at
www.SOCCA.org/membership.php

CON: Extracorporeal Membrane Oxygenation (ECMO) In Cardiac Arrest

Michael Andrews, MD
ICU Fellow
New York Presbyterian Hospital
Weill Cornell Medical Center
New York

Introduction:

With the publication of the CESAR Trial in 2009, the international medical community has taken a renewed interest in examining and investigating a wide variety of patient populations that may benefit from ECMO intervention. A particular area of interest in recent years concerns the use of ECMO in the management of in-hospital cardiac arrest (IHCA) and out-of-hospital cardiac arrest (OHCA). In the last decade, there has unquestionably been an increased use of ECMO for IHCA and OHCA; however, it is paramount that physicians are aware of both the benefits and drawbacks of this emerging technology.

Discussion:

The use of venous-arterial ECMO to assist in Cardiopulmonary Resuscitation (ECPR) has limited supporting evidence.[1] While there is evidence in the literature to support the use of ECPR in cardiac arrest secondary to hypothermia and drug intoxication, its implementation in cardiac arrest due to other etiologies has not shown as much benefit.[2] The CPS Chen Lancet Study demonstrated a statistically significant difference for patients who suffered from IHCA, with a survival to hospital discharge percentage of 32.6% in the ECPR group compared to 17.4% in the conventional CPR group.[3] However, closer review of this study reveals that patients in the ECPR group had a higher incidence of LVAD and heart transplant intervention. Furthermore, the first documented rhythm of ventricular tachycardia or ventricular fibrillation was much higher in the ECPR group (49% ECPR vs. 32% CPR), whereas the first documented rhythm of asystole was higher in the CPR group (27% CPR vs. 22% ECPR).[3,4]

The SAVE-J Trial attempted to more closely examine the benefits of ECPR after OHCA. Four hundred fifty-four (454) patients were followed over three (3) years in this multi-center trial which showed a statistically significant difference in favorable neurological outcome between ECPR and standard CPR groups (13.7% ECPR vs. 1.9% CPR at 1 month).[5] However, the rates of use of targeted temperature management (therapeutic hypothermia) and intra-aortic balloon pump placement were higher in the ECPR group, possibly confounding the results. Also, the 46 centers involved in this trial performed either ECPR or CPR, but not both therapeutic modalities at the same center.[4,5]

"Another key factor that affects the outcome of ECPR is the time from cardiac arrest to the initiation of ECPR."

Analysis of the data provided by the Extra-corporeal Life Support Organization (ELSO) showed a poor survival rate (29%) when ECMO is initiated after cardiac arrest irrespective of the underlying cause.[6] Patients with cardiac arrest due to pulmonary embolism demonstrated a 37%-57% chance of survival to discharge with ECPR, and those with drug intoxication showed a rate as high as 86%. Other etiologies, such as viral cardiomyopathy and refractory arrhythmia, had a much lower chance of survival to discharge.[1]

Another key factor that affects the outcome of ECPR is the time from cardiac arrest to the initiation of ECPR. A survival rate of 50% was determined when ECPR was initiated within 30 minutes of cardiac arrest. However, the survival rate decreased to 30% between 30 and 60 minutes and 18% after 60 minutes of time elapsed.[2] While determination of the time from cardiac arrest to initiation of ECPR can easily be made in the hospital setting, the same cannot be said for out-of-hospital cardiac arrests.

Conclusion:

The increasing use and acceptance of ECPR by the international medical community over the past decade has been striking. There have been several reports in the literature of improved patient outcomes and survival benefits when ECPR is initiated early and effectively, which is likely why ECPR has shown more promising results in treating IHCA, as compared to OHCA.[3,5] Nevertheless, it is paramount that we not rush to institute this novel treatment modality in a generalized and non-structured manner.

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CON: Extracorporeal Membrane Oxygenation (ECMO) In Cardiac Arrest

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Outcomes of cardiac arrest patients treated with ECPR are highly dependent upon the expertise of the ECMO team at each separate institution, as well as appropriate patient selection. Furthermore, ECPR is an extremely costly intervention, as was shown in the CESAR Trial.[8] This leads one to reasonably question how feasible and practical ECPR initiation would be, especially at smaller and regional medical centers. Performing ECMO safely and effectively requires that appropriate equipment, staffing and ICU availability are present at all times.

The crux of ECPR feasibility involves the rapid and accurate determination of the underlying etiology of the cardiac arrest. Patients who have not had a cardiac arrest secondary to hypothermia, acute myocardial infarction or drug intoxication are unlikely to benefit from ECPR. In addition, patients who have suffered cardiac arrest for greater than 30 minutes are also unlikely to benefit.[1] Furthermore, there is no strong evidence validating the use of ECPR in OHCA patients at this time.

Finally, there have not been any cost-benefit analyses examining ECMO in cardiac arrest patients in order to legitimize its generalized, wide-spread use. For all the above reasons, while this modality may prove beneficial in certain circumstances, it is premature to recommend its broad implementation at this time.

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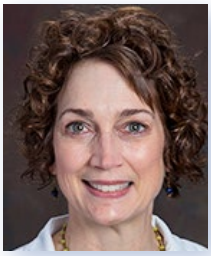

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