The
Academy
NEWSLETTER

THE AMERICAN ACADEMY
OF
CARDIOVASCULAR PERFUSION
515A EAST MAIN STREET
ANNVILLE, PA 17003
(717) 867-1485 PHONE OR FAX
OFFICEAACP@AOL.COM
HTTP://WWW.THEAACP.COM

WINTER 2015

Inside This Issue

2016 Annual Meeting

As the sun sets on this current year, and we start to look upon the dawn of another New Year I would like you all to consider joining us for the 37th Annual Seminar of The American Academy, in Savannah, GA this February 4-7, 2016.

This years meeting is focusing on empowering the perfusionist.

The Friday morning special session will feature presentations and discussion about *Waterborne Bugs and Heater-Cooler Design*, so we hopefully will gain a better understanding surrounding the recent issues with some heater-coolers.

The Friday afternoon session will be on *Human Factors, Safety, & OR Design: Empowering the Perfusionist* and will provide a wide array of speakers.

- Mr. Dann Runik be speaking to us on *Building a Safe Team Through Standardization.*
- Mr. Runik serves as an instructor for Gulfstream aircraft and works with Gulfstream Aerospace on issues of procedure and courseware development, and other special projects, has been a Delta Airlines Boeing 747-400 Captain since 1983, previously flew for Flying Tigers, and worked on the Space Shuttle program as a Staff Engineer at Rockwell International, holds ATP Multi-Engine, Turbojet Flight Engineer, and A&P Mechanic licenses. He will be speaking to us on *Building a Safe Team Through Standardization.*
- Scot Schappel, PhD, will be speaking on *Cardiac Surgery (surgical) Flow Disruptions, HFACS, CVOR Performance.* Dr. Shappell is currently Professor and Chair of the Department of Human Factors and Systems at Embry-Riddle Aeronautical University. He has served nearly 20 years (11 years on active duty) in the U.S. Navy as an Aerospace Experimental Psychologist. During his time in the US Navy, he served as the Human Factors Branch Chief at the U.S. Naval Safety Center and as a human factors accident investigation consultant for the Joint Service Safety Chiefs. While noted for his work in aviation, Dr. Shappell has been involved in a variety of industries including petrochemical industry, forensic science, mining, and medicine.
- Ken Catchpole, PhD, was Director of Surgical Safety and Human Fac-

Continued on Page 2

Continued from Page 1

tors Research at Cedars-Sinai Medical Center, and is currently relocating to the Medical University of South Carolina. He has pioneered direct observation and human factors improvement techniques in surgery, he joined Cedars-Sinai from the University of Oxford in 2011 to embark on projects in trauma, hand offs, teamwork and systems redesign. He is best known for his work translating expertise from motor racing teams to improve high-risk surgical hand offs. Dr. Catchpole will be speaking on *Technology, Environment, and Team(work) Interaction.*

- Drs Catchpole and Shappell will join us for the Fireside Chat titled *Human factors, safety and OR design* on Friday afternoon for those interested in more information, detail, discussion.
- David Euastace, Sr Business Development Manager with Getting/Maquet Surgical Workplaces will speak on *Cardiac/Hybrid OR Design Consideration and Tools*.

This years Charles C Reed Memorial Lecture will feature a long time member of the perfusion/ manufacturing community.

- Mr. Colin Green completed his nursing education in 1960 at Odstock Hospital in Salisbury, UK. In 1961 he joined the OR team at St. Georges Hospital in London, UK, as an instrument nurse and assistant to the perfusionist using the Drew machine for hypothermic autogenous oxygenation. In 1962 Colin moved to the Thoracic Unit at Guys Hospital in London UK and joined the perfusion team there. He continued his perfusion career at Guys Hospital and was the first European perfusionist to present at an AmSECT meeting in 1968 at the Jack Tar Hotel in San Francisco.. In 1969 he relocated to Toronto,Canada, joining Cardiovascular Specialties Ltd as the project and production manager for a fascia lata valve developed at Guys hospital by Mr. Donald Ross. In 1971 Colin joined Polystan, starting and managing two distribution companies in North America – Polystan North America Inc. in Bloomington and Polystan Canada Ltd in Toronto. He initiated the first AmSECT award – the Polystan Education and Travel Award which was given for the first time in 1972. In 1973 he relocated to Copenhagen, Denmark continuing his career with Polystan in various capacities but mainly working internationally in a Technical and Clinical Support function. In 2001 Jostra acquired Polystan, in 2003 Maquet acquired Jostra, and from 2003 until 2007, when Colin retired, he supported the Maquet Cardiopulmonary activities in South East Asia.
- Colin will be a giving a presentation titled *Extracorporeal Circulation and Cardiac Surgery - Some Moments in History.*

Saturday afternoon session will be on *Congenital Cardiac Surgery – Doing More with Less* and will feature:

- *Family Centered Care*, with Ashley Hodge, CCP,FPP, presenting on an application for communicating with family from the OR, and a parent of a child with congenital heart disease speaking on the families perspective.
- *Team CommunicationTools* will again feature Dr. Catchpole, and Dr Alistair Phillips, MD, Co-Director of the Congenital Heart Program and Dir. of Congenital Cardiothoracic Surgery at Cedars-Sinai Medical Center, will be speaking on team huddles and hand-offs.
- *Outcomes* will involve Dr. Evan Zahn, MD, Co-Director of the Congenital Heart Program and Dir of Interventional Cardiology at Cedars-Sinai Medical Center will tag team on the Hybrid Approach to Congenital/Adult Congenital Heart Disease with, and without cardiopulmonary bypass, and the use of 3D modeling. Joseph Sistino, PhD, CCP, FPP, will be presenting on quality of life after neonatal heart surgery, and Vincent Olshove, CCP, FPP, will finish up with an introduction to the Congenital Perfusion Registry.

There are 17 excellent scientific papers that will be presented on Friday, Saturday, and Sunday mornings, and an excellent variety of Fireside Chats sprinkled into the mix, including 2 sessions on *Accrediting High-Fidelity Perfusion Simulation Programs: Community feedback; Transporting VAD's and ECMO; Pediatrics; Transplants, harvests, ex-vivo perfusion; Adult ECMO; Closing the gap between generations.*

*T*he Hilton DeSoto Hotel stands 15 stories in Savannah's Historic District, overlooks Madison Square,

Continued on Page 13

2016 Annual Academy Meeting
Host Hotel

Hilton Savannah DeSoto

Single/Double Occupancy - $154.00 per night
Reservations: 877-280-0751

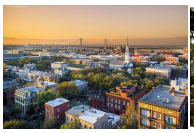
When you stay at Hilton Savannah DeSoto in Savannah, you will be in the historical district and minutes from the Sorrel Weed House and Madison Square. This romantic hotel is within close proximity of the Green-Meldrim House and the Girl Scout's First Headquarters.

www.desotohilton.com

Area Attractions

To learn more about what Savannah has to offer, please visit http://www.visit-historic-savannah.com/savannah-visitor-center.html

2016 Annual Academy Meeting




Savannah, Georgia
February 4-7, 2016


Thursday, February 4, 2016

9:00 AM – 1:00 PM	Council Meeting
10:00 AM – 3:00 PM	REGISTRATION
12:00 PM - 2:00 PM	High-Fidelity Perfusion Simulation
2:30 PM – 4:30 PM	Fireside Chats (Session #1)

Accrediting High Fidelity Perfusion Simulation Programs: Community Feedback
Best Practices
Emergencies, accidents, common mishaps and how to fix them
Pediatric ECMO
Students Only Forum

4:30 PM – 5:30 PM	REGISTRATION
5:00 PM	Opening Business Meeting

Fellow, Member, Senior and Honorary Members

6:00 PM – 8:30 PM Sponsor's Hands-On Workshop & Reception

Friday, February 5, 2016

7:00 AM	REGISTRATION
8:00 AM – 9:30 AM	Scientific Session
9:30 AM – 10:00 AM	Break
10:00 AM – 11:30 PM	Special Scientific Session (Panel)

Waterborne Infections and Heater-Cooler Design
Waterborne Bugs - TBD
Perfusion Related Issues - Richard Walczak, CCP
Manufacturer's Perspective - Sorin Group
Panel Q&A

11:30 PM – 1:00 PM	Lunch
1:00 PM – 3:30 PM	Special Scientific Session (Panel)

Human Factors, Safety, & OR Design: Empowering the Perfusionist
Building a Safe Team Through Standardization: Lessons Learned From The Aviation Industry - Dann Runik
Cardiac Surgery (surgical) Flow Disruptions, HFACS, CVOR
Performance - Scott Schappel, PhD
Technology, Environment, and Team(work) Interaction - Ken Catchpole, PhD
Cardiac/Hybrid OR Design Consideration and Tools: Hybrid/OR Design - TBA
Getting involved in OR Design, No Room to Complain - TBA
Panel Q&A

3:30 PM – 5:30 PM	Fireside Chats (Session #2)

Human factors, safety and OR design
Pediatrics
High-Fidelity Perfusion Simulation
Transplants, harvests, ex-vivo perfusion
Transporting VADs and ECMOs

6:30 PM Induction Dinner
Fellow, Senior, Honorary Members & Guests

Saturday, February 6, 2016

7:00 AM REGISTRATION
8:00 AM – 9:30 AM Scientific Session
9:30 AM – 10:00 AM Break
10:00 AM – 11:30 AM Memorial Session
Charles C. Reed Memorial Lecture
Colin Green
Thomas G. Wharton Memorial Lecture
Vincent Olshove, President, AACP

11:30 AM – 1:00 PM Lunch
1:00 PM – 3:30 PM Special Scientific Session (Panel)
Congenital Cardiac Surgery - Doing More with Less
Family Centered Care
EASE - Ashley Hodge, CCP, FPP
Patient/Family Perspective - TBD

Team Communication Tools
Hand-off - Ken Catchpole, PhD
Cardiac Team Huddle - Alistair Phillips, MD

Outcomes
Hybrid Approach to Congenital Heart Disease Without CPB – Evan Zahn, MD
Use of 3D Modeling in Congenital Heart Disease – Evan Zahn, MD
Hybrid Approach to Congenital Heart Disease With CPB – Alistair Phillips, MD
Quality of Life after Neonatal Heart Surgery - Joseph Sistino, PhD, CCP, FPP
The Congenital Perfusion Registry - TBD

Panel Q&A

3:30 PM – 5:30 PM Fireside Chats (Session #3)
Adult ECMO
Closing the gap between generations *(What the old guts expect from the new guys and what the new guys expect from the old guys.)*
Myocardial protection - "What's new"
High-Fidelity Perfusion Simulation
Ventricular assist devices

5:30PM Closing Business Meeting
Fellow, Senior and Honorary Members Only

Sunday, February 7, 2016

8:00 AM – 10:00 AM Scientific Session
10:30 AM – 12:30 PM Fireside Chats (Session #4)
Accrediting High Fidelity Perfusion Simulation Programs: Community Feedback
Adult ECMO
Life outside the cardiac OR
There were incidents, accidents, hints and allegations *(Did I meet the standard of care? What are my legal obligations?)*

All About our Corporate Partners

Anti-foam: What is It? Why Do Perfusion Systems Need It?

The Science of Anti-Foaming Agents

Defoaming or anti-foaming agents are used to break up or reduce bubbles that form at the blood-air interface.

Polydimethylsiloxane (PDMS), the silicone agent used in many anti-foam agents, is "a hydrophobic or 'water fearing' liquid component that is insoluble in water and blood," explained Joseph Kalscheuer, Principal Scientist, Medtronic Coronary and Structural Heart Disease Management. "It disperses and spreads across the surface of the foam's lamellae — thin liquid films that separate the foam gas bubbles. The PDMS dispersion can create localized areas of extremely low surface tension which, when low enough, disrupt the stabilizing mechanism of the lamellae and cause the membrane to burst."

PDMS can also carry modified silica particles to assist in foam structure disruption. Silica particles are a naturally hydrophilic or "water loving" material made partially hydrophobic to allow its suspension in the PDMS oil. "The PDMS oil transports the suspended silica particles to the lamellae's surface. The lamellae's hydrophilic qualities allow the particles to bridge between the two layers, rupture the membrane, and ultimately disrupt the foam's structure," Kalscheuer noted. "It is through the mechanisms of local depression in surface tension and bubble rupturing particles that medical anti-foams disrupt foam generation."

Most entrained material exists at the blood-air interface due to the natural affinity of hydrophobic PDMS and the semi-hydrophobic silica particles for air — a similarly hydrophobic surface — and due to their mutual insolubility in blood.

Historical Use of Anti-foaming Agents

Disc oxygenators, introduced in the 1950s, oxygenated blood by passing discs through the blood reservoir, where the turning discs would cause the blood to foam. To break up the bubbles, perfusionists had to lift the reservoir lid and spray the blood with an anti-foaming agent. For this and a variety of other clinical reasons, disc oxygenators were quickly replaced with bubble oxygenators.

In contrast, bubble oxygenators employed a diffuser, a simple piece of perforated plastic, which had a single-piece design upstream of the pump, including an oxygenating foaming column, a defoaming section, and an arterial reservoir that held the blood to be returned to the patient. During perfusion, blood was exposed over the top of the diffuser and oxygen ran underneath, forcing oxygen through the blood, which caused it to foam. This foam would then rise up a column, where it was oxygenated and CO_2 was removed. The oxygenator's efficiency depended on the diffuser's design and the size of the bubbles it created: small bubbles were good for oxygenating, big bubbles were good for removing

CO_2. Thus, a balance was needed to provide adequate oxygenation and CO_2 removal.
Because bubble oxygenators purposely foamed blood, the blood had to be defoamed before being returned to the patient. Bubble oxygenator defoamers had to be large to ensure sufficient bubble break up to return blood to a liquid state. Blood passed through a defoamer — a black filter sponge saturated with a defoaming agent — then settled into the arterial reservoir.

As membrane technology became prevalent in oxygenator designs, blood had to be collected in a separate container. Initially, this container was a soft-shell or flexible venous reservoir and no defoamer was needed since there was no blood-air interface. The blood simply flowed into a bag already filled with blood.

Designs evolved to an open/hard shell reservoir configuration that merged the cardiotomy venous reservoir and defoamer into a single device that automatically removed air from the circuit. Smaller cannulae and smaller ID venous lines impacted venous return. For the increasing number of minimally invasive techniques requiring smaller cannulae, perfusionists needed the ability to use vacuum on the reservoir, possible only with hard shell systems. Consequently, hard shell systems became the go-to devices and today they are the most common configuration in use worldwide.

Use of Anti-foam in the Hard Shell Cardiotomy and Venous Reservoirs

As with earlier reservoir designs, today's devices use a silicone anti-foam agent to disrupt foaming and return blood to a liquid phase. The difference is in how the cardiotomy/venous reservoir's (CVR) design features interact with blood and the anti-foam agent.

It is well known that air can be become entrained in blood. On the venous side, it may occur when there's a problem with the cannulation site. When this happens, blood flows into the bottom of the reservoir and foam rises to the top. Thus, the placement of the anti-foaming agent is critical. In Medtronic's Affinity Fusion® Cardiotomy / Venous Reservoir (CVR), the anti-foam agent is located high in the reservoir. Consequently, when venous blood flows normally, it does not touch the anti-foam agent. This design limits blood exposure to the anti-foam agent to instances when significant foaming occurs.

Blood is rich in proteins and other components that, when combined with air, produce significant structure, making blood defoaming essential. According to John Knoll, Senior Engineering Manager, Medtronic Coronary and Structural Heart Disease Management, "The Affinity Fusion's reservoir incorporates a fluid outlet that drains at the bottom while air escapes upward. If there's foam on the blood's surface inside the reservoir, it simply sits there and the anti-foam agent manages it."

On the cardiotomy side, foam is introduced in the CVR through the intermittent introduction of air and blood from the various chest cavity instruments that provide suction for a clear field of view. "In the Affinity Fusion CVR, blood flows over a cardiotomy cone and out through the cardiotomy filter," Knoll explained. "If the blood enters as foam, it contacts the anti-foam agent, which is strategically placed to defoam the cardiotomy blood as needed. Only liquid blood exits the cardiotomy inside the CVR."

"Some anti-foam agent contact is inevitable on the cardiotomy side because the blood comes in as foam," Knoll noted. "The Affinity Fusion CVR design facilitates minimal contact between the blood and anti-foam agent."

Modern day oxygenators and CVR's utilize many design and technological advances to manage air in the perfusion circuit, including smooth curves, the reduction of falling blood, and active air removal as seen in the Affinity Fusion System. While these design advances help reduce air entrainment in the oxygenator and CVR, anti-foaming agents are still required to facilitate air removal from the blood stream.

Continued on Page 8

Continued from Page 7

The Medtronic Affinity Fusion® Oxygenation System uses a silicone anti-foam agent to disrupt and break down foam.

Affinity Fusion Oxygenation System:

Indications for Use:

The Affinity Fusion Oxygenator with Integrated Arterial Filter is intended to be used in an extracorporeal perfusion circuit to oxygenate and remove carbon dioxide from the blood and to cool or warm the blood during routine cardiopulmonary bypass procedures up to 6 hours in duration. The Affinity Fusion Oxygenator with Integrated Arterial Filter is designed to filter from the circuit microemboli larger than the specified micron size for periods up to six hours during cardiopulmonary bypass surgery.

The Affinity Fusion Cardiotomy/Venous Reservoir is intended to be used in an extracorporeal perfusion circuit to collect venous and cardiotomy suctioned blood during routine cardiopulmonary procedures up to 6 hours in duration. The CVR is also intended for use during vacuum assisted venous drainage (VAVD) procedures. The Affinity Fusion Cardiotomy/ Venous Reservoir with Balance Biosurface is also intended for use after open heart surgery to collect autologous blood from the chest and to aseptically return the blood to the patient for blood volume replacement.

Contraindications:

Do not use this device for any purpose other than indicated.

Do not use if air leaks are observed during priming and/or operation; this may result in air embolism to the patient and/or fluid loss.

The Affinity Fusion Cardiotomy/Venous Reservoir is contraindicated for use in postoperative chest drainage and autotransfusion procedures when:

■ There is an air leak in the lung or gross perforations to the chest wall exist.

■ Pericardial, mediastinal, pulmonary or systemic infection or malignancy is present.

■ Gross contamination or a lymphatic failure is present or suspected.

■ Suctioned blood is obtained from a site where a topical hemostatic agent has been used.

■ The chest is open and vacuum is applied.

■ Protamine has been administered prior to the reservoir being removed from the bypass circuit.

■ The patient is returned to surgery for any reason.

■ Vented chest tubes not incorporating vent flow regulation, such as a stopcock, are used.

Caution: An assessment should be made of the quality and suitability of the blood that has been collected before re-infusion begins.

Warning: A strict anticoagulation protocol should be followed and anticoagulation should be routinely monitored during all procedures. The benefits of extracorporeal support must be weighed against the risk of systematic anticoagulation and must be assessed by the prescribing physician.

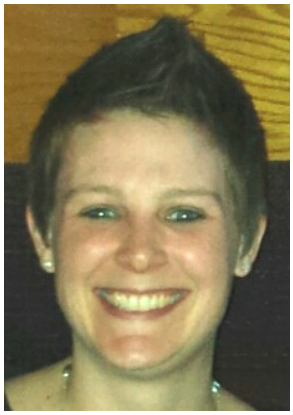
For a complete listing of indications, contraindications, precautions and warnings, please refer to the Instructions for Use which accompany the product.

Caution: Federal law (USA) restricts these devices to sale by or on the order of a physician.

The Student Section

Managing Anticoagulation in the ECMO Population: Striving for Standardization

Amber Harmon, B.S.
Milwaukee School of Engineering
Masters of Science in Cardiovascular Perfusion Candidate 2016



Since its introduction, anticoagulation has been a key component to successful Cardiopulmonary Bypass (CPB). Adequate ACT (activated clotting time) levels are required to be met prior to CPB and maintained throughout the entire duration. Failure to reach and maintain adequate anticoagulation levels while on CPB can result in life threatening thrombus formation or bleeding. Similar to CPB, ECMO (Extracorporeal Membrane Oxygenation) involves the use of mechanical devices to temporarily support heart or lung function in patients experiencing cardiopulmonary failure. In contrast to CPB, however, ECMO allows for longer periods of support, ranging from days to months.[3]

Two major complications with high morbidity and mortality rates associated with ECMO are bleeding and thrombosis, both of which arise directly from the activation of platelets and the clotting cascade, largely in response to contact of the blood with the ECMO circuit itself. The extended period of blood contact with a foreign surface experienced by these patients is what makes anticoagulation an even greater challenge in the ECMO population than compared to CPB.[5]

Anticoagulation during ECMO is a tedious battle that involves compromise. Bleeding is the most common complication of ECMO, as it can arise from both hypercoagulability, associated with excessive consumption of clotting elements, or a hypocoagulable state, associated with an inability to stop tissue blood loss. Finding an optimal level at which bleeding is minimized at the same time that thrombus formation is avoided is critical to managing an ECMO patient. Excessive anticoagulation can lead to uncontrollable bleeding and blood loss, while too minimal of levels of anticoagulation can lead to thrombus or excessive bleeding via platelet and coagulation factor consumption.[5]

To successfully manage an ECMO patient, special attention must be given to the monitoring methods of anticoagulation. Monitoring via lab testing helps to indicate optimal anticoagulant dosing rates and the need for blood component administration. There are various tests available to monitor anticoagulation during ECMO, dependent upon the anticoagulant being used: ACT, Prothrombin time (PT), Partial Thromboplastin time (PTT), Anti-factor Xa, ATIII, and Thromboelastography (TEG). [5] Table 1 compares the different monitoring tests currently used. [3,4,7] Each test varies in regards to what part of coagulation they measure and what information can be obtained from them.

The Extracorporeal Life Support Organization (ELSO) is an organization that exists to provide support to institutions providing ECMO care. With regard to anticoagulation in ECMO, they publish guidelines that provide information on anticoagulation strategies and monitoring methods, but because of the patient specific nature of ECMO, they recommend that each program develop their own protocol to follow. This has required institutions to take it upon themselves to refine and manage their own methods based on the outcomes seen at their individual centers and the limited published literature available.[3]

Bembea, et al.[2] conducted a survey through November 2010 to evaluate monitoring methods amongst ECMO centers worldwide. Through their analysis of 121 centers, they

Continued on Page 10

Continued from Page 9

Table 1: Anticoagulation Monitoring Tests. [3,4,7]

Test	What it Measures	Disadvantages
ACT	Time to clot formation	Affected by thrombocytopenia, coagulopathy, dilution, and temperature
PT	Extrinsic & common pathway: Time to fibrin formation	Affected by thrombocytopenia, coagulopathy, and dilution
PTT	Intrinsic & common pathway: Time to fibrin formation	Affected by thrombocytopenia, coagulopathy, and dilution
Anti-factor Xa	Heparin activity	More expensive and not readily available in most centers
ATIII	ATIII level	Only assesses available ATIII
TEG	Integrity of the coagulation cascade	More expensive than conventional testing & requires training and competency of staff to run

concluded, that anticoagulation management internationally is highly variable, but that the ACT is still the most widely used monitoring method. Because of the many limitations of the ACT, however, institutions are beginning to incorporate more comprehensive panels of testing.[2]

This high variability in monitoring methods due to the lack of standardized guidelines can be attributed to the severely limited number of studies that actually demonstrate improved clinical outcomes with one testing method versus another. Studies exist that show improved correlations of PTT, TEG and Anti-factor Xa with heparin concentrations than with the ACT, but without data on clinical outcomes, it is hard to label one test as superior to another. [1,4,6]

Northop, et al.[6] is the first and only publication to show clinical outcomes in relation to anticoagulation management strategies. Within their center, they were able to demonstrate decreased blood product administration, decreased hemorrhagic complications and an increased ECMO circuit life through the use of a protocol that included Anti-factor Xa, TEG, and ATIII measurements. [6]

With high morbidity and mortality rates associated with bleeding and thrombus complications in ECMO, a successful anticoagulation monitoring protocol is a critical component of every ECMO program.[3] With the various anticoagulation monitoring methods available, however, and lack of studies proving ones superiority over another, centers around the world are left to refine their own protocols to try to improve patient outcomes. Until additional studies, similar to Northop, et al., are conducted and published, standardization of anticoagulation management in ECMO will be hard to achieve.

References

1.) Atallah, S., Liebl, M., Fitousis, K., Bostan, F., & Masud, F. (2014). Evaluation of the activated clotting time and activated partial thromboplastin time for the monitoring of heparin in adult extracorporeal membrane oxygenation patients. *Perfusion, 29*(5), 456-461. doi:10.1177/0267659114524264

2.) Bembea, M. M., Annich, G., Rycus, P., Oldenburg, G., Berkowitz, I., & Pronovost, P. (2013). Variability in anticoagulation management of patients on extracorporeal membrane oxygenation: An international survey. *Pediatric Critical Care Medicine : A Journal of the Society of Critical Care Medicine and the World Federation of Pediatric Intensive and Critical Care Societies, 14*(2), e77-e77. doi:10.1097/PCC.0b013e31827127e4

3.) Extracorporeal Life Support Organization. (2014). ELSO anticoagulation guideline. Retrieved from http://www.elso.org/Portals/0/Files/elsoanticoagulationguideline8-2014-table-contents.pdf

4.) Lequier, L., & Massicotte, M. P. (2015). Monitoring of anticoagulation in extracorporeal membrane oxygenation: Is anti-xa the new activated clotting time? *Pediatric Critical Care Medicine : A Journal of the Society of Critical Care Medicine and the World Federation of Pediatric Intensive and Critical Care Societies, 16*(1), 87-89. doi:10.1097/PCC.0000000000000298 [doi]

5.) Muntean, W. (1999). Coagulation and anticoagulation in extracorporeal membrane oxygenation. *Artificial Organs, 23*(11), 979-983. doi:10.1046/j.1525-1594.1999.06451.x

6.) Northrop, M. S. M., Sidonio, R. F. M., Phillips, S. E. M., Smith, Andrew H. MD, MSCI, MMHC1, Daphne, Hardison C. RN, BSN, Pietsch, J. B. M., & Bridges, B. C. M. (2015). The use of an extracorporeal membrane oxygenation anticoagulation laboratory protocol is associated with decreased blood product use, decreased hemorrhagic complications, and increased circuit life. *Pediatric Critical Care Medicine, 16*(1), 66. doi:10.1097/PCC.0000000000000278

7.) Srivastava, A., & Kelleher, A. (2013). Point-of-care coagulation testing. *Continuing Education in Anaesthesia, Critical Care & Pain, 13*(1), 12-16. doi:10.1093/bjaceaccp/mks049

All About our Corporate Partners

Individualized Heparin Management: Because ACT alone is no longer enough

When "Judy", a 68-year-old retired paralegal with multiple challenges, including diabetes, chronic renal disease and moderate anemia underwent a quadruple bypass, she was heparinized according to the hospital's protocol, using ACT to monitor and manage heparin levels throughout the procedure.

Although Judy is a fictional patient*, her story is based on actual test data, and reflects very real challenges perfusionists face today in managing heparin levels. Today's cardiac patients are complex patients. They're older and sicker, with multiple conditions and comorbidities, taking numerous medications and nutritional supplements – presenting real challenges around anticoagulation management. Further complicating matters, heparin potency can vary considerably. And institutions are closely scrutinizing the use of blood products, looking to minimize clinical and financial costs.

In this environment, the need for precise, individualized heparin management has become critical and ACT by itself is no longer enough.

Why you shouldn't ACT alone

In spite of her complex condition, Judy's surgery was uneventful. Nothing unexpected came up in the course of heparin dosing, managing and neutralizing, guided by ACT. But she began to bleed post-op, and ended up needing to be transfused, at considerable clinical and financial cost.

The question is, did ACT provide adequate visibility into the Judy's heparin concentration throughout the procedure? The answer is most likely not. Medications, supplements, comorbidities and other factors can cause significant differences in the way individual patients respond to heparin and ACT alone does not account for these differences.

Experience the impact of Individualized Heparin Management (IHM) with the impACT interactive tool

You can walk through Judy's case—as well as the cases of three other patients with different conditions and challenges— using the impACT tool, an interactive experience created by Medtronic to show how visibility can affect heparin management decisions and patient outcomes.

The impACT Tool and other resources including video, patient stories and product information are available at medtronic.com/ihm.

*This is a fictional case based on observed data. The patient name, stats, health factors and procedure in this story are fictional; however, the diagnostic test results are representative examples of actual test data. The data was observed when comparing heparin levels during cardiac surgery with ACT alone and with Individualized Heparin Management with the HMS Plus Hemostasis System. The comparisons were done for evaluation purposes only. Patient transfusion data are actual.

This patient story is not intended to be a recommendation by Medtronic. It does not represent the professional opinion of any physician, practice, or practitioner. It is compiled and provided by Medtronic for general educational purposes only and should not be considered the exclusive source for this type of information. At all times, it is the professional responsibility of the practice or clinical practitioner to exercise independent judgment in a particular situation and treat patients based on their judgment and medical necessity. Results may vary.

1. Despotis GJ, et.al. "The Impact of Heparin Concentration and Activated Clotting Time Monitoring on Blood Conservation" *J Thorac Cardiov Sur*, 1995, Vol1 No 1: 46-54

PRE-REGISTRATION FORM

The 2016 Annual Meeting of
The American Academy of Cardiovascular Perfusion

MEMBER	**FEE**	**Amount**
Registration Fee	$350.00	_____
2016 Annual Dues	$155.00	_____
Adult Guest to Workshop	$25.00	_____
NON-MEMBER	**FEE**	**Amount**
Registration Fee	$400.00	_____
Adult Guest to Workshop	$25.00	_____
STUDENT PERFUSIONIST	**FEE**	**Amount**
Registration Fee	$30.00*	Waived**
Adult Guest to Workshop	$25.00	_____
***MUST** *include a letter from the school director with registration.*		
***To take advantage of the waived Student fee, you must be a current Student Member of The Academy.*		
FELLOW or SENIOR MEMBER	**FEE**	**Amount**
Registration Fee	$400.00	_____
2016 Annual Dues	$180.00	_____
Guest to Induction Dinner	$100.00	_____
Adult Guest to Workshop	$25.00	_____

FIRESIDE CHAT REGISTRATION
(make your first three choices each day)

Thursday Sessions
1)_____
2)_____
3)_____

Friday Sessions
1)_____
2)_____
3)_____

Saturday Sessions
1)_____
2)_____
3)_____

Sunday Sessions
1)_____
2)_____
3)_____

PRINT OR TYPE

NAME _____

ADDRESS _____

CITY _____ **STATE** _____ **ZIP** _____

HOME PHONE _____ **WORK PHONE** _____ **FAX** _____

E-MAIL ADDRESS _____ ***(Required for confirmation)***

ANTICIPATED ARRIVAL DATE IN SAVANNAH _____

Please read all instructions and information before completing this form.
If you have questions completing this form, please call the national office. Hotel Reservations must be made separately through the hotel directly.

Total Amount of Payment $ _____ **METHOD OF PAYMENT:** Check** __ Money Order __ Credit Card __

VISA/MasterCard # _____ **Exp. Date** _____ **3-digit security code** __ __ __

Credit card billing address if different from above.

ADDRESS _____

CITY _____ **STATE** _____ **ZIP** _____

Signature_____

** ***There will be a $25.00 service charge for any check returned for insufficient funds.***

INSTRUCTIONS and INFORMATION

o Complete each appropriate section of this form by printing or typing.
This form may be copied, but must include both pages.
o Members must pay their 2016 Annual Dues along with their registration fees by completing that portion of the form.
o You will receive acknowledgment of your pre-registration by January 15, 2016--bring it with you to the meeting.
o No pre-registration will be processed after January 8, 2016.
-- **After this date you must register at the meeting**.
o Your receipt and meeting credentials will be available for you at the Pre-Registration desk at the meeting.
o There will be **NO ADMISSION to any Fireside Chat without proper admission credentials**.
o If you are joining The Academy with your registration you must:
1) complete appropriate areas of the form;
2) you MUST INCLUDE the membership application form;
3) include the $25 filing fee;
4) include $155 for the 2016 Annual Dues;
(Your membership begins with the closing business meeting)
o ONLY VISA/MasterCard credit cards are accepted - with VISA/MasterCard you may FAX your registration to (717) 867-1485
o The AACP Federal Tax ID Number: 63-0776991 (for hospital use only)
o Refund policy: Anyone that is pre-registered for this meeting and is unable to attend will receive a full refund minus $50.00 for handling, mailing, and processing upon written request before January 12, 2016.

o **Make checks payable to AACP (US dollars). Mail completed pre-registration form and check to:**

AACP
515A East Main Street
Annville, PA 17003

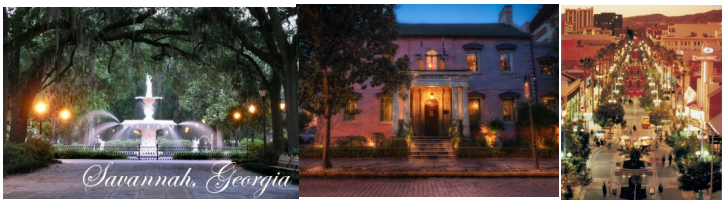
IF YOU HAVE QUESTIONS FILLING OUT THIS FORM, PLEASE CONTACT THE NATIONAL OFFICE (717) 867-1485.

o **If paying by VISA/MasterCard you may FAX this form to (717) 867-1485 or mail to above address.**

2016 AACP Annual Meeting

Continued from Page 2

historic mansions, and oak trees draped in Spanish moss. A short walk will take one to many of Savannah's treasured landmarks, museums, theaters, parks, dining, and shopping.



River Street, City Market, Forsyth Park, Historic Savannah Theater, Civic Center, and College of Art & Design all a short walk.

Weather in Savannah tends to have highs in the low 60's °F and lows in the low 40's °F, during early February, according to US News & World Report.

I wish you all a very Happy, Healthy & Successful New Year and look forward to you joining us in Savannah.

Vincent Olshove
President, AACP

All About our Corporate Partners

Medtronic announces strategic partnership with MC3 Cardiopulmonary

Medtronic has entered into a strategic partnership with MC3 Cardiopulmonary, a privately held Extracorporeal Life Support (ECLS) company. As part of the partnership, Medtronic will become the exclusive worldwide distributor for all MC3 products including its Soft-Flow® Arterial cannula, which is expected to be available in the first half of 2016. MC3's pipeline includes a full spectrum of products in development with long-term indications designed specifically for ECLS, including advanced catheters, newly designed oxygenators, and a versatile and portable system and pump.

ABOUT ECLS (ECMO)

ECLS is an important and growing part of the care continuum for management of cardiovascular disease and acute respiratory failure

ECLS is the use of temporary heart pump and/or lung support to enable patient recovery or to bridge to other definitive therapies

The investment in MC3 gives Medtronic the opportunity to positively impact the millions of patients who could benefit from improved life support technologies

ABOUT MC3 CARDIOPULMONARY

MC3 Cardiopulmonary is a privately held ECLS company founded in 1991 with the aim of developing and commercializing intellectual property related to artificial heart and lung technologies. MC3 has grown to become one of the most respected names in the cardiopulmonary research community, with close ties to the University of Michigan. Today, MC3 Cardiopulmonary is focused on becoming a leading medical device developer and manufacturer of cardiopulmonary devices. With deep roots in patient physiology, hemodynamics, technology, and caregiver needs, MC3 Cardiopulmonary is well positioned to deliver intelligent solutions that address critical unmet needs.

Any forward-looking statements in this media advisory are subject to risks and uncertainties such as those described in Medtronic's periodic reports on file with the Securities and Exchange Commission.

Actual results may differ materially from anticipated results.

THE ACADEMY TO OFFER LIVE WEBCAST

The American Academy of Cardiovascular Perfusion will again be offering a live webcast of our 2016 Annual Meeting in Savannah.

The General Sessions of the meeting will be broadcast in high quality streaming video. There will also be an opportunity for attendees to ask questions, thus qualifying for Category I CEUs from the American Board of Cardiovascular Perfusion.

Contact Information for Our Sponsoring Partners

COVIDIEN
Phone: 303-305-2370
Fax: 303-305-2865
Website: www.covidien.com

MAQUET MEDICAL SYSTEMS, USA
Phone: 888-627-8383
Website: www.maquet.com

MEDTRONIC PERFUSION SYSTEMS
Phone: 763-391-9000
Websites: www.medtronic.com
www.perfusionsystems.com

QUEST MEDICAL, INC.
Phone: 800-627-0226 or 972-390-9800
Fax: 972-390-2881
Website: www.questmedical.com

SORIN GROUP USA, INC.
Phone: 800-221-7943 or 303-467-6517
Fax: 303-467-6375
Website: www.soringroup.com

SPECTRUM MEDICAL, INC.
Phone: 800-265-2331
Fax: 803-802-1455
Website: www.spectrummedical.com

TERUMO CARDIOVASCULAR SYSTEMS
Phone: 734-663-4145 or 800-521-2818
Fax: 734-663-7981
Website: terumo-cvs.com

Important Academy Dates

The ACADEMY ANNUAL MEETING DEADLINES

ABSTRACT DEADLINE	**October 30, 2015**
MEMBERSHIP DEADLINE	**December 4, 2015**
PRE-REGISTRATION	**January 8, 2016**
HOTEL REGISTRATION	**January 8, 2016**
2016 ANNUAL MEETING	**February 4 - 7, 2016**

Others Meetings

Cardiology 2016
Loews Royal Pacific Resort at Universal Orlando
Orlando, Florida
February 24-28, 2016
Contact: www.chop.edu/cardiology2016

Information: The meeting will mix plenary sessions aimed at a multidisciplinary audience with breakout sessions for in depth review of pediatric perfusion, heart failure, transplantation, and intensive care. Course Highlights: Advances in pediatric CPB Neurocognitive Outcome in CHD Heart Transplantation treatment and outcomes Pediatric Mechanical assist and ECMO Controversies in anesthesia and critical care Thrombosis and anticoagulation in congenital heart disease Challenges and dilemmas in adult congenital heart disease Outcomes: the results of our efforts .

The Houston Conference-Enhanced Learning Through Perfusion Simulation
Houston Methodist Hospital, MITIE Center
Houston, Texas
March 3-5, 2016
Contact: Joe Basha, CCP -318-623-0890 or
Jeri Fontenot, CCP – 381-682-4545

Information: The Houston Perfusion Conference: Enhanced Learning Through Perfusion Simulation. Practice your perfusion skills using the CALIFIA State of the Art Patient Simulation System. Simulation sessions includes CPB, ECMO and use of the AngioDynamics AngioVac device. Learn how to expand the services you can offer your patients and learn economics of VAD and ECMO therapies. The Houston “Perfusion” Conference is approved for 23.8 Category 1 CME by the ABCP. Enjoy the many attractions of Houston, including discounted tickets to the Houston Rodeo.

Please visit our website at www.TheHoustonConference.com