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

FALL 2011

Inside This Issue

Pump Tech or Perfusionist?

I work in a large academic adult cardiac surgical practice. We have ample opportunity to take advantage of many learning opportunities. We are confronted with complex cases for patients with a variety of medical problems. We are often consulted by our surgical staff in the planning of operations and are welcome to contribute our perspective at any point in the procedure. In addition, we are fortunate to have perfusion students from three outstanding programs rotate through our institution.

Occasionally we have a little down time, between cases or late in the evening, when we convene in the Pump Room and sometimes talk about our role or impact on a case. Some of these discussions are very technical, others sometimes wax philosophical. One recurring topic is the question; what is the difference between a Pump Tech and a Perfusionist? Understanding that each of you may have a different set of answers to this question, taking into account your personal experience, your specific interests and priorities, I will offer my perspective on this question with the intention of provoking a discussion in your Pump Room.

Much like the great jazz pianist, Thelonius Monk, who when asked for a definition of jazz replied, “I don’t have one ……you’re just supposed to know it when you hear it”, I find it easier to say what a perfusionist isn’t.

A Perfusionist is not necessarily the brightest person in the room. Although intelligence is a valuable asset, a Perfusionist is less concerned with proving how smart they are and more focused on the outcome. Nor is she/he the first to arrive and the last to leave, demonstrating how hard working they are, martyrs for the profession. There is no doubt that a strong work ethic is appreciated, but it is more important that the Perfusionist is there when needed, healthy, rested and prepared to provide the needed support. A Perfusionist is not perfect. On the contrary, it is the person most open to how wrong they can be who is best prepared to do right by their patients. A Perfusionist does not take him/herself too seriously, however he/she takes the job very seriously. There is nothing more humbling for us than the trust placed in us by the patients we care for, regardless of the fact that it is often done anonymously. However important the task, the Perfusionist suppresses their ego in the interest of the team; he/she understands that they are there to facilitate the surgery in the safest way possible. A Perfusionist is not easily distracted; vigilance is the most important characteristic we can possess.

In a recent rereading of Robert Pirsig’s acclaimed 1974 book “Zen and the Art of Motorcycle Maintenance, an Inquiry into Values”, I came across a section of the work that deals with the author’s dissatisfaction over some work done on his mo-

Continued on Page 17

33rd Annual Seminar of The American Academy of Cardiovascular Perfusion

Omni Royal Orleans Hotel
New Orleans, Louisiana
January 26-29, 2012

Thursday, January 26, 2012

9:00 AM – 1:00 PM	Council Meeting
10:00 AM – 3:00 PM	REGISTRATION
2:30 PM – 4:30 PM	Fireside Chats
	Computers in Perfusion, Simulation
	ECMO
	Managing Perfusion, Leadership, Dealing with Administration
	Perfusion Safety How to Prevent, React and Deal with Perfusion Accidents
	"Students Only" Forum
4:30 PM – 5:30 PM	REGISTRATION
5:00 PM	Opening Business Meeting
	Fellow, Member, Senior and Honorary Members
5:30 PM – 8:00 PM	Sponsor's Hands-On Workshop & Reception

Friday, January 27, 2012

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

Perfusion Mythology- the Fables, Folklore and Facts of the Fundamentals of Cardiopulmonary Bypass

Moderator: Giovanni Cecere, CCP

Speakers to include:
James Beck, CCP
Joel Davis, CP
Linda Mongero, CCP
Jeffrey Riley, MHPE, CCT, CCP
William Riley, CCP
Ian Shearer, CCP
Joseph Sistino, MS, MPA, CCP

3:30 PM – 5:30 PM	Fireside Chats
	Budget Management Techniques, Cost Savings, Administration
	Future of Perfusion
	Hemostasis Management, "What's Hot, What's Clot"
	Mechanical Therapies, VADs and More
	Pediatrics, Cutting Edge, Are We There?

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

Saturday, January 28, 2012

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 Memorial Session

Charles C. Reed Memorial Lecture
Professor Chuen Neng Lee
National University of Singapore

Thomas G. Wharton Memorial Lecture
Daniel J. FitzGerald, CCP, LP—President, AACP
Brigham and Women's Hospital , Boston, Massachusetts

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

The Protected Heart - The History, Techniques and Controversies of Myocardial Protection

Speakers to include:
Andrew Wechsler, MD
Richard Weisel, MD
Mihai Podgoreanu, MD

3:30 PM – 5:30 PM Fireside Chats
Ask the Experts
Expanding the Role of Perfusion, Cath Lab, EP Lab, ER, etc.
Myocardial Protection Strategies
New Approaches to Old Surgery, "Adapt, Re-Engineer or Retire"
Women in Perfusion

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

Sunday, January 29, 2012

8:00 AM – 10:00 AM Scientific Session
10:00 AM – 12:00 PM Fireside Chats
Computers in Perfusion, Assisted Bypass, Electronic Records
New Devices, "A Time to Embrace Change", Spectrum Medical, Cardiohelp, HLMs, VADs and More
Patient Management, "What Pressure, Flow, Temperature, etc., Are We Good?"
Perfusion Safety: How to Prevent, React and Deal with Accidents

The Student Section

Clinical Concepts And Treatment For Cold Agglutinin On Cardiopulmonary Bypass

Stephen Miklas, **Richard Chan**
North Shore University Hospital
School of Cardiovascular Perfusion
Great Neck, New York

A fifty-three year old female patient with a weight of sixty-one kilograms, a height of one-hundred fifty-two centimeters, and a body surface area of 1.60 meters squared presented with symptoms which necessitated surgery for a mitral valve repair and removal of a cardiac tumor. Clinical findings included severe mitral regurgitation, mild aortic insufficiency, moderate pulmonary hypertension, rheumatic mitral valve disease, hypertension, myomatous degeneration, and cold agglutinin disease. The paragraphs to follow will describe the pathophysiology and clinical concepts behind cold agglutinin disease and specific modifications in perfusion technique to treat such a patient on cardiopulmonary bypass. The cardioplegia system used for this case is a "coil-in-bucket" blood cardioplegia set. Under normal circumstances when using this system, the blood and cardioplegia solution mix together at a 4:1 blood to cardioplegia solution ratio. The solutions mix and are sent forward with a roller pump through tubing into a metal coil which had been placed inside a bucket full of ice cubes and then continues to travel upward to the patient's myocardium. An alternative delivery technique with this cardioplegia system will be described to follow.

Cold agglutinins are serum antibodies that work on the antigens found on the surface of red blood cells. They are present in all normal, healthy humans but are usually benign unless under extreme cold temperature conditions. The antibodies are usually an IgM immunoglobulin which activates complement and bind to the I-antigens of the red blood cell or anti-I specificity. The IgM antibodies are large proteins used by the immune system to identify and neutralize foreign antigens. The IgM antibody is produced by B cells and is the primary antibody against A and B antigens on red blood cells. IgM antibodies are primarily responsible for the clumping or agglutination of red blood cells. Cold agglutinin disease or hemagglutinin disease is an autoimmune reaction in which antibodies react to a range of cold temperatures which can lead to complement activation, red blood cell agglutination (clumping), hemolysis, and vascular occlusion leading to possible organ ischemia. The main characteristic distinguishing benign and pathologic cold reacting autoantibodies is thermal amplitude which is the temperature at which the antibodies become activated.

With benign autoantibodies, the thermal amplitude is generally less than twenty-two degrees Celsius. Spontaneous autoagglutination does not occur. The antibody titer test is less than 1.64 at four degrees Celsius. The direct antiglobulin test score is usually negative or weak positive with a polyspecific antiglobulin reagent. In contract, the pathologic autoantibodies may have a thermal amplitude as high as thirty-two degrees Celsius, spontaneous autoagglutination can occur until the patient reaches a normal body temperature of thirty-seven degrees Celsius, an antibody titer test with a ratio of one/one thousand at four degrees Celsius, and a direct antiglobulin test score of two to three plus with a polyspecific antiglobulin reagent. The two above antibody tests are described below.

The autoantibody titer test is a measurement of how much antibody an organism has produced that recognizes a particular part of an antigen recognized by the immune system. It is expressed as the greatest dilution ratio that still gives a positive result. For example, a titer of 1:8 compared to a titer of 1:32 means that the patient tested gives a positive result for the antibody at any dilution down to 1:8 (1 part serum to 8 parts solvent). Therefore, at any greater dilution, the test would be negative. Hence, a titer of 1:32 means that the patient produces more of the specific antibody because it now takes a greater dilution (1 part serum to 32 parts solvent) to deem the test negative.

The direct antiglobulin test (DAT), also known as the direct Coomb's test, is used primarily to help determine if the cause of hemolytic anemia is due to antibodies attached to red blood cells. A blood sample

is taken and the red blood cells are washed which removes the patient's own plasma. The blood is then incubated with antiglobulin reagent. If this produces agglutination of the red blood cells, then the DAT test is positive suggesting that antibodies are present on the red blood cell surface. The range for a DAT score is from 0 to 4+. The stronger the DAT result, the more antibodies that are present and the higher the degree of red blood cell agglutination. For example, a DAT score of 3+ would represent a much greater degree of agglutination compared to a DAT score of only 1+.

A patient with cold agglutinin disease can have many potential risks which may occur during cardiopulmonary bypass including hemoagglutination, vascular occlusion with organ ischemia, complement activation, hemolysis, thrombocytopenia, peri-operative myocardial infarction, microvascular thrombosis, renal failure, or cardiac heart failure. Therefore, perfusion technique should be modified to help attenuate any of the above harmful conditions. Two techniques that could be done prior to bypass may include plasmapheresis or plasma exchange.

Plasmapheresis is the removal, treatment, and return of blood plasma from blood circulation. Blood is taken out of the patient's body, plasma is removed from a cell separator, and red blood cells are returned to the patient. The plasma, which contains the antibodies, is treated and then returned to the patient. This technique may be useful if the patient must be cooled to temperatures that would likely cause the autoimmune reaction. Plasma exchange is when blood is taken out of the patient's body, plasma is removed from a cell separator and red blood cells are returned to the patient. The plasma, which contains the antibodies, is completely discarded and the patient receives replacement donor plasma. This technique is useful for rapid removal of the cold-reacting antibodies in short term management.

After a bolus dose of heparin was administered, cannulation occurred. A 20 French aortic arterial cannula was placed. After the cannula was secured and free of any air emboli, a test dose of one hundred milliliters was sent through the arterial line to test that forward flow could be achieved. This was followed by the placement of 26/32 French dual venous cannulas. Once an adequate ACT was established at a minimum of four-hundred and eighty seconds, the initiation of bypass occurred. The patient's temperature was only "drifted" down to a minimum of 35.4 degrees Celsius at its coldest throughout the entire duration of bypass. The cross clamped was placed and the administration of a warm flush followed by the delivery of cold crystalloid was administered. This was given at a four parts blood to one part crystalloid solution ratio. In total, three hundred milliliters of warm and five hundred milliliters of cold solution was given. With the 4:1 ratio, this equaled a total of one-hundred and sixty milliliters of crystalloid. The surgeon first removed some cardiac vegetation and then progressed to repairing the mitral valve. The cross clamp was removed for a total cross-clamp time of 64 minutes. After adequate de-airing and assessment of the mitral repair, the patient was weaned off bypass. The whole duration of bypass lasted for a total of 79 minutes.

The modifications made during bypass for this specific case included "drifting" the patient's core temperature to a lowest recorded temperature of 35.4 degrees Celsius avoiding any potential risk with the use of hypothermia as well as a change with the delivery of cardioplegia solution. An alternative for blood cardioplegia is the use of crystalloid cardioplegia. Therefore, the use of cold crystalloid cardioplegia with a warm flush prior to delivery was administered. A quarter inch "Y" connector is cut into the blood cardioplegia line with one port to the cardioplegia set and the other port to the crystalloid solution. When delivering the initial warm flush to wash out the coronary blood in the myocardium, the ice in the bucket is replaced with warm water kept between 37-40 degrees Celsius. After the flush is complete, the delivery of cold crystalloid is administered through a bucket with ice to maintain heart arrest which can be scavenged away to the cell saver. In total, three hundred milliliters of warm and five hundred milliliters of cold crystalloid was delivered. Other alternative cardioplegia delivery techniques may include continuous warm retrograde delivery with normothermic temperatures or the use of warm blood cardioplegia.

For a standard cardioplegia delivery system without the use of a "coil-in-bucket" system, the same modified approach can easily be achieved. The perfusionist would make sure that the cardioplegia delivery temperature on the heater/cooler unit was set to a normothermic value of at least 37 degrees Celsius before administering the initial dose of warm flush to the coronaries. Once complete, the cardioplegia delivery temperature should be flushed and lowered to a cold cardioplegia delivery temperature before administering the remaining cold crystalloid solution. Alternatively, the continuous warm retrograde delivery technique is easily achieved by setting the cardioplegia delivery temperature to a normothermic value of at least 37 degrees Celsius and delivering the warm crystalloid at a low continuous pressure through the coronary sinus.

The technique proved to be very beneficial to the patient, avoiding any adverse autoimmune reactions due to the cold agglutinin disease while generating very good post-operative outcomes. Since the surgical procedure could be accomplished successfully without cooling the patient to harmful cold temperatures, plasmapheresis was not used in this particular case but is an important concept to understand with cold agglutinin disease patients undergoing cardiopulmonary bypass. Researching and understanding the pathophysiology and clinical con-

Continued on Page 7

New Orleans Dining and Attractions

Compiled by New Orlean's Own William Harris

Excellent Tourism Web Sites- A what to do?

http://www.neworleansonline.com
www.NOLA .com

Newpaper must read on entertainment
Lagniappe Section of every Friday's **Times-Picayune**

Some Favorite Attractions:
French Quarter
French Market
Audubon Aquarium of the Americas
Audubon Zoo
Audubon Insectarium
City Park - Botanical Gardens, Golf, Boat and Bike rentals, Tennis, New Orleans Museum of Art
Lake Pontchartrain
Contemporary Arts Center
Harrahs New Orleans Casino
Louisiana's Civil War Museum
National World War II Museum
Audubon Park- including Tulane and Loyola Universities
Louisiana Superdome
Many of the old Cemeteries- truly works of art
Steamboat Natchez

Dining
NOMenu.com
Tom Fitzmorris's ultimate food critic web site for most 1400 restaurants in and around New Orleans. Referenced by neighborhoods, cuisine, and whether dinner, lunch or breakfast.

Some of my favorites although I know I am cheating **MANY** by only including these names:
Dinners
Stellas
August
Dragos
Bistro Daisy
Commanders Palace
Palace Café
Bourbon House
Jacque - Imos
Gallatois
Bayona
Irenes

Cochon, Cochon Butcher
Camella Grille - Expecially late at night either Uptown or in the Quarter
Casamentos - Seafood opened during the “R” months - OYSTERS
Mahoneys- especially for lunch
Rivershak- especially for lunch

Live Music
Clubs with Live Music
http://www.neworleansonline.com/neworleans/music/musicclubs.html

Some of my favorites:

Tipitinas in Uptown New Orleans		
Blue Nile	**www.bluenilelive.com**	
d.b.a	**www.drinkgoodstuff.com**	Frenchman Street, Marigny
Maple Leaf	**www.mapleleafbar.com**	Uptown
Mid-City Lanes Rock and Bowl	**www.rockandbowl.com**	MidCity
Irvin Mayfields Live Jazz Playhouse	**www.sonesta.com**	French Quarter
Howlin’ Wolf	**www.howlin-wolf.com**	Warehouse Distr.
Le Bon Temps Roule		Uptown
One Eyed Jacks	**www.oneeyedjacks.net**	French Quarter
Palm Court Jazz Café	**www.palmcourtjazzcafe.com**	French Quarter
Snug Harbor	**www.snugjazz.com**	Marigny
The Three Muses	**www.thethreemuses.com**	Marigny

Radio
Music
WWOZ.com FM90.7

Talk and Sports
wwl.com AM870

Cold Agglutinin on CPB

Continued from Page 5

cepts of cold agglutinin disease led to a modification of the normal perfusion technique and cardioplegia delivery for a mitral valve replacement procedure which avoided any adverse risks and reactions that may have caused a detrimental outcome for the patient.

References

Harmening, Denise. "Hemolytic Anemias." *Clinical Hematology and Fundamentals of Hemostasis*. Philadelphia, PA: F. A. Davis, 2009.

Hensley, Frederick A., Donald E. Martin, and Glenn P. Gravlee. "Anesthetic Management During Cardiopulmonary Bypass." *A Practical Approach to Cardiac Anesthesia*. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins, 2008.

Hoffman, J.W. , T.B. Gilbert, and M.L. Hyder. "Cold Agglutinins Complicating Repair of Aortic Dissection Using Cardiopulmonary Bypass and Hypothermic Circulatory Arrest: Case Report and Review." *Perfusion* 17 (2002): 391-394. Print.

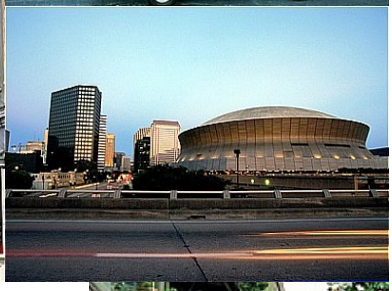
Lich, Bryan V., and D. Mark. Brown. "Blood Disorders." *The Manual of Clinical Perfusion*. Ft. Myers, FL: Perfusion.com, 2004.

Pecsi, Sharon A., G. Hossein Almassi, and Peter Langenstroer. "Deep Hypothermic Circulatory Arrest for a Patient With Known Cold Agglutinins." *The Annals of Thoracic Surgery* 88 (2009): 1326-1327. Print.

2012 Annual Seminar

New Orleans, Louisiana

January 26-29, 2012



Transportation options from the airport:

- Airport Taxi Service: Approximately $33 one way for up to two passengers:
  $14 per person for additional passengers

- Airport Shuttle: Approximately $20 one way per person;
  $38 round-trip
  (advance purchase required)

Our Host Hotel

Omni Royal Orleans Hotel
New Orleans, Louisiana
(Located in the French Quarter)

Single/Double Occupancy

$159.00 per night

Luxury French Quarter Accommodations

Our 346 guest rooms are tastefully furnished in 19th century New Orleans decor and are well appointed to assure your absolute comfort. All rooms showcase marble bathrooms and executive writing desks, while some offer private balconies overlooking the famed streets of Royal and St. Louis in the heart of the French Quarter.

Room Features

- Fully stocked refreshment center
- Hair dryer
- Iron and ironing board
- Coffeemaker
- Complimentary USA Today delivered to your room daily
- In-room safe
- Robe to use during your stay
- Work desk

Reservations:
800-578-0500

Remember to mention that you will be attending the AACP annual meeting to get the discounted room rate.

In-Room Technology

- Complimentary high-speed wireless Internet access
- Three dual-line telephones
- Speaker phone
- Voice mail
- Computer modem hook-up and dataports
- 25-inch remote control cable TV
- Video check-out
- LodgeNet system featuring on-demand hit movies and Nintendo 64® video games (additional cost)
- AM/FM alarm clock
- Individual climate control

ON BYPASS

REMEMBERING THE DISC OXYGENATOR

Kelly D. Hedlund, MS, CCP

The Michael E. DeBakey Heart Institute of Kansas

Hays, Kansas

Introduction

When I began my career in perfusion 30 years ago, the hardshell disposable bubble oxygenator was king. Membrane oxygenators were certainly available, but only comprised 20% of the market. By the mid-1980's however, the use of membranes quickly surpassed that of bubblers. Today, membranes are the preferred choice of oxygenation worldwide. Incredibly, bubble oxygenators are still available and used in various parts of the world. In terms of the history of oxygenators, no discussion is complete without mentioning the rotating disc oxygenator (see Figure 1). This "filming" device was first built in 1948 by Viking Bjork whilst working in Clarence Craaford's lab. Hooker is often mentioned as the originator of the disc oxygenator. In truth, Hooker used a flat disc merely to spread blood centrifugally inside a container. Virtually all of the gas exchange in Hooker's design occurred on the walls of the device as the blood streamed downward in a filming fashion. Of course, rotating *cyclinder* oxygenators go back to the days of von Frey and Gruber in 1885, as well as to Gibbon's early attempts at extracorporeal oxygenation in the 1930's. But it was two ingenious surgeons from Ohio, Drs. Frederick S. Cross and Earl B. Kay (see Figure 2), who brought name-brand recognition to *disc* oxygenation. Their device, introduced in 1956 as the Kay-Cross Rotating Disc Oxygenator, was soon manufactured by companies like Pemco, Med-Science, American Optical, and Sarns. For a brief time, it was the oxygenator of the day - a truly commercial device to be enjoyed by the masses.

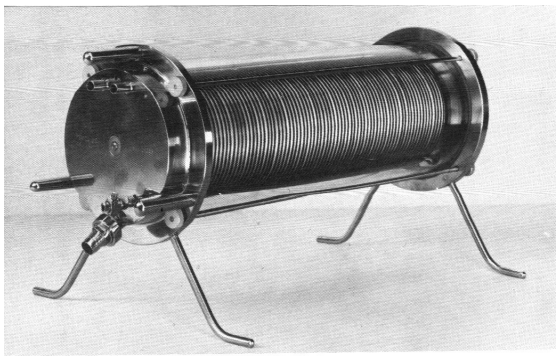


Figure 1
Kay-Cross Rotating Disc Oxygenator

Figure 2. Dr. Frederick S. Cross (left) and Dr. Earl B. Kay (right).

Disc Oxygenation

The original Kay-Cross oxygenator contained 59 silicone-coated stainless steel discs mounted on a central shaft separated by stainless steel spacers. The disc assembly was held horizontal within a pyrex glass cylinder by endplates containing gaskets that sealed the device.

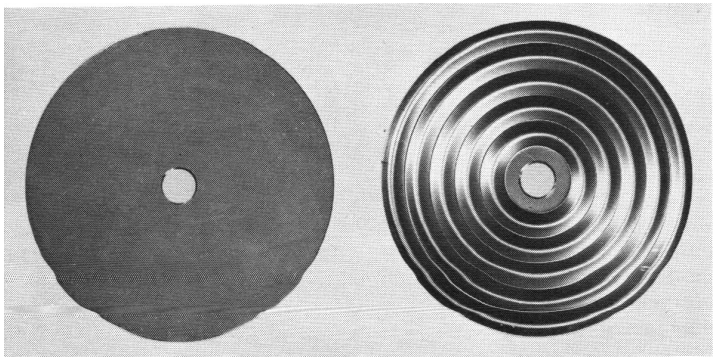


Figure 3
Flat (left) and corrugated (right) discs

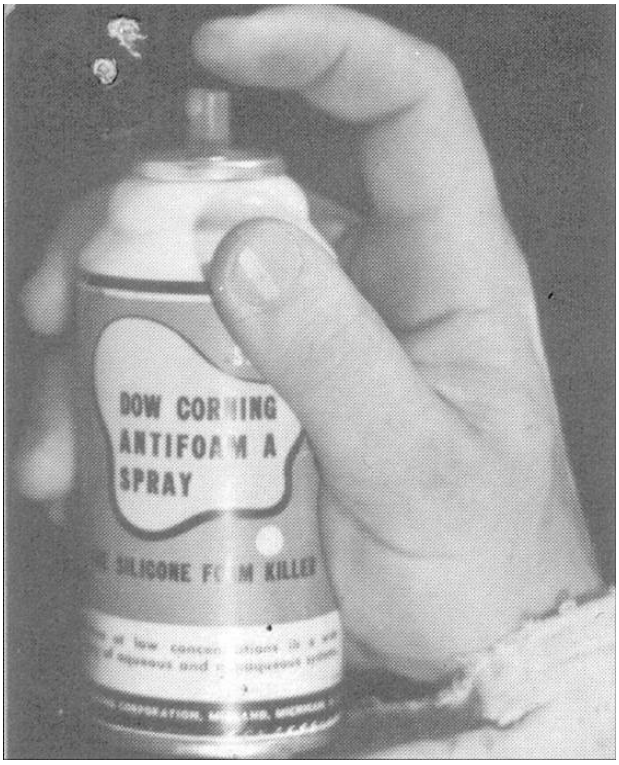


Figure 4
Dow Corning Antifoam A Silicone Spray

Cylinders, approximately 5 inches in diameter, were made available by manufacturers in various lengths (6", 9", 13", 17", 21", 25") to meet the oxygenation needs of the patient. Corrugated discs, which were stamped with 90 degree impressions in a concentric manner, offered 30% more surface area than the conventional flat disc design (see Figure 3). However, corrugated discs required more spacing between them (4.7 mm instead of 3.6 mm in one commercial model) to avoid "bridging" of blood from one disc to the next. As such, many perfusionists believed the additional space requirement for the entire corrugated disc assembly outweighed the modest advantage of increased filming area. During perfusion, the discs spun at a rate of 120 revolutions per minute. This was generally accomplished by connecting the central shaft to a motor housed inside the heart-lung machine chassis via a flexible cable. Free-standing direct drive motor units were also available. Increasing the spin rate beyond 120 revolutions did not significantly improve gas transfer, and tended to cause splashing and foaming of the blood. Reapplying the silicone coating to the discs, spacers, shaft, and endplates varied greatly between centers (see Figure 4). Kay and Cross advocated re-coating after 20 to 25 pump runs. The lack of an integrated heat exchanger was an obvious drawback of the original rotating disc design. Some centers wrapped a heating wire around the glass cylinder, or employed external heat lamps.

During his Gibbon Award acceptance speech in 1995, the late Ben Mitchell confessed to using a heating wire as a means to reduce condensation buildup inside the glass cylinder. Unfortunately, both wires and lamps frequently caused clotting at the blood-gas interface as the blood level oscillated up and down the cylinder wall. In response, companies like Olson and Pemco began manufacturing a heat exchanger that fit within the confines of the cylinder directly below the disc assembly (see Figure 5). A little known fact is that researchers began experimenting with *plastic* discs as early as 1957. Looking remarkably similar to phonograph records, plastic discs were molded from methylmethacrylate and offered disposability and quick setup (see Figure 6).

In the early 1960s, Sarns devised a rotating disc oxygenator with no endplates. Rather, the shaft and disc assembly were suspended inside a specially-contoured metal pan. The lid was made from Lexan – a new plastic at the time that could withstand repeated autoclaving up to 270º F (see Figure 7).

Continued on Page 16

The Student Section

Perfusion Student Chronicle

Whitt Behr, BS
Vanderbilt University Medical Center
Cardiovascular Perfusion Technology Program
Nashville, Tennessee

An electronic student chronicle or blog is a personal journal with reflections, comments, followers and hyperlinks with an intended purpose. This purpose is for the dissemination of information to anyone who wants to learn more about a particular topic. The blog should provide an unbiased view from the writer's perspective without the distraction of advertisers or other influences on the content. This blog is not designed to impart favoritism towards any perfusion program, department, technique, or medical facility. However, this blog is designed to chronicle my personal perfusion experiences from start to finish at Vanderbilt University Medical Center, but will also highlight additional communication that is gathered through this forum. I would like all perfusion students and anyone with an interest in extracorporeal technology to participate in the perfusion student chronicle.

There is very little public information about the perfusion profession and the type of individuals that enter this field of study. This is the first blog that I am aware of that provides a complete in depth perspective for potential applicants starting from the application process. My goal is to provide a complete chronicle through the entire perfusion student cycle. This may provide additional resources for those considering the perfusion profession and provide a platform to discuss concerns related to the field and the application process. The success of this perfusion student chronicle relies on additional information provided by perfusion students, student applicants, practicing perfusionists, other medical personnel and patients.

While the blog may provide useful information for prospective students it is also intended to provide insight for practicing perfusionists to understand how extracorporeal technology is being taught and is evolving. In my opinion, anyone associated with cardiac surgery should be able to gain knowledge as to the educational processes for perfusionists today. Further, the patient should also be able to obtain information as to the educational background of perfusionists and the different types of training programs that are currently available. The aspirations of this blog are to start a following that not only reads, but contributes and shares information from all aspects of perfusion to include educational, professional and consumerism.

My sincere hopes are that the perfusion community around the world will continue to embrace the perfusion student chronicle and contribute through the sharing of information (Figure 1, Figure 2). I plan to continue updating the blog to include experiences of my classmates, instructors, follower inquiries, etc. However, the intended direction is for the blog to evolve into a diverse platform for all persons to obtain perfusion information. Please consider sharing experiences and information related to this dynamic field, as this will determine if the blog will progress forward into an irreplaceable resource. Everyone will benefit and has a vested interest!

www.mc.vanderbilt.edu/cvpt
http://vandyperfusionwbehr.blogspot.com/

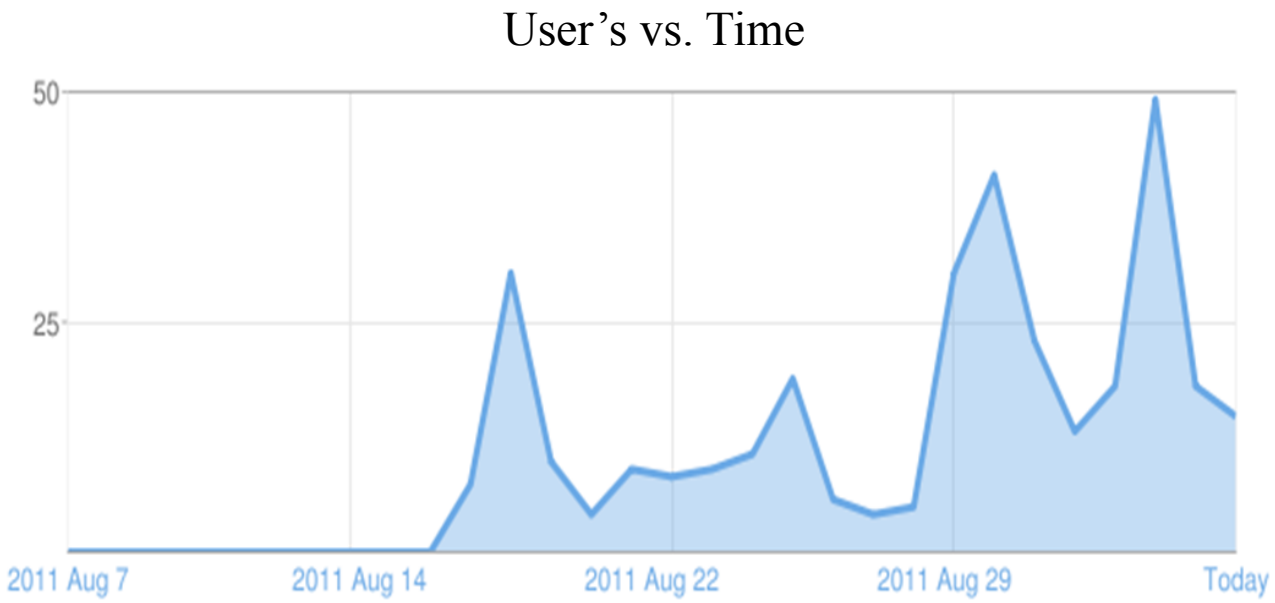
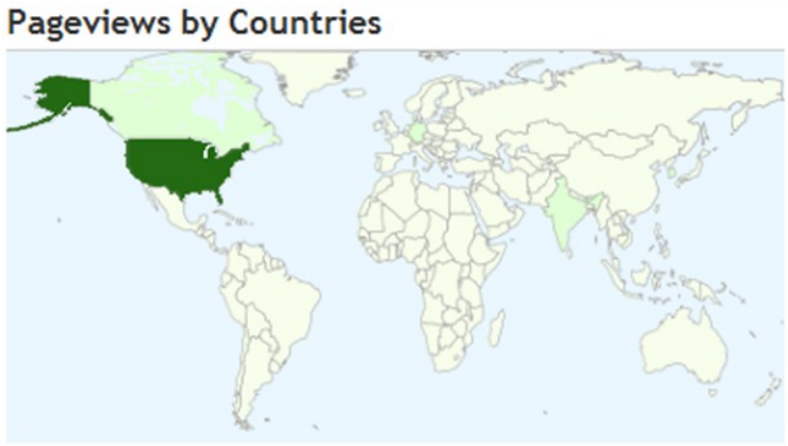


Figure 1: This graph represents the number of user's that have accessed the blog since it was launched on 16 Aug. 2011 until 6 Sept. 2011.



United States	319
Germany	2
Denmark	2
Canada	1
India	1
South Korea	1
Kuwait	1

Figure 2: This chart represents the different countries that have viewed the blog since it was launched on 16 Aug. 2011 until 6 Sept. 2011.

All About our Corporate Partners

Medtronic Receives FDA Premarket Clearance for its AFFINITY™ CP Centrifugal Blood Pump with Balance™* Biosurface and Carmeda® BioActive Surface** Coatings

This July, Medtronic received 510(k) clearance from the U.S. Food and Drug Administration (FDA) for the AFFINITY™ CP Blood Pump with Balance™ Biosurface coating or Carmeda® BioActive Surface coating in the U.S. The CE (Conformité Europeenee) Mark was also received for marketing the AFFINITY™ CP Blood Pump with Balance™ Biosurface in Europe.

These approvals make the AFFINITY™ CP blood pump the first adult product available in the U.S. and European Union with Balance™ Biosurface. This hydrophilic polymer for cardiopulmonary bypass (CPB) circuit coating contains no heparin and reduces platelet adhesion and activation and preserving platelet function.

The AFFINITY™ CP pump is also available with Carmeda® BioActive Surface. Carmeda® BioActive Surface is a durable, non-leaching End Point Attached heparin biocompatible surface technology that enhances blood compatibility and provides thromboresistant blood-contacting surfaces for CPB circuit devices. It has the largest body of peer-reviewed clinical and scientific evidence of any biocompatible surface used for CPB devices today.

"The launch of the AFFINITY™ CP with Balance™ Biosurface and Carmeda® BioActive Surface is another example of Medtronic's commitment to perfusion solutions. With a choice of the Balance™ Biosurface or Carmeda® BioActive Surface, we've expanded the comprehensive strategy options available to cardiovascular surgery teams, allowing them to achieve the best possible outcomes for their CPB patients," said Denise Steinbring, Marketing Director, Medtronic Perfusion.

The AFFINITY™ CP, designed for the extracorporeal circulation of a patient's total blood volume for up to six hours, is a low prime centrifugal blood pump that gently handles blood, resulting in minimized hemolysis. Combined with the Bio-Console® system, the AFFINITY™ CP pump exemplifies the durability that is a hallmark of Medtronic centrifugal pump products. With few moving parts, the pump's design allows for even blood flow at lower RPMs as well as low shear, resulting in reduced heat generation and low hemolysis. Customers continue to respond positively to the AFFINITY™ CP pump's small size and ease of use.

For more information or to trial the AFFINITY CP pump, contact your Medtronic representative or visit our website [http://www.medtronic.com/for-healthcare-professionals/products-therapies/cardiovascular/cardiopulmonary-products/Affinity-cp-centrifugal-blood-pump/index.htm].

AFFINITY CP centrifugal blood pump is now available in the U.S. with either Balance™ Biosurface or with Carmeda® BioActive Surface. It is available with Balance™ Biosurface in Europe.

*Technology licensed under agreement from BioInteractions, Limited, United Kingdom

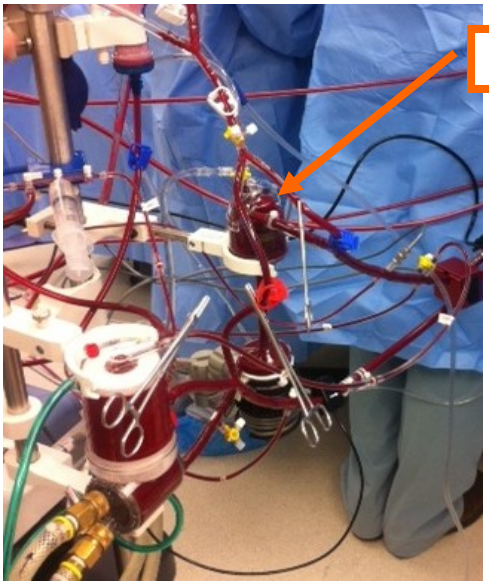
Michigan Hospital First in U.S. to Use the Medtronic Affinity® Venous Air Removal Device in a Custom Pack Circuit

Building on its legacy of mini circuit development and incorporation, William Beaumont Hospital, Troy, MI, expanded their use with a custom mini circuit for their coronary artery bypass grafting (CABG) procedures. They are the first U.S. hospital to use a Medtronic custom pack with the Affinity® Venous Air Removal Device (VARD) as a component.

William Beaumont Hospital's custom pack with the Affinity® VARD was first used in a CABG procedure requiring three bypass grafts. Subsequently, the next case using the Affinity® VARD was an aortic valve replacement (AVR) concomitant to a CABG procedure requiring three bypass grafts on an 85-year-old male patient weighing 83 kilograms. The initial prime was 700 mL and the RAP prime was 500 mL. Both antegrade and retrograde cardioplegia were used. There was less than 10cc of blood loss during the procedure as the Affinity® VARD triggered only once to remove venous air at start-up and never again during the procedure. The patient had a hematocrit level of 34 when he first went on-pump. The last hemotacrit reading was 36.

Advanced Technology Facilitates Automatic Venous Air Removal with the Affinity® VARD

Part of the Rethinking Blood Conservation® (RBC) Initiative, the Affinity® VARD offers perfusionists the flexibility to customize circuit systems for improved air handling. It encourages the use of closed circuits, which have been clinically demonstrated to reduce patient complications.[1] Paired with the Affinity CP™ centrifugal blood pump, the Affinity® VARD reduces priming volumes, a major goal for perfusionists and surgeons who support blood conservation initiatives.



The Affinity® VARD facilitates the benefits of closed circuits by automatically and quickly removing air from the extracorporeal circuit. As it does so, it provides a visual and audible alarm to alert the surgical team to the condition, all with no intervention by the perfusionist. The Affinity® VARD features:

- Ultrasonic air sensors that detect air at the system inlet and that monitor liquid level in the filter
- A 38 micron screen
- A chamber and port at the top of the device to collect and remove coalesced air
- Prime volume of 212 mL (not including purge line)

The Affinity® VARD gives perfusionists the flexibility to include or eliminate a venous hardshell reservoir, cardiotomy, or holding bag, depending on individual circuit set-up preference.

For more information on mini circuits with the Affinity® VARD, contact your Medtronic representative or visit our website.

Medtronic Academia Education Courses Designed for Mini Circuit Training

Mini-circuits are among the latest innovations in perfusion systems, opening the door to more effective blood management through blood conservation. They are integral to Medtronic's RBC® initiative, an effort to change paradigms and expand patient care possibilities for the cardiac surgeon, perfusionist and anesthesiologist. To support the training and education programs associated with the use of mini circuits during cardiopulmonary bypass, Medtronic Academia offers three comprehensive, practical courses for cardiac surgery, perfusion and anesthesiology teams.

Continued on Page 17

Continued from Page 11

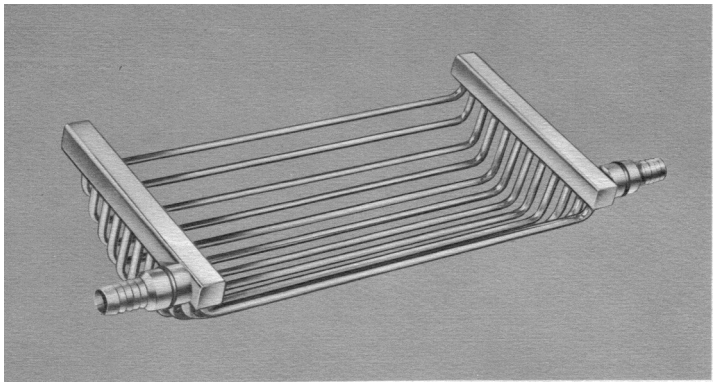


Figure 5
Heat exchanger designed to fit inside the rotating disc oxygenator

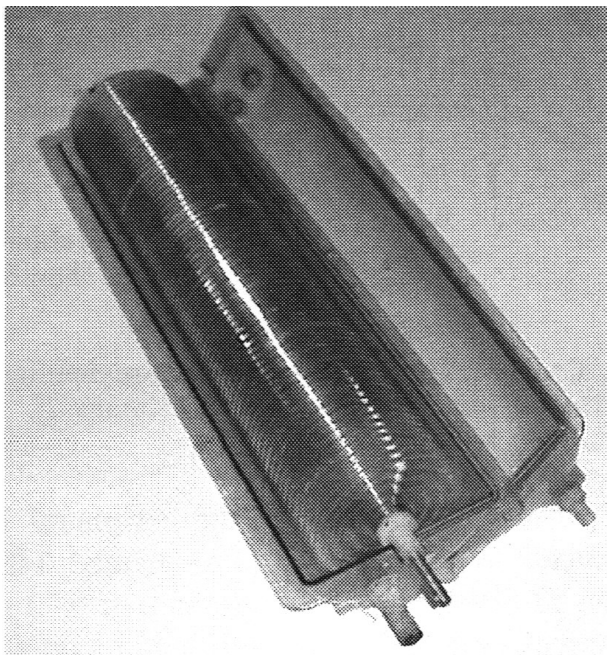


Figure 6
Disposable disc oxygenator made entirely of plastic

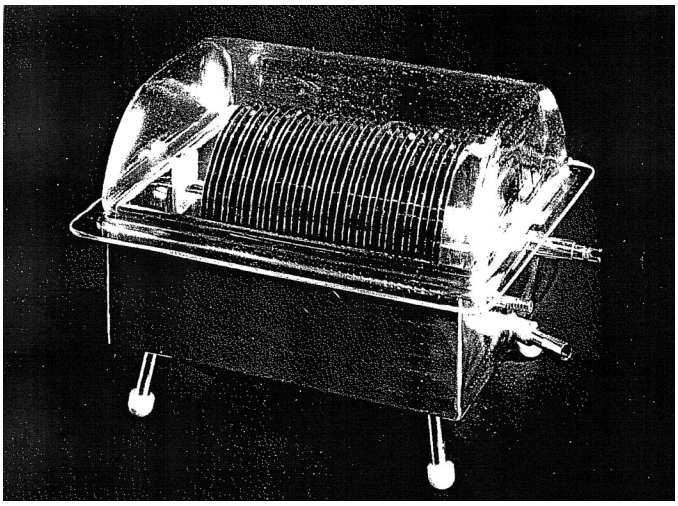


Figure 7
Sarns disc oxygenator with Lexan cover

Summary
Recently, I obtained a rotating disc oxygenator from the Ukraine. It was machined in Kiev in 1959 using the Kay-Cross specifications. According to the perfusionist who sent it to me, it was used on thousands of cases from 1960 until the late 1970s at the Amosov Institute of Cardiovascular Surgery. In 1967, a landmark article published by Gollub, Hirose, and Everett reported that the disc oxygenator (American Optical brand) caused far less destruction of erythrocytes than the bubble oxygenator (Travenol brand) using an in vitro test circuit primed with freshly-collected whole human blood. Studies like this are likely the reason why disc oxygenators remained in clinical use for so long, and why Dr. Norman Shumway once proclaimed, "Compared with the rotating disc oxygenator, the bubbler must be considered a second-class ticket good only for the short distance, and all too frequently the return trip has been cancelled". The disc oxygenator's place in history is secure. For those who haven't seen one up close, it was truly a feat of engineering - just ask the poor souls who had to clean and assemble it.

References

1) Galletti PM and Brecher GA. Heart-Lung Bypass: Principles and Techniques of Extracorporeal Circulation. Grune & Stratton Publishing. New York 1962.

2) Nose Y. The Oxygenator. CV Mosby Publishing. St. Louis 1973.

3) Stofer RC. A Technic For Extracorporeal Circulation. Charles C. Thomas Publishing. Springfield, Illinois 1968.

4) Stammers AH. Historical Aspects of Cardiopulmonary Bypass: From Antiquity to Acceptance. Journal of Cardiothoracic & Vascular Anesthesia. Vol. 11, no. 3, 1997: pp 266-274.

5) Gollub S, Hirose T, and Everett H. A Comparison of Blood Trauma by Various Extracorporeal Oxygenators. The Annals of Thoracic Surgery. Vol. 3, no. 4, 1967: pp 346-352.

Pump Tech or Perfusionist?

Continued from Page 1

torcycle at a local shop. He came away from the experience wondering why these mechanics, these technologists butchered his bike. It goes like this; you might substitute Pump Tech for mechanic.

The radio was a clue. You can't really think hard about what you are doing and listen to the radio at the same time. Maybe they didn't see their job as having anything to do with hard thought, just wrench twiddling. If you can twiddle wrenches while listening to the radio that's more enjoyable.

Their speed was another clue. They were really slopping things around in a hurry and not looking where they slopped them. More money that way—if you don't stop to think that it usually takes longer and comes out worse.

But the biggest clue seemed to be their expressions. They were hard to explain. Good-natured, friendly, easygoing-and uninvolved. They were like spectators. You had the feeling they had just wandered in there themselves and somebody handed them a wrench. There was no identification with the job. No saying, "I am a mechanic." At 5 p.m. or whenever their eight hours were in, you knew they would cut it off and not have another thought about their work. They were already trying to not have any thoughts about their work *on* the job.

A Perfusionist is someone who brings his/her full attention to the task at hand, who is mindful, who respects their position of responsibility and who engages with the care team in the most constructive way possible.

Daniel J. FitzGerald, CCP, LP
President, AACP

Abstract Deadline
October 15, 2011

Medtronic Affinity® Venous Air Removal Device

Continued from Page 15

"Developed in collaboration with preeminent physicians and healthcare professionals, Medtronic Structural Heart Academia offers access to innovative, topical educational opportunities that help clinicians optimize patient care. Each of the three courses is designed to enrich their knowledge and understanding, while advancing clinical skills," said Mark Bearss, Medtronic Cardiopulmonary Education Program Manager.

For more information about Medtronic Academia mini circuit education and training courses, contact your Medtronic representative.

1. Ranucci M, Isgrò G. Minimally invasive cardiopulmonary bypass: does it really change the outcome? *Crit Care*. 2007;11(2):R45. PubMed PMID: 17433112; PubMed Central PMCID: PMC2206473.

William Beaumont Hospital, Troy, MI, was the first U.S. hospital to use a Medtronic custom pack with the Affinity® VARD (Venous Air Removal Device) for coronary artery bypass grafting procedures.

PRE-REGISTRATION FORM

The 2012 Annual Meeting of
The American Academy of Cardiovascular Perfusion

MEMBER	**FEE**	**Amount**
Registration Fee	$340.00	_____
2012 Annual Dues	$145.00	_____
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 rate, you must be a current Student Member of The Academy.*		
FELLOW or SENIOR MEMBER	**FEE**	**Amount**
Registration Fee	$400.00	_____
2012 Annual Dues	$170.00	_____
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)_____

Choices will be assigned in the order they are received. Each Fireside Chat is limited to 30 attendees per session each day.

PRINT OR TYPE

NAME _____

ADDRESS _____

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

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

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

ANTICIPATED ARRIVAL DATE IN NEW ORLEANS _____

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 $35.00 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 2012 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, 2012--bring it with you to the meeting.
o No pre-registration will be processed after January 3, 2012.
-- **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 $145 for the 2012 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, 2012.

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.**

Call for Video Presentations for the Annual 2012 Meeting

This year the American Academy is preparing a Video Session for all Perfusionists to share their techniques with others at our National Symposium which will be held in New Orleans, Louisiana on January 26-29, 2012. The video presentations will be available to view for the entire meeting. You will be able to spend time reviewing each video at your leisure and we will provide USB output to download the video presentations, as well as policy or procedure materials provided by authors for you to take back and share with your perfusion teams at no extra charge.

These videos should be submitted by October 15, 2011. (Guidelines for production are listed on the AACP website. An example video is available on the website as well.) We are very pleased to add this teaching tool to our annual meeting.

It is very important for all Perfusionists to share their shortcuts, new techniques, special procedures, oxygenator change-outs, and other various skilled maneuvers that may enable others to gain experience from a video series.

Thank you in advance and we look forward to this exchange of Perfusion Techniques from your hospital in video form.

Important Academy Dates

The ACADEMY ANNUAL MEETING DEADLINES

ABSTRACT DEADLINE	**October 15, 2011**
MEMBERSHIP DEADLINE	**November 26, 2011**
PRE-REGISTRATION	**January 3, 2012**
HOTEL REGISTRATION	**January 3, 2012**
2012 ANNUAL MEETING	**January 26 - 29, 2012**

Others Meetings

Update on Perfusion Devices
Medical University of South Carolina
Charleston, South Carolina
October 13–15, 2011
Contact: 843-792-2298
Email: hannm@musc.edu
Website: http://www.musc.edu/upd

Dynamic Changes in the Cardiac Patient Population: Challenges for Technologies and Perfusion Techniques
Cornell Medical Center in NYC
Sponsored by NYSSP/ NFFPE
November 5, 2011
Contact: 516-466-2994
Email: rbahk@nshs.edu

Current Concepts in Pediatric Cardiac Critical Care
Columbia University Hammer Health Science Center, 701 W. 168th Street, 4th Floor, New York, NY
December 11, 2011
Contact: Stephanie Scheeler
Phone: 201-346-7003
Email: sas2258@columbia.edu
Website: http://columbiasurgery.org/cme/event_20111211.html

Cardiology 2012
Loews Portofino Bay Hotel at Universal Orlando
Orlando, Florida
February 22-26, 2012
Website: www.chop.edu/cardiology2012
Contact: Tami Rosenthal 267-425-6588

Contact Information for Our Sponsoring Partners

ABIOMED, INC.
Phone: 978-777-5410
Fax: 978-777-8411
Website: www.abiomed.com

COVIDIEN (now offering Somanetics INVOS System)
Phone: 248-689-3050
Fax: 248-689-4272
Website: somanetics.com

KIMBERLY-CLARK HEALTH CARE
Phone: 770-587-8578
Fax: 920-225-4531
Website: www.kchealthcare.com/warming

MAQUET CARDIOPULMONARY
Phone: 888-627-8383
Website: www.maquet.com

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

NONIN MEDICAL INC.
Phone: 763-553-9968
Fax: 763-553-0363
Website: www.nonin.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-usa.com
Email: Sorin-CP.Info@sorin.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