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

SUMMER 2010

Inside This Issue

2011 Academy Meeting
Reno, Nevada

Reno – The "Biggest Little City in the World" while famous for its hotels, gaming, and nightlife, has much to offer the outdoor enthusiast as well! According to a Splash magazine review, *"Reno is the **adventure** filled version of it's southern located sister, Las Vegas. Whether you're into skiing, boarding, whitewater, cycling or hiking - the Reno-Tahoe area has all the adventure you can handle."*

Consider that within an hour's drive of Reno, there are 18 ski resorts, thousands of mountain biking and hiking trails, several lakes that are perfect for fishing and boating.

Couple those activities with the 2011 Annual Academy Meeting and you have the perfect place to put up for a few days and enjoy some recreation and education!

Speaking of the annual meeting, the program committee is busy preparing another high-quality conference. The 2011 conference will feature the Sponsors Hands-on session, 19 Fireside Chats, two special panel presentations, 4 robust scientific sessions, a "how-to" video kiosk and the Charles C. Reed and Thomas G. Wharton Memorial Lectures.

I am extremely honored to represent the Academy as this years' president and look forward to working with you as we advance the Academy's mission "**to encourage and stimulate investigation and study which will increase the knowledge of cardiovascular perfusion, to correlate and disseminate such knowledge."**

Whether you're a student, staff or chief perfusionist, there will be something for everyone at the 2011 meeting. I certainly hope you can join me in Reno!

Edward Darling
President, AACP

32nd Annual Seminar of The American Academy of Cardiovascular Perfusion

Grand Sierra Resort and Casino
Reno, Nevada
January 27-30, 2011

Thursday, January 27, 2011

9:00 AM – 1:00 PM	Council Meeting
10:00 AM – 3:00 PM	REGISTRATION
2:30 PM – 4:30 PM	Fireside Chats
5:00 PM – 7:00 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 28, 2011

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)
3:30 PM – 5:30 PM	Fireside Chats
6:30 PM	Induction Dinner *Fellow, Senior, Honorary Members & Guests*

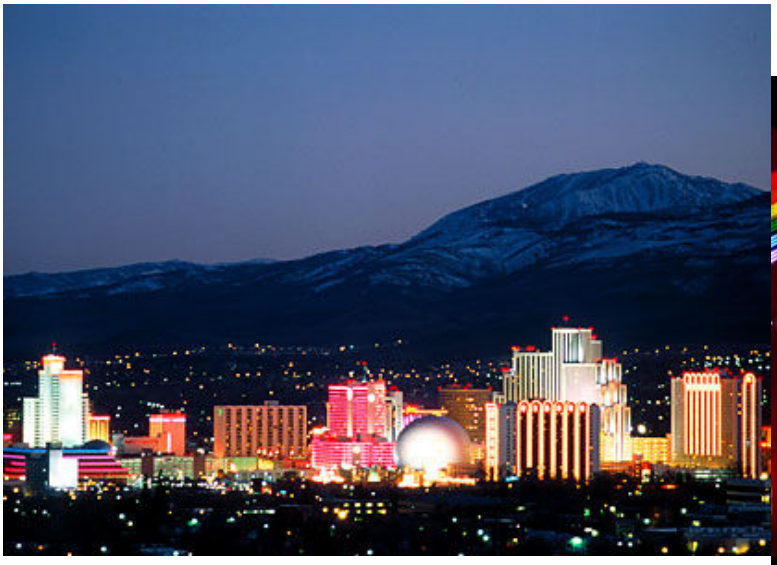
Saturday, January 29, 2011

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
11:30 PM – 1:00 PM	Lunch
1:00 PM – 3:30 PM	Special Scientific Session (Panel)
3:30 PM – 5:30 PM	Fireside Chats

Sunday, January 30, 2011

8:00 AM – 10:00 AM	Scientific Session
10:00 AM – 12:00 PM	Fireside Chats
12:30PM	Closing Business Meeting *Fellow, Senior and Honorary Members Only*

Our 2011 Host Hotel



Grand Sierra Resort and Casino

Reno, Nevada

January 27-30, 2011

Luxury Summit Accommodations
$99.00 Single/Double Occupancy

($10 daily resort fee allows you access to the health club, free valet parking, airport shuttle to the Reno-Tahoe International Airport, free local phone calls, wireless internet and two bottles of Fiji water.)

Reservations: 800-501-2651

Remember when making reservations to mention that you will be attending the AACP Meeting.

www.grandsierraresort.com

The Student Section

Ex Vivo Lung Transplants Made Possible With The Use Of An Extracorporeal System

Krysta L. Gleeson and **Richard Chan** CCP

NSUH School of Cardiovascular Perfusion

Long Island University
Brookville, NY

The gas exchange occurring inside the lungs rids the body of carbon dioxide in exchange for oxygen, allowing the body to maintain homeostasis and avoid tissue ischemia. Type II alveolar cells produce surfactant, a phospholipoprotein, which lowers the surface tension of the lungs and results in the prevention of atelectasis and increased pulmonary compliance. Conditions such as COPD, pulmonary fibrosis, cystic fibrosis, congenital defects, and pulmonary hypertension are common circumstances that cause significant damage to the functionality of the gas exchange between the alveoli and capillaries, creating a decreased quality of life and the need for medical intervention. Lung transplants are used as an end-stage treatment when medications are no longer useful and life threats become apparent.

Prior to undergoing a single or double lung transplant, blood and tissue typing are completed to test for the possibility of organ rejection. General health considerations are also taken into account, including cancers and infections, which could make recipients ineligible for receiving a new lung. The lungs are harvested from the donor, kept chilled to preserve the tissue, and typically maintained in solutions such as low potassium dextran (LPD) in order to reduce reperfusion injury. The organs must be transplanted within six hours after harvesting. After the tissue cross match comes back negative, or compatible with a donor lung, the recipient is prepared for surgery. The patient is placed under general anesthesia. A central venous line is inserted into the internal jugular vein for direct access of medication, antibiotics, and fluids. An extracorporeal system is used to bypass blood flow from the heart and lungs while maintaining oxygenation and removing carbon dioxide. This circuit contains leukocyte depleting filters, which will help reduce reperfusion injury caused by donor pulmonary macrophages and the recipients own circulating leukocytes. The old lung is removed and the new lung is transplanted by suturing the bronchus, pulmonary arteries, and pulmonary veins of the patient to the transplanted organ. Chest tubes are inserted to drain any excess air, blood, or fluid from the operation and are left in place for numerous days until the lungs are able to fully re-expand.

Currently in the United States, approximately 4,000 patients are on the waiting list to obtain either a single or double lung transplant. Only 15% of possible candidates for donation are considered suitable for transplantation after final evaluation of lung function. Moreover, during the last five years, a staggering 920 transplants were performed leaving thousands to die on the waiting list. The transplants performed only express the number of viable organs and fails to account for the lungs that were salvaged for donation and deemed unsuitable for transplantation. Conventional donors are typically brain-dead and supported by a ventilator, allowing little ischemic time and a better chance for viable lungs. Non-beating heart donors have been viewed as potential sources, since the lungs can undergo respiration during circulatory arrest and even hours after death due to lung parenchyma tissue,

or alveolar tissue. The alveolar tissue can be found in the respiratory bronchioles, alveolar ducts, and terminal bronchioles. The non-beating heart donors have a significantly higher ischemic time and are commonly associated with medical ailments that would cause the lungs to be ineligible for transplantation, thus creating an exceptionally undersized donor pool.

Research commenced to determine a method that would increase the number of non-beating heart donors, or donors after cardiac death (DCD). By artificially improving the functionality of the DCD lungs, the organs could be regenerated enough to be viable, quality donors for a patient. On June 27, 2006, The Ottawa Hospital in Toronto, Canada announced their first organ donation in a patient post cardiac arrest. This was followed by a successful DCD lung transplant at Toronto General Hospital six months later.

The procedure of ex vivo lung perfusion has been utilized in more recent DCD lungs, which places the donor lungs with a PaO_2/FiO_2 ratio of 300mmHg or less on an extracorporeal system with the infusion of Steen solution. A PaO_2/FiO_2 ratio is an index of arterial oxygenation efficiency that correlates the ratio of partial pressure of arterial O_2 (PaO_2) to the fraction of inspired O_2 (FiO_2). Steen solution is a physiologic salt containing albumin, dextran, and a low composition of extra-cellular electrolytes (low K+). It acts as an oncotic agent by mediating fluid shift in edematous lungs, eventually providing normal colloid osmotic pressure inside the lungs. Dextran reduces leukocyte adhesion and activity, preventing the possibility of thrombogenesis. The addition of a low dose of potassium reduces the amount of oxygen free radicals and vascular spasm at normothermia.

A standard cardiopulmonary bypass circuit is arranged in conjunction with a heater cooler and a single leukocyte filter. This circuit contains a venous reservoir-cardiotomy combination, a centrifugal pump, a membrane oxygenator, a heat exchanger, and an arterial filter. As an alternative for using oxygen, however, carbon dioxide is utilized so any form of gas exchange the lungs generate can be measured. The arterial and venous lines are cannulated into the pulmonary artery and vein of the DCD lungs respectively. An angiocath, typically 16 gauge, is inserted into the right pulmonary artery to monitor PA pressure. Steen solution, heparin, lactated ringers, and packed red blood cells (PRBC) with a hematocrit of 15% are used to prime the circuit. At initiation of bypass, a temperature of 32°C is maintained with a low flow of 100cc/min. for adequate perfusion of the lungs, which were already in a hypothermic state for preservation. Gradually, the temperature and flows are increased as the temperature of the perfusate is balanced to the adjusted temperature. Flow should be monitored closely as exceeding 5.0 LPM could cause edema, as well as perfusion pressures above 20mmHg. Blood gases are evaluated continuously and compared with baseline values at the beginning of extracorporeal circulation. Once appropriate values of pH, pCO_2, pO_2, and electrolytes are obtained, temperature can be adjusted respectively until normothermia is reached. Final evaluation of lung function can be assessed at the conclusion of bypass, which can be as long as 12 hours.

Results for this procedure have been promising. Dr. Cypel from the University of Toronto cited that among twenty-five lungs that were treated with ex vivo lung perfusion, twenty-two were restored to a viable, transplantable state. These twenty-two lungs were transplanted into patients, with no rejection, and resulted in the same ICU stay, extubation time, and morbidity/mortality as with standard lung transplants. None of these patients required extracorporeal membrane oxygenation (ECMO), compared with 3.5% from conventional transplants. Final evaluation of the functionality of ex vivo lungs resulted with a PaO_2/FiO_2 ratio with a mean of 498 mmHg prior to transplantation with little change post -transplant. There had also been less inflammatory response associated with ex vivo transplanted lungs due to the decrease of inflammatory mediators and oxygen free radicals by prime components.

It is apparent that the future of ex vivo lungs transplants would be exuberantly beneficial for the general population. Thousands of people who die on the waiting list each year could have a new chance at life since there would be exponentially more potential donor matches. The regeneration of DCD lungs could be made possible with the knowledge and skills of perfusionists and doctors to impact this community of patients in dire need. This new technology impacts the cardiothoracic community in a comparable manner as the ventricular assist device (VAD) and the production of the artificial heart have in the past. VAD technology was a breakthrough for bridge-to-transplant and bridge-to-

Continued on Page 5

Continued from Page 5

recovery therapy, extending countless lives in terms of quality and time. Moreover, ECMO is being utilized in the preservation of organs of DCD donors. After five minutes of circulatory arrest, which is required to declare a patient legally deceased, a patient will be placed on ECMO to provide oxygenation and circulation throughout the body and allow time for ischemic tissues to recover before organ harvest. Currently the ex vivo lung procedure is awaiting FDA approval in the United States, but since it has been so successful in Canada and research has shown outstanding results, authorization in the near future looks promising. Technology can only go forward from this—the potential to perfuse and revive other organs with the use of an extracorporeal system, such as the liver and kidneys, stands as a possibility. One thing is certain; perfusionists will be an integral part of the team and at the heart of saving and extending countless lives.

References

Egan T. Ex vivo evaluation of human lungs for transplant suitability. *Ann Thorac Surg* 2006; 81: 1205-1213.

Cypel M. Technique for prolonged normothermic ex vivo lung perfusion. *J Heart Lung Trans* 2008; 27: 1319-1325.

Pego-Fernandez PM. Ex vivo lung perfusion: early report of brazilian experience. *Transpl Proc* 2010; 42: 440-443.

Steen Solution. *Vitrolife*. Vitrolife Transplantation Products, 2006. Web. 14 May 2010. http://www.vitrolife.com/transplantation/index.cfm?page=5C2F0741-022E-89DF-30E9FD699403D1B0

Helwick C. Ex vivo lung perfusion renders previously unacceptable lungs usable. *Medscape,* WebMD, 28 April 2010. Web. 14 May 2010. http://www.medscape.com/viewarticle/720937

Bernat J. The boundaries of organ donation after circulatory death. *N Engl J Med* 2008*;* 359: 669-671. Web. 17 May 2010. http://content.nejm.org/cgi/content/full/359/7/669

IF YOU WOULD LIKE THE ACADEMY NEWSLETTER EMAILED TO YOU DIRECTLY, PLEASE SEND YOUR NAME, CITY, STATE AND EMAIL ADDRESS TO OFFICEAACP@AOL.COM.

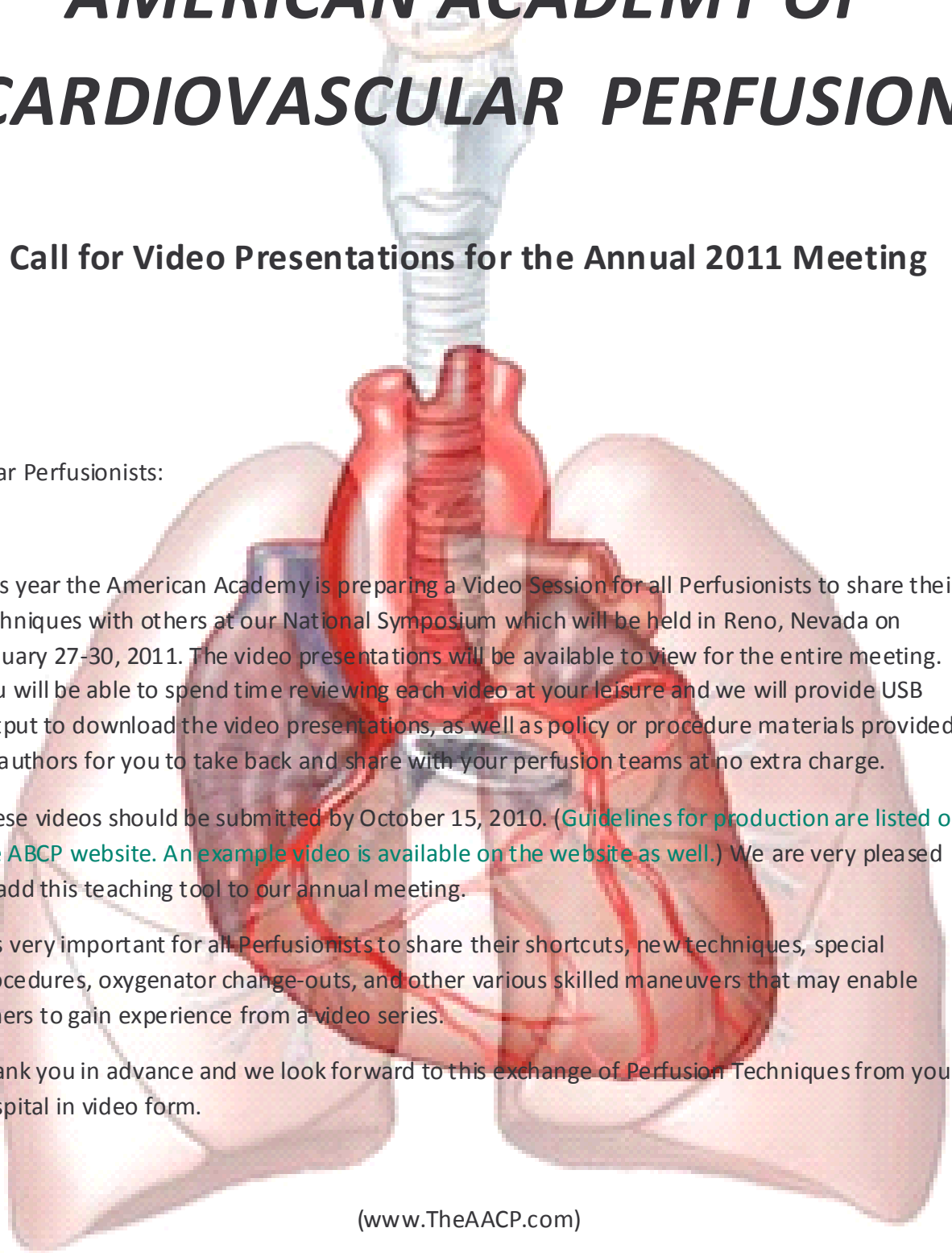
Distinguished Service Award

Linda Mongero and Daniel FitzGerald on behalf of The American Academy of Cardiovascular Perfusion presented the *Distinguished Service Award* to William J. Horgan, CCP (1988–2010) in appreciation for his years of dedicated service on the AC-PE and outstanding accomplishments in the perfusion community. The award was presented at the AC-PE meeting in Denver, Colorado on June 19, 2010.

Picture of Bill taken at the first Academy meeting in 1980.

AMERICAN ACADEMY OF CARDIOVASCULAR PERFUSION

Call for Video Presentations for the Annual 2011 Meeting



Dear Perfusionists:

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 Reno, Nevada on January 27-30, 2011. 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, 2010. (Guidelines for production are listed on the ABCP 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.

(www.TheAACP.com)

Important Academy Dates

The ACADEMY ANNUAL MEETING DEADLINES

ABSTRACT DEADLINE	**October 15, 2010**
MEMBERSHIP DEADLINE	**November 27, 2010**
PRE-REGISTRATION	**December 27, 2010**
HOTEL REGISTRATION	**December 27, 2010**
2011 ANNUAL MEETING	**January 27 - 30, 2011**

Others Meetings

Team SUNY 2010
Marriott, Renaissance Hotel
Syracuse, New York
September 10-12, 2010
Phone: 315 464-6933
Fax: 315 464-6914
Website: www.ec.upstate.edu/chp/cp/TeamSUNY/home.html
Contact Name: Lynn Kennedy
Contact Phone: 315 464-4464
Contact Email: kennedyl@upstate.edu

Canadian Society Clinical Perfusion
Palais des Congrès de Montréal
Montréal, Quebec, CANADA
October 23-27, 2010
Phone: 1-888-496-2727
Website: cscp@cscp.ca
Contact Name: Eric Laliberte
Contact Phone: 514-402-2399
Contact Email: agm@cscp.ca

Cardiology 2011
Hyatt Regency Scottsdale Resort and Spa at Gainey Ranch
Scottsdale, Arizona
February 2-6, 2011
Preliminary program available at
www.chop.edu/cardiology2011
Contact Name: Tami Rosenthal
Contact Phone: 267-425-6588

Contact Information for Our Sponsoring Partners

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

MAQUET CARDIOPULMONARY
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

SOMANETICS CORPORATION
Phone: 248-689-3050
Fax: 248-689-4272
Website: somanetics.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