# The Academy NEWSLETTER

SPRING 2013



THE AMERICAN ACADEMY
OF
CARDIOVASCULAR PERFUSION
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## Inside This Issue



## *AACP 2013 Annual Meeting*


EXIT

# Welcome to New Members

The American Academy of Cardiovascular Perfusion would like to welcome the following individuals whom were voted into membership at the Closing Business Meeting of our annual meeting in

**Fellow Membership**

Adam Fernandez
Thomas Klein
Harry McCarthy II
Scott Noesges
Julie Pokersnik
Michael Smith

**Member Membership**

Shannon Bryant
Jenna Cornibe
Patrick Grady
Karl Kaiser
Mark Lowther
Shaelynne Pohlman
Kathleen Rezler
D. Bradford Sanders
Emily Saulitis
Robin Sutton

**Student Membership**

Andrew Berardi
Amanda Best
Daniella Boros
Christopher Castellanet
Urvee Chauhan
Kelly Cole
Gabe Compton
Kelly Duschner
Joy Evangelin
Kristin Ewen
Rosanna Falco
Kelley Feather
Cassandra Garland
Claire Jara
Thomas Kantner
Violet Koch
Kayla Kutilek
Pietroluca Libreri
Samantha Martin
Court Menke
Patrick Miller
Alex O'Donnell
Derman Ozdemir
Dennis Palitang
Michelle Palmer
Krishna Phifer
Albert Pinter
Stephanie Radford
Christopher Rezler
Laura Rigg
Steven Robertson
Madison Ropp
Alberto Rostro
Morgan Russo
Bryan Schmerler
Ajay Sharma
Antoine Simons
Zach Suare
Trevor Swyers
Catherine Torma
Randy Vasquez
Whitney Western
Ryan Zavala

# *AACP 2013 Officers and Council*

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*Woodbury, NJ*

# AACP Student Council

The AACP Student Society has selected the AACP Student Council for this year. The following students will make up the inaugural AACP Student Council, President -Seana Hall - University of Arizona, Vice President - Claire Jara - State University of New York, Secretary - Whitney Western - University of Nebraska Medical Center, Treasurer - Krishna Phifer – RUSH, Catherine Torma - Cleveland Clinic School of Perfusion, Michelle Palmer - Midwestern University (Glendale, AZ).

# 2014 Annual Academy Meeting


## Orlando Hilton
## Lake Buena Vista, Florida
## January 23 - 26, 2014

# Awards Committee Selects Winning Paper Presentations

Three students received **Lawrence Awards** for their paper presentations at the Annual Seminar in Los Angeles.


Amanda Best - Effect of Simvastatin on Intimal Hyperplasia

Antoine Simons - Efficacy and Safety of Strategies to Preserve Stable Extra-corporeal Life Support Flow During Hypovolumia


Trevor Swyers - Volatile Anesthetic Induced Preconditioning

The Lawrence Award is a $500 cash award for the best student paper presentations.


In addition, James Beck was awarded the **Best Paper of the Conference** - a $750 cash award funded by the journal *Perfusion* for his presentation entitled, “Real Time Data Acquisition and Alerts Reduce Reaction Time and Improve Perfusionist Performance During CPB”

A new award was given to the best pediatric paper presented at the meeting. The C. N. Lee Pediatric Presentation Award was given to Joseph Sistino for his paper entitled, “Attention Deficit/Hyperactivity Disorder After Neonatal Heart Surgery - What Are the Risk Factors?“ This $500 award is supported by a generous grant from the New Foundation For Perfusion Education.

ON BYPASS

# Stabilizing Extracorporeal Life Support Flow During Hypovolemia

*Antoine P. Simons (PhD), Anouk A.M.A. Lindelauf, Yuri M. Ganushchak (MD, PhD), Jos G. Maessen (MD, PhD), Patrick W. Weerwind (PhD)*
*Dept. of Cardiothoracic Surgery, Maastricht University Medical Center and Cardiovascular Research Institute Maastricht, Maastricht, the Netherlands*

## INTRODUCTION

Extracorporeal life support (ELS) has proven life saving in several settings [1-4], but remains susceptible to hypovolemia that decreases blood flow [5]. To maintain flow, automated pump speed adjustment using servo pump control has been developed. In contrast to such active strategy, a passive volume buffer capacity (VBC) device incorporated into the drainage line has shown to stabilize flow [6, 7]. This study evaluates the efficacy of combined servo pump control and VBC on ELS flow during simulated hypovolemia.

## MATERIALS AND METHODS

The flow stabilizing strategies were evaluated in vitro using a collapsible vena cava model, a support module (CardioHelp HLS Advanced 7.0, Maquet CardiopuImonary AG, Hirrlingen, Germany) and a VBC device (Better-Bladder, Circulatory Technologies Inc., Oyster Bay, New York, USA) (Figure 1). After setup, hypovolemia was induced and data acquisition was started for 30 seconds and values were averaged. The procedure was repeated without (A) and with (B-E) servo pump control strategies, either without or with VBC:

A. no servo pump control.
B. pressure servo control: pump speed decreases when venous line pressure exceeds a preset threshold.
C. flow servo control: pump speed increases when flow diminish es.
D. flow-pressure servo control: pump speed increases when flow diminishes, but dominant pressure servo prevents venous line pressure from exceeding a preset threshold.
E. reserve-driven pump control adapts speed using a 2-step adjustment (VBC included).

B, C and D are CardioHelp-embedded. C and D use a flow set point of 3.1 l/min. B and D use a venous line pressure threshold of -60 mmHg. E employs a 5 second lasting, manual speed adjustment: 100% ➔ 50% ➔ 90% rpm [8].

## RESULTS

Normovolemia (baseline) resulted in a pump flow of 3.1±0.0 L/min and a venous line pressure of -10±1 mmHg (Figure 2). Hypovolemia without servo pump control (A) resulted in a flow of 2.3±0.4 L/min with a venous line pressure of -114±52 mmHg. Servo controllers B, C and D resulted in an unstable flow of 1.5±1.2 l/min on average, of which the flow servo ($C_{noVBC}$) trig-

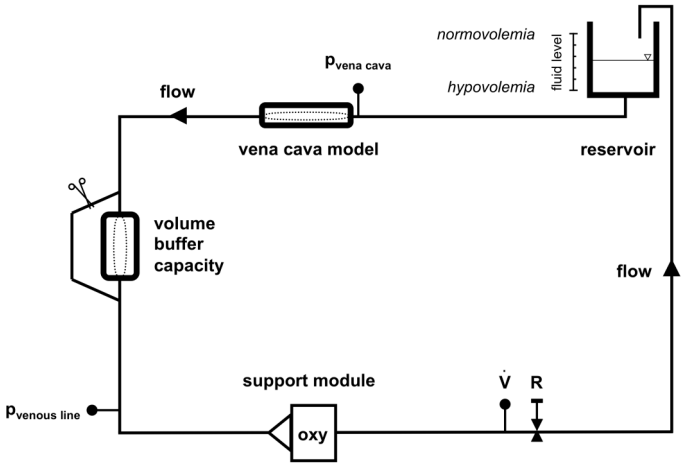



**Figure 1:** Schematic representation of the mock circulation in which drainage flow-stabilizing strategies were tested. When drainage flow exceeded venous return, the vessel model collapsed.

p, pressure; oxy, oxygenator; $\dot{V}$, flow measurement side; R, adjustable hydraulic resistance.

gered pump speed up-spin to 5,000 rpm with immediate pump depriming due to degassing. A subsequent controller-induced pump stop required manual repriming and restart of the pump. With and without servo pump control, the VBC device stabilized flow (SD=0.2 and 0.0 L/min, respectively) and venous line pressure (SD=51 and 4 mmHg, respectively). Reserve-driven pump control combined with a VBC device ($E_{VBC}$) restored a stable flow of 2.7±0.0 L/min with a venous line pressure of -9±0 mmHg. These values were lower than baseline ($p<0.001$), but proved higher than all other flow stabilizing strategies ($p<0.001$).

## DISCUSSION

ELS servo-regulated pump control aims at preserving stable support flow during varying volemic conditions. Our results, however, show that the current pressure and flow servo pump controllers failed in preserving stable support during simulated low patient filling. The reserve-driven control combined with a VBC, however, was able to restore a decreased but stable pump flow, may reduce negative side effects associated with hypovolemia [8-11] and aid patients supported by ELS.

This study used the CardioHelp-embedded servo pump steering (software release 03.03.00). Controllers of competing manufactures, however, assume linear or near-linear speed-flow or speed-pressure relationships as well. Therefore, we expect comparable results when using those servo controllers, although their data processing might use different signal processing to enhance controller stability.

## CONCLUSION

In contrast to a reserve-driven pump control strategy combined with a VBC device, flow and pressure servo pump control for ELS show evident deficits in preserving stable and safe support flow during hypovolemia.

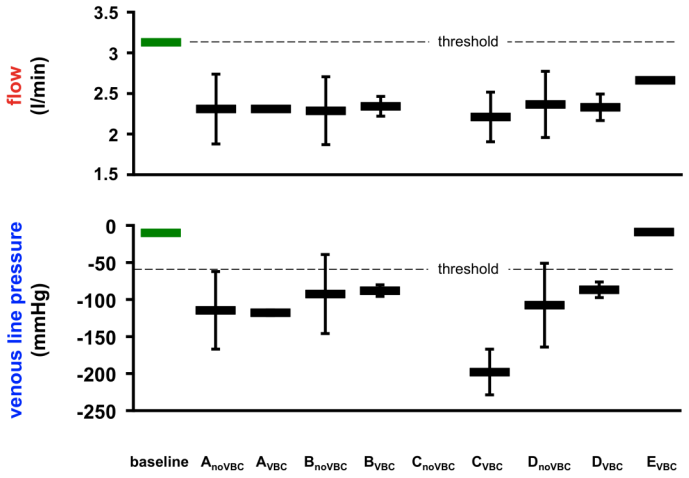



**Figure 2:** The effect of simulated hypovolemia and an incorporated volume buffer capacity (VBC) device without/with pump servo control on flow and venous line pressure. A, no servo pump control; B, pressure servo pump control; C, flow servo pump control; D, flow-pressure servo pump control; E, reserve-driven pump control strategy.

*The full manuscript of this article has been submitted to the journal Perfusion for possible publication.*

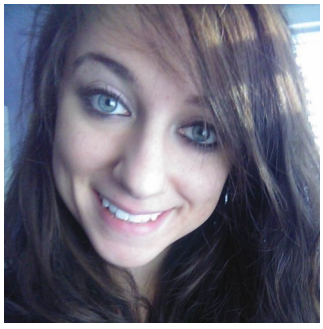
*Continued on Page 9*

The Student Section

# MANAGING MULTIPLE VADS: RAPID ACCESS OF USER MANUALS

**Stephanie L. Radford**

*SUNY Upstate Medical*
*Syracuse, NY 13210*



It's 3 am … you're are the on-call perfusionist … your cell phone rings … ***"Hello, this is the ICU, we have a new patient transported in with a XVE VAD and it's beeping every 4 seconds with a little yellow light on a button that has a …"***. In your half-dazed state you struggle to remember what this alarm means. You are good at your job – real good, but how could anyone remember all the technical details of the half dozen current VADs used at your hospital in addition to the older versions previously implanted. As you gather yourself to make the drive in, you recall other times during implantation when frantic consolations between team members was required to keep the details straight, and still others when the nurses and physicians just needed some answers to questions and could not find the right information and you began wishing for a more effective way of accessing key information relevant to you -- the trouble-shooting perfusionist. This article gives an overview of one facility's solution for addressing this vital information need.

Individual VAD manuals are comprehensive and voluminous and a problem emerges as an institution adds additional VADS to its armamentarium. This creates an accumulative effect of 'instructions for use' (IFU) information that could fill a library. To tackle this logistical and organizational challenge we undertook an initiative to synthesize key data into an abridged concise, single source rapid access reference.

So, an audit was made of all VADs and their manuals and training materials currently in use at the clinic. Concurrently, interviews of the VAD coordinators, surgeons, cardiologists and Critical Care Unit staff were performed for their input on what data would be most useful. From this information, a review of each devices' most updated IFU along with other relevant data was compiled in a binder producing a

single summative VAD manual (Figure 1). The positive results of consolidating information into an easily accessible single-source manual were recognized (Table 1).

TABLE 1

Benefits of a Single-Source VAD Manual

Increased data retrieval efficiency
Impoved continuty of care
Reduced staff confusion
Decreased stress

As the use of VADs continues to rise and new device options become available, there exists a logistical challenge to organize technical information. While this small initiative may seem self-evident, it will provide considerable benefits to teams who manage multiple mechanical assist devices.

*The full manuscript of this article has been submitted to the journal Perfusion for possible publication.*

**The Academy welcomes two new sponsors:**

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**We thank them and all our sponsors for their contributions to perfusion education.**

## Stabilizing Extracorporeal Life Support Flow During Hypovolemia

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**ACKNOWLEDGMENT**

The authors are grateful to the American Academy of Cardiovascular Perfusion who distinguished this work by the Lawrence Scientific Presentation Award at the 34th Annual Seminar on Cardiovascular Perfusion, held January 24-27, 2013 in Los Angeles, CA, United States of America.

**REFERENCES**

1. Gajarski RJ, Mosca RS, Ohye RG, et al. Use of extracorporeal life support as a bridge to pediatric cardiac transplantation. *J Heart Lung Transplant* 2003; 22: 28-34.
2. Pagani FD, Aaronson KD, Swaniker F, et al. The use of extracorporeal life support in adult patients with primary cardiac failure as a bridge to implantable left ventricular assist device. *Ann Thorac Surg* 2001; 71: S77-81; discussion S82-85.
3. Rehder KJ, Turner DA and Cheifetz IM. Use of extracorporeal life support in adults with severe acute respiratory failure. *Expert Rev Respir Med* 2011; 5: 627-633.
4. Wu MY, Lee MY, Lin CC, et al. Resuscitation of non-postcardiotomy cardiogenic shock or cardiac arrest with extracorporeal life support: the role of bridging to intervention. *Resuscitation* 2012; 83: 976-981.
5. Simons AP, Reesink KD, Lance MD, et al. Dynamic filling index: a novel parameter to monitor circulatory filling during minimized extracorporeal bypass. *Eur J Cardiothorac Surg* 2009; 36: 330-334.
6. Ganushchak Y, Severdija E, Simons A, et al. Can minimized cardiopulmonary bypass systems be safer? *Perfusion* 2012; 27: 176-184.
7. Tamari Y, Lee-Sensiba K, King S, et al. An improved bladder for pump control during ECMO procedures. *J Extra Corpor Technol* 1999; 31: 84-90.
8. Simons AP, Reesink KD, Lance MD, et al. Reserve-driven flow control for extracorporeal life support: proof of principle. *Perfusion* 2010; 25: 25-29.
9. Simons AP, Reesink KD, Molegraaf GV, et al. An in vitro and in vivo study of the detection and reversal of venous collapse during extracorporeal life support. *Artif Organs* 2007; 31: 154-159.
10. Ganushchak YM, Severdija EE, Simons AP, et al. Can minimized cardiopulmonary bypass systems be safer? *Perfusion* 2012; 27: 176-182.
11. Simons AP, Ganushchak YM, Teerenstra S, et al. Hypovolemia in extracorporeal life support can lead to arterial gaseous microemboli. *Artif Organs* in press

All About our Corporate Partners

# Medtronic Gains FDA Clearance for New Oxygenation System for Adult Cardiopulmonary Bypass Surgery

On January 9th, 2013, Medtronic gained FDA clearance for its new Affinity Fusion® Oxygenation System with Balance® Biosurface[1], followed by clearance of the system with Carmeda® Bioactive Surface[2] on January 22nd, 2013. This new adult oxygenation system incorporates over 79 design enhancements, based on a collaborative development process between Medtronic engineers and more than 500 perfusionists worldwide. The oxygenator has a built-in integrated filter, with a prime volume of 260 mL, and was designed for excellent air handling capabilities.

The Affinity Fusion oxygenation system's new design enhancements include, but are not limited to:

A proprietary fiber winding process with an interlaced pattern that efficiently filters the blood and removes particles and air while at the same time oxygenating the blood, for progressive fiber filtration;

Smooth tubular pathways for blood to pass through and a first-of-its-kind curved venous inlet tube, both of which reduce blood turbulence during the surgical procedure, for uniform flow distribution;

Enhanced setup and customization capabilities, including a new oxygenation system holder, the Affinity Orbit®, which gives perfusionists improved flexibility and ease of use in various operating rooms, including those with limited space.

"The new Affinity Fusion oxygenator is designed to provide perfusionists with the most innovative and enhanced product of its kind, based on their inputs during the development process," said Denise Steinbring, Marketing Director, Medtronic Perfusion Systems, "along with providing perfusionists with a reliable oxygenation system they can count on, based on the experience gained in manufacturing over 4 million Affinity® oxygenators."

Medtronic, Inc. announced Conformité Européenne (CE) Mark for the Affinity Fusion® oxygenation system with Balance Biosurface on September 24, 2012. Since then, over 2100 cardiopulmonary bypass surgery cases have been performed in 23 countries utilizing this new oxygenation system. It was unveiled for the first time publically to US perfusionists at the American Academy meeting in Los Angeles, CA on January 24th, 2013. Later that week, the Affinity Fusion system was also on display at the Society of Thoracic Surgery meeting in Los Angeles, and connected to the Orpheus perfusion simulator, so that surgeons could experience a hands-on demonstration of the proactive air handling capabilities of the device.

The Affinity Fusion® Oxygenation System is another example of Medtronic's Commitment to Perfusion Solutions, by introducing another new product to the market, in collaboration with perfusionists world-wide. For more information about the new Oxygenation System, go to www.fusionoxygenator.com

[1]Technology licensed under agreement from BioInteractions, Limited, United Kingdom.

[2]Carmeda is a trademark of Carmeda AB. Products are coated with Carmeda® BioActive Surface, which is licensed from Carmeda AB for use only as part of an extracorporeal blood circulation system or circuit that includes an oxygenator or blood pump.

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# Important Academy Dates

The ACADEMY ANNUAL MEETING DEADLINES

| | |
|---|---|
| **ABSTRACT DEADLINE** | **October 15, 2013** |
| **MEMBERSHIP DEADLINE** | **November 23, 2013** |
| **PRE-REGISTRATION** | **January 3, 2014** |
| **HOTEL REGISTRATION** | **January 3, 2014** |
| **2014 ANNUAL MEETING** | **January 23 - 26, 2014** |

***Others Meetings***

**Wisconsin Perfusion Society Annual Spring Meeting (20th Anniversary)**
Glacier Canyon Lodge in the Wilderness Resort in the Wisconsin Dells
April 12-14, 2013
Website: www.wisperfusion.org
Contacts: Matthew Hietpas, CCP, LP (mhietpas@me.com)
Kirsten Kallies, CCP, LP (kalliesk@gmail.com

**9th International Conference on Pediatric Mechanical Circulatory Support Systems & Pediatric Cardiopulmonary Perfusion**
May 8-11, 2013.
Hershey Lodge, Hershey, PA, USA,
Website: http://pennstatehershey.org/web/pedscpb/home

**15th European Congress on Extracorporeal Circulation Technology**
June 12th – 15th, 2013
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