Artificial Organs

Guest Editorial

Outcomes of the Ninth International Conference on Pediatric Mechanical Circulatory Support Systems and Pediatric Cardiopulmonary Perfusion

The Ninth International Conference on Pediatric Mechanical Circulatory Support Systems and Pediatric Cardiopulmonary Perfusion was held at the Hershey Lodge in Hershey, PA, USA from May 8 to 11, 2013.

The overall objective of this annual conference remains to bring together internationally known clinicians, bioengineers, and basic scientists involved in research on pediatric mechanical circulatory support (MCS) systems and pediatric cardiopulmonary bypass (CPB) procedures. The main focus is to explicitly describe the problems with current pediatric MCS systems, methods, and techniques during acute and chronic support, and to suggest solutions and future directions for research. During the past 9 years, the main focus has not changed but has given the highest possible educational opportunities to the diverse participants. More hands-on wet labs and simulations with the newest devices and techniques have been added (1,2).

JOHN A. WALDHAUSEN, MD

The Ninth International Conference was dedicated in honor and memory of John A. Waldhausen, MD, Professor Emeritus, for his life-long contributions as the Founding Chair of the Department of Surgery at Pennsylvania State University College of Medicine (PSUCOM) and as a pioneering surgeon and educator in the development of pediatric cardiac surgery in the USA (Fig. 1).

CONFERENCE PROGRAM

John L. Myers, MD, and Professor Emeritus William S. Pierce, MD, of PSUCOM presented remarks in remembrance of Dr. Waldhausen on the opening day of the conference (Fig. 2). After these opening remarks, we asked if anyone in the audience would like to share any memories of Dr. Waldhausen with the participants. One of the legends of MCS, Jack G. Copeland, MD, surgeon and inventor, shared his story that Dr. Waldhausen was in fact a chair on his General Surgery Board Oral Examination and let Dr. Copeland know that he passed the test after he answered his challenging questions.

This year, conference attendees had the opportunity to hear two keynote lectures during the morning session on Thursday, May 9, the first day of the scientific program. The first keynote, presented by Jeffrey Towbin, MD, was entitled "Pediatric Heart Failure Etiologies and the Outcomes of Children with Mechanical Circulatory Support." The second keynote, presented by Shunji Sano, MD, PhD, was entitled "Stem Cell Therapy in Children with HLHS." Both lectures were highly informative and provided excellent insights to the future of MCS (Fig. 3).

Plenary sessions were held throughout the morning and afternoon sessions on Thursday, Friday, and Saturday. The topics of these sessions included "Pediatric MCS: 2013 Update" (moderated by Shunji Sano, MD, PhD, and Jeffrey Towbin, MD), "Neuromonitoring/Neuroprotection during CPB" (moderated by Erle H. Austin III, MD, J. Brian Clark, MD, and Gioanni Battista Luciani, MD), "ECLS Systems: 2013 Update" (moderated by Emre Belli, MD, and Chitra Ravishankar, MD), and "Pediatric Perfusion: 2013 Update" (moderated by Larry Baer, CCP, and Tami Rosenthal, BS, CCP, MBA). The conference also included three minisymposiums on the following topics: "Pediatric Extracorporeal Life Support: Nursing Perspective" (moderated by Paula Baldridge, MSN, MHA, RN and Bonnie Weaver, RN, MSN, CCRN, CCNS), "Bioengineering Approaches in Pediatric Cardiovascular Medicine" (moderated by Kerem Pekkan, PhD, and Jeffrey D. Zahn, PhD), and "Penn State Hershey Pediatric Cardiovascular Research Center—International Collaborations: 2013 Update" (moderated by Akif Ündar, PhD). Oral

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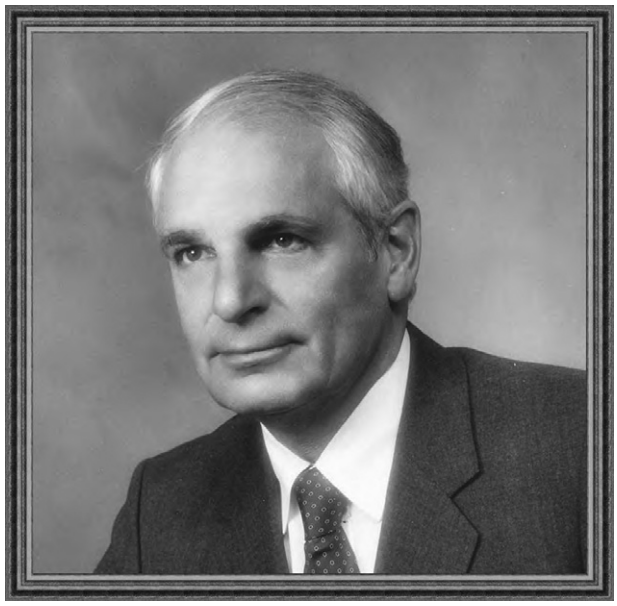

FIG. 1. John A. Waldhausen, MD (1929–2012).

presentations were held in the afternoon sessions on Friday and Saturday. Poster presentations were displayed throughout the duration of the conference.

PEDIATRIC EXTRACORPOREAL LIFE SUPPORT (ECLS) WORKSHOP

As a new feature, the Ninth Conference included a hands-on experience with the newest pediatric ECLS systems (3–6). This session was conducted at the Animal Research Farm on the grounds of PSUCOM during the preconference program on Wednesday, May 8 (Fig. 4). The instructors for this session were Larry Baer, CCP, David Palanzo, CCP, Bonnie Weaver, RN, MSN, CCRN, CCNS, Shigang Wang, MD, Karl Woitas, CCP, J. Brian Clark, MD, Ronald Wilson, VMD, and Akif Ündar, PhD. This session was limited to only 25 participants (nine US centers along with five overseas centers including France, Germany, Italy, Taiwan, and Turkey).

CARDIAC ICU/PICU AND PENN STATE CHILDREN'S HOSPITAL TOURS

In addition to the ECLS workshop, attendees had the opportunity to tour the Cardiac Intensive Care Unit (ICU)/Pediatric Intensive Care Unit (PICU) and the recently opened Penn State Hershey Children's Hospital. The tours of the Cardiac ICU and PICU were led by Penn State Children's Hospital staff and were interactive, allowing active discussion regarding all aspects of patient management and outcomes.

WINE AND CHEESE RECEPTION AT THE HERSHEY STORY

At the conclusion of the scientific program on Friday, attendees were given a 30-min trolley tour of "the sweetest place on earth" by Hershey Trolley Works. Following the tour, attendees participated in a wine and cheese reception at The Hershey Story, the newest museum in Hershey dedicated to the life and legacy of Milton S. Hershey. In addition to the five permanent exhibits on display at the museum, attendees were also able to explore the museum's unique Chocolate Lab, complete with hands-on experiences and interactive demonstrations. In keeping with the musical entertainment provided at previous conferences, attendees were treated to the musical talents of vocalist Heidi Watts, guitarist Tim Vallati, and saxophonist Emre Belli, MD, who again shared his considerable talents with us as he did during the eighth conference (Fig. 5). It was a wonderful evening of wine, cheese, music, chocolate, and conversation.

CONFERENCE AWARDS

This event continues to recognize young investigators, residents, and medical and bioengineering students for their contributions to the advancement of cardiopulmonary bypass and MCS systems for pediatric patients (Fig. 6). This year, three conference awardees were selected for recognition based on their full manuscripts (Table 1). This year, we also repeated a new award called Special Travel Award. Mosthafa Moosa, MD, from New Zealand received the second travel award for traveling the longest distance to attend the conference.

FIG. 2. John L. Myers, MD, Professor Emeritus William S. Pierce, MD, and Akif Ündar, PhD (left to right).

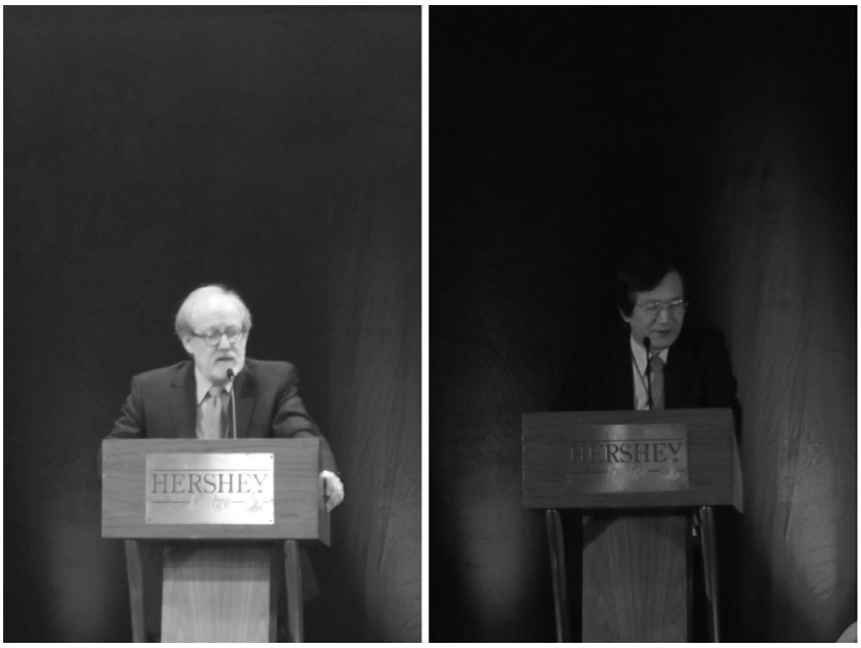

FIG. 3. The keynote lecturers Jeffrey Towbin, MD, and Shunji Sano, MD, PhD.

ARTIFICIAL ORGANS

As in the past, all of the accepted conference abstracts for the Ninth Conference were published in the May 2013 issue of the peer-reviewed journal *Artificial Organs*. In addition, the January 2014 issue of *Artificial Organs* (this issue) is dedicated to peer-reviewed manuscripts that were based on regular slide and poster presentations during the conference. Special thanks to Carol Malchesky, Editorial Assistant, Angela T. Hadsell, Executive Editor, and Paul S. Malchesky, DEng, Editor-in-Chief, for making this special issue possible and for their continued support year after year.

To date, over 400 manuscripts, including original articles, editorials, special reports, and case reports have been peer-reviewed and published in *Artificial Organs*. These publications have become the largest resource for investigators in their research projects related to pediatric CPB and MCS.

Artificial Organs has the highest impact factor compared with all artificial organs journals and is

FIG. 4. Hands-on experience with the newest pediatric ECLS systems at the Animal Research Farm on the grounds of PSUCOM.

FIG. 5. A wonderful evening of wine, cheese, music, chocolate, and conversation at The Hershey Story.

FIG. 6. Young investigator awardees, clockwise from the top left: Conrad Krawiec, Sertaç Haydin, Hyoung Woo Chang, and Musthafa Moosa.

TABLE 1. *Ninth International Conference Awards*

Award	Awardee	Title of Manuscript
John A. Waldhausen, MD, Young Investigator Award	Conrad Krawiec, MD	Impact of pulsatile flow on hemodynamic energy in a Medos Deltastream DP3 pediatric extracorporeal life support system
William S. Pierce, MD, Young Investigator Award	Hyoung Woo Chang, MD	Five-year experience with mini-volume priming in infants <5 kg: Safety of significantly less transfusion volume
Aydin Aytaç, MD, Young Investigator Award	Sertaç Haydin, MD	Initial experiences with Medos Deltastream DP3 pediatric extracorporeal life support system
Special Travel Award	Musthafa Moosa, MD	For travelling the longest distance for the attendance of conference

now the official journal of the International Society for Pediatric Mechanical Cardiopulmonary Support (7).

FINANCIAL SUPPORT

This year, we are proud to say we received educational support and funds from the International Society for Pediatric Mechanical Cardiopulmonary Support. Although this unique society was only established in 2010 during the Sixth International Conference in Boston, it covered over 97% of all expenses for the Ninth International Conference.

Dr. Ündar also contributed from his personal funds to balance the budget during the past three events.

In addition, financial support was received from companies including Medos Medizintechnik AG (Germany)—Platinum level supporter; Covidien, Inc. (USA), Maquet Medical Systems (USA), Syncardia Systems, Inc. (USA), Terumo Cardiovascular Systems (USA), and Wiley Blackwell (USA)—Bronze level supporters.

EDUCATIONAL CREDITS

The Ninth International Conference was approved for the following educational credits: 24.5 American Medical Association Physician's Recognition Award Category 1 Continuing Medical Education (CME) credits, 34.5 Category 1 Continuing Education Unit hours by the American Board of Cardiovascular Perfusion, and 24.6 Category 1 Continuing Education Unit hours by the California Board of Registered Nursing. These very valuable educational credits demonstrate the high quality scientific program we provide year after year.

SUMMARY

Once again, our annual conference was an overwhelming success. We are encouraged by the volume of scholarly work published as a result of our conference, and we look forward to continuing to provide opportunities for the leading investigators in CPB and MCS systems to share their research and encourage further studies to improve the lives of pediatric patients. To date, a total of 870 presentations have been made at our conferences, and over 400 peer-reviewed articles have been published based on the conference proceedings. All of the details regarding the Ninth International Conference, as well as the previous eight events and information on future events, can be found at our conference website: http://pennstatehershey.org/web/pedscpb/home. As we prepare for the Tenth International Conference in 2014, we continue to set our sights on the goal of publishing over 500 peer-reviewed manuscripts and having over 1000 presentations in the first 10 years of our conference.

Acknowledgments: We would specifically like to thank Bonnie Weaver, MSN, RN, for leading the pre-conference events, including the tours of the Cardiac Care/ICU facilities and the new Penn State Children's Hospital. Additionally, Tami Rosenthal, BS, CCP, MBA, and David Palanzo, CCP, are to be thanked for the time they spent selecting and organizing the new pediatric devices used in the hands-on ECLS workshop. In addition, we sincerely appreciate all the conference organizational support we receive from the Pediatric Clinical Research Office at Penn State Hershey. Special thanks go to Heather Stokes, Jennifer Stokes, Erlee Meyers, Jessica Beiler, Julie Vallati, Amy Shelly, Gabrielle H. Murray, and Shigang Wang, MD, of the Pediatric Cardiovascular Research Center at Penn State Hershey who were instrumental in organizing this event from start to finish. We also appreciate Ann Hagan's invaluable help organizing CME from the Department of Continuing Medical Education of The Children's Hospital of Philadelphia.

Akif Ündar, PhD,[1] Shigang Wang, MD,[1]
David Palanzo, CCP,[1] Bonnie Weaver, RN, CCRN,[1]
Kerem Pekkan, PhD,[2] Mehmet Agirbasli, MD,[3]
Jeffrey D. Zahn, PhD,[4] Giovanni B. Luciani, MD,[5]

J. Brian Clark, MD,[1] Ronald P. Wilson, VMD,[1] Allen R. Kunselman, MA,[1] Shunji Sano, MD, PhD,[6] Emre Belli, MD,[7] William S. Pierce, MD,[1] and John L. Myers, MD[1]

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REFERENCES

1. Ündar A. Welcome to the 9th International Conference on Pediatric Mechanical Circulatory Support Systems & Pediatric Cardiopulmonary Perfusion. *Artif Organs* 2013;4: 354–6.
2. Ündar A, Akçevin A, Alkan-Bozkaya T, et al. Outcomes of the eighth international conference on pediatric mechanical circulatory support systems and pediatric cardiopulmonary perfusion [Guest Editorial]. *Artif Organs* 2013;37:1–9.
3. Wang S, Kunselman AR, Ündar A. Novel pulsatile diagonal pump for pediatric extracorporeal life support system. *Artif Organs* 2013;37:37–47.
4. Krawiec C, Wang S, Kunselman AR, Ündar A. Impact of pulsatile flow on hemodynamic energy in a Medos Deltastream DP3 pediatric extracorporeal life support system. *Artif Organs* 2014;1:19–27.
5. Wang S, Kunselman AR, Ündar A. In vitro performance analysis of novel pulsatile diagonal pump in simulated pediatric mechanical circulatory support system. *Artif Organs* 2014 (in press).
6. Wang S, Ündar A. Current devices for pediatric extracorporeal life support and mechanical circulatory support systems in the United States [Invited Review]. *Biomed Mater Eng* 2013;23:57–62.
7. Malchesky PS. International Society for Pediatric Mechanical Cardiopulmonary Support selects Artifical Organs as its official journal [Editorial]. *Artif Organs* 2013;37:115.