

# CONGENITAL CARDIOLOGY TODAY

News and Information for Pediatric and Congenital Cardiovascular Physicians and Surgeons

Vol. 4 / Issue 5  
May 2006  
North American Edition

[WWW.CONGENITALCARDIOLOGYTODAY.COM](http://WWW.CONGENITALCARDIOLOGYTODAY.COM)

## INSIDE THIS ISSUE

### Bedside Ultrasound in the Critical Care Unit

by Yanick Beaulieu, MD  
~Page 1

### Graduate Course in Pediatric Cardiovascular Disease—State of the Art Management of the Neonate and Infant with Cardiac Disease

by Gil Wernovsky, MD  
~Page 10

## DEPARTMENTS

### Medical News, Products and Information

~Page 8

## CONGENITAL CARDIOLOGY TODAY

9008 Copenhaver Drive, Ste. M  
Potomac, MD 20854 USA  
Tel: +1.301.279.2005  
Fax: +1.240.465.0692  
[www.CongenitalCardiologyToday.com](http://www.CongenitalCardiologyToday.com)

© 2006 by Congenital Cardiology Today (ISSN 1554-7787-print; ISSN 1554-0499-online). Published monthly. All rights reserved. Congenital Cardiology provides timely news and information for pediatric and congenital cardiologists. Statements or opinions expressed in Congenital Cardiology Today reflect the views of the authors and sponsors, and are not necessarily the views of Congenital Cardiology Today.

## CAREER OPPORTUNITIES

See pages 8, 9 and 14 in the issue or go to [www.cct.bz](http://www.cct.bz)

**Congenital Cardiology Today would like to share your interesting stories or research in congenital cardiology.**

Submit a brief summary of your proposed article to

[Article-May@CCT.bz](mailto:Article-May@CCT.bz)

## BEDSIDE ULTRASOUND IN THE CRITICAL CARE UNIT

By Yanick Beaulieu, MD

### Bedside Ultrasound in the Critical Care Unit: a Concept Becoming of Primary Importance and Growing

Ultrasonography has become an invaluable tool in the management of critically ill patients. Its safety and portability allow for use at the bedside to provide rapid, detailed information regarding the cardiovascular system and the function and anatomy of certain internal organs. Echocardiography can non-invasively elucidate cardiac function and structure. This information is vital in the management of hemodynamically unstable patients in the ICU. In addition, ultrasonography has particular value for the assessment and safe drainage of pleural and intra-abdominal fluid and the placement of central venous catheters. Hand-carried ultrasound devices (HCUs) can provide immediate diagnostic information not assessable by physical examination alone. Performance of an ultrasound examination in the ICU allows for procedures that previously required transport to the radiology suite to be performed at the bedside. This is an important advantage in the treatment of the critically ill patient as the portability of the examination prevents many of the potential complications that are known to occur during patient transport out of the ICU[1,2].

### “Goal-directed” Echocardiography

In the critically ill patient with unexplained hemodynamic instability, determination of cardiac function is an integral part of the medical management. Echocardiography is of the utmost importance to evaluate left and right ventricular function in this setting[3-6], as clinical examination and invasive hemodynamic monitoring are not always reliable and often misleading[7-10]. Assessment of the pericardial space to rule out the presence of a tamponade is also an important indication to perform a focused ultrasonographic bedside cardiac examination. Point-of-care exam will also help to indirectly assess the volemic status of the patient by assessing the biventricular dynamics and dimensions and by estimating right atrial pressure (by using inferior vena cava diameter and its respiratory variation).

### Assessment of Central and Peripheral Vessels

Central venous catheterization is frequently performed in critically ill patients. Placement of a central venous catheter is not without risk and can be associated with adverse events (arterial puncture, local hematoma, hemothorax, pneumothorax) that are both hazardous to patients and expensive to treat [11,12]. Complications have been reported in up to 15-20% of cases. The use of ultra-

sound guidance during central venous catheterization has been well demonstrated to reduce the risk of complications, most notably for the internal jugular route. It has also been shown to improve the rapidity of catheter placement, decrease the number of attempts before successful placement, and improve the overall rate of successful placement. Multiple studies have reported the superiority of ultrasound-assisted cannulation of the internal jugular vein in ICU patients as compared with the external landmark-guided technique[13-17]. Most peripheral and central vessels that are catheterized can usually be imaged by ultrasound (Figure 1).

The benefits demonstrated for ultrasound guidance have been shown across operators with varying levels of experience in central catheter placement and in patients with both low and high risks of potential complications. The technique is easy to learn and can be self-taught with some practical assis-

tance from radiologists or other experienced sonographers.

#### **“Goal-directed” General Ultrasonography: Assessment of Pleural Effusions, Intra-Abdominal Fluid Collections and Urinary Bladder**

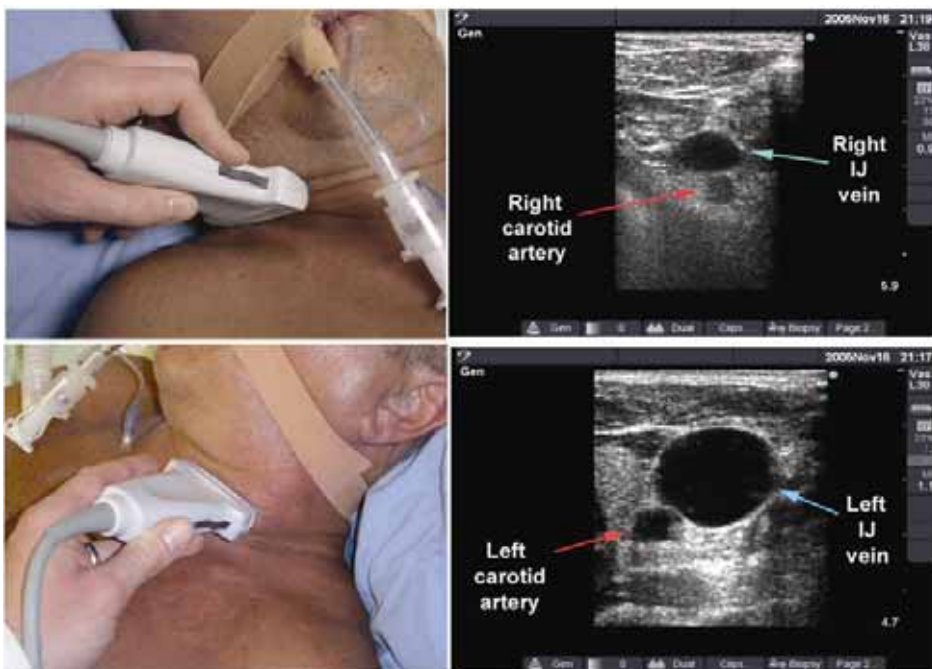
Ultrasound examination of the pleural space has proven to be of high value for diagnosis of effusion. Its value in aiding in the drainage of pleural effusions with a catheter or for simple thoracentesis is now well recognized[18]. It is especially valuable in guiding drainage of loculated or very small effusions. In the mechanically ventilated patient, it may be hazardous to attempt a blind tap for a suspected effusion, especially if the effusion is small or if the patient is on a high level of PEEP. Under such circumstances, potential risk for pneumothorax or other complications are high. Lichtenstein and colleagues[19] evaluated the feasibility and safety of ultrasound-aided thoracentesis in 40 mechanically ventilated patients. No complications occurred in the

45 ultrasound-aided thoracentesis, all performed by intensive care physicians. Similar results have been obtained in a more recent comparable study by Mayo et al[20]. The basic skill required to detect a pleural effusion by ultrasonography can be acquired in a very short period of time.

The same diagnostic and therapeutic procedures described above can be applied for intra-abdominal fluid collections. Evaluation for intra-abdominal fluid collection or abscess are restricted to areas that are not impeded by gas-filled structures and include the regions around the liver and gallbladder, spleen, kidneys and lateral retroperitoneal areas, lateral gutter and pelvis around the uterus and bladder. As with pleural effusions, intra-abdominal fluid collection can be percutaneously sampled or drained safely at the bedside under real-time ultrasonographic guidance.

#### **Bedside Ultrasound in the Pediatric ICU Environment**

The body of literature on the use and impact of bedside ultrasound in the pediatric ICU population is not as wide as that for the adult population. Despite that, certain specific applications have been described. The benefits of ultrasound-guided central venous cannulation in infants and children has been well documented in the pediatric literature since the 1990s[21,22]. More recent articles have also shown that ultrasound-guided technique for placement of central venous catheters was easy to apply in infants and children and that it increased the precision and safety of the procedure in this group of patients [23,24]. Recent literature has also shown that non-cardiologist pediatric intensive care physicians with a limited, “goal-directed” training, were capable of diagnosing significant pericardial effusions, decreased LV systolic function, and LV enlargement with good accuracy [25]. Similar findings have been demonstrated in another recent study[26] who tested the accuracy of bedside-limited echocardiography by the emergency physician (BLEEP) in estimating left ventricular function and inferior vena cava (IVC) volume (as an indirect measure of



*Figure 1. Ultrasound imaging of the right internal jugular vein (upper row) reveals a vein of relatively small caliber compared to that on the left side (lower row). Moreover, the right internal jugular vein lies directly over the right carotid artery making it a high risk anatomy if a catheter is to be inserted. In this case, cannulation of the left internal jugular vein would clearly be the best choice. Using ultrasound to identify the dominant internal jugular vein prior to insertion of a central catheter is a simple, non-invasive and rapid technique. Internal jugular vein asymmetry can be seen in up to 60% of patients and can sometimes be significant. Identifying such asymmetry will likely result in a shorter and safer procedure.*

preload) in patients admitted to an intensive care unit. Results of that study suggest that with goal-directed training and pediatric cardiology oversight, pediatric emergency physician sonographers are capable of obtaining images that permit accurate assessment of LV function and IVC diameter. Bedside ultrasound has also been used with good success for assessment of pediatric trauma[27] and for other uses like bedside bladder ultrasound scanning to estimate the amount of urine present within the bladder [28].

As in the adult population, the goal of the bedside ultrasound study in the critically ill pediatric patient is intended only to be a clinical decision support tool and not to supplant formal cardiac and general imaging.

#### **Performance of Bedside Ultrasonography by the Intensivist**

As it is usually not feasible to have a cardiologist or sonographer available on immediate call on a 24-hour basis to perform bedside ultrasonographic examinations in the ICU, advantages of having the intensivist performing the exam himself are many. It can provide: immediate information on LV / RV function, volume status, pericardial space, aorta and valvular pathologies with no delays; it allows diagnosing and monitoring response to therapy (fluid, inotropes) by doing repetitive bedside evaluations; it allows assessment of the pleural and abdominal cavities for free fluid; and it improves safety when performing invasive procedures. Finally, it serves as an important learning and teaching tool at the bedside to better understand patients physiology.

Successful performance of bedside echocardiography by non-cardiologist intensivists has been well demonstrated

in the literature[8,29,30]. The safety and utility of performance of bedside ultrasound by the intensivist for various other purposes in the ICU (central venous cannulation, thoracentesis, paracentesis) have also been well demonstrated[13-17].

Focused bedside ultrasound, as done by the intensivist, is performed most of the time to answer a specific clinical question that will often ultimately lead to an important change in clinical diagnosis or management of a medical / surgical condition.

Both the acquisition and interpretation of images are highly dependent upon the skill of the operator. Rigorous training is required if the goal is the performance and interpretation of a complete echocardiographic study as suggested by the American College of Cardiology and the American Heart Association[31]. However, a lower degree of training is feasible when the goal is to perform a focused exam used as an extension to the physical examination. Provided that physicians performing point-of-care examinations have adequate training, have realistic expectations, and understand the potential limitations of a "goal-directed" exam, then use of bedside ultrasound by the intensivist as an extension to the physical examination has the potential to create a tremendous advantage for bedside assessment and treatment of the ICU patient.

#### **Hand-Carried Ultrasound: a Revolution for Enhancement of ICU Care**

The traditional physical examination is often significantly limited in the diagnosis of cardiopulmonary pathology. These diagnostic shortcomings are exaggerated in acutely ill ICU patients. HCU's are a new generation of portable ultra-



*Figure 2. HCU's are a new generation of portable ultrasound machines that are light weight (6-10 lbs), battery powered and much less expensive than the sophisticated high-end machines. Their small size is a tremendous advantage in the acute care environment as space is often significantly limited as shown in this picture of an ICU patient on mechanical ventilation and also receiving continuous hemofiltration therapy (the portable ultrasound device in the above picture is the MicroMaxx system from SonoSite).*

sound machines that are lightweight (6-10 lbs), battery-powered and much less expensive than the sophisticated high-end machines (Figure 2). Despite the fact that their initial introduction into clinical patient care was met with some criticism, the tremendous potential of the HCU to immediately provide diagnostic information at the bedside not assessable by the physical examination alone, has been increasingly demonstrated and recognized in the last few years[29,30, 32-34]. These devices may facilitate the full clinical potential of ultrasound imaging in the ICU, with true portability, ease of use and low cost. They are especially powerful when used as an adjunct to the physical examination[29,33].

An examination using HCU is usually "directed" toward a specific clinical question and is, in general, significantly shorter in duration (less than 6 minutes in some studies) than one using tradi-

Sponsored By

**B | BRAUN**

For information, please call **1-800-BBRAUN2 (227-2862)** or visit [www.bbraunusa.com](http://www.bbraunusa.com)

[www.CongenitalCardiologyToday.com](http://www.CongenitalCardiologyToday.com)



tional echocardiography. The disadvantage of such directed examinations with hand-carried devices is that they are not as comprehensive and can potentially miss some findings compared to traditional echocardiographic examinations. However, the HCU devices should not be compared with the yield or quality of the high-end machines. The HCU should be viewed more as an extension to the physical examination. Imaging modes and capabilities of currently available HCU machines vary with color Doppler [true Doppler vs power Doppler], spectral Doppler, harmonics and capacity to output video and image storage. Results from studies[30,32] suggest that the accuracy of HCU with respect to two-dimensional imaging remains very good in the critically ill patient when compared to standard ultrasound machines, but that information derived from HCU Color-Doppler imaging should be interpreted cautiously in this patient population.

The value of HCU in the ICU extends beyond the cardiovascular examination in that it allows for the safe performance of bedside procedures which have traditionally been performed "blindly." A HCU device will reduce complications associated with central venous cannulation and should be considered the standard of care when performing such hazardous procedures as thoracentesis in mechanically ventilated patients, paracentesis, and pericardiocentesis (the latter being illustrated in the picture above).

#### **Specific Applications for Point-of-Care/Bedside Ultrasound Technology in Other Acute Care Environments: Emergency Medicine, Anesthesiology and the Operating Room**

##### **Emergency medicine**

In emergency medicine, point-of-care ultrasound has a very important place for the assessment of unstable trauma patients. Since the early 1990s, bedside ultrasound has been used in the United States as an additional diagnostic modality for use in determining the presence of intra-abdominal injury after blunt trauma. It is performed in the trauma bay during the secondary survey (as described in Advanced Trauma Life Support) or as part of the primary survey in



*Figure 3. A HCU device will reduce complications associated with central venous cannulation and should be considered the standard of care when performing such hazardous procedures as thoracentesis in mechanically ventilated patients, paracentesis, and pericardiocentesis (the latter being illustrated in the picture above).*

hemodynamically unstable patients. The focused assessment for sonographic examination of trauma (FAST) examination is done with a specific purpose, usually identification of hemoperitoneum, hemothorax, or tamponade. FAST seeks to determine the presence of fluid in four areas:

- (1) the subxiphoid region for the pericardial sac,
- (2) the right upper quadrant in Morison's pouch,
- (3) the left upper quadrant in the splenorenal recess, and
- (4) the pelvis in the pouch of Douglas or rectovesical space. Since the FAST examination is non-invasive and quickly performed at the bedside, it is ideal for detecting intra-abdominal injury in the resuscitation area. It has now been incorporated in the trauma resuscitation algorithm of the majority of Level I trauma centers in the United States.

Point-of-care ultrasound in the emergency room also has a very important role in the care of patient who presents with unexplained abdominal pain with or without hypotension. In such a clinical situation, bedside ultrasound is performed to rule out the presence of a dissecting abdominal aortic aneurysm. Timely recognition of such a lethal diagnosis by bedside ultrasound performed by the ER physician speeds the diagnosis and treatment of such a condition, and most likely, ultimately saves lives.

Bedside ultrasound in the ER is also often used for focused assessment of the hemodynamically unstable patient to rule out a cardiac cause to explain the instability (for example; left and/or right ventricular failure, cardiac tamponade). Ultrasound will often also be used for obstetrical purpose to detect, for example, if a pregnancy is present or not.

##### **Anesthesiology**

In the anesthesia environment, bedside ultrasound will most often be used for assessment of peripheral and/or central vessels to help for insertion of catheters and for performance of regional block anesthesia. With bedside ultrasound, the anaesthesiologist can directly visualize nerves and their main surrounding structures (artery, veins, muscles, soft tissues) allowing precise insertion of the needle and direct visualization of local anesthetic spread around the nerves. This greatly improves the overall success of the procedure and, very importantly, also greatly improves its safety.

Focused assessment of the cardiac function can also be an important aspect of the use of bedside ultrasound by the anaesthesiologist (for example with an unstable patient in the recovery room). Also, with the new transesophageal (TEE) probes that are now available on some portable machines, the anaesthesiologist can monitor global and regional cardiac function before, during and after a surgery. In addition, cardiac anaesthesiologists, can use the portable devices with TEE probes to assess valvular function, aortic diseases and other cardiac surgical pathologies.

One of the great advantages of the port-



Figure 4. One of the great advantages of the portable devices in the OR is that the device can easily be hand-carried from one operating room to the next with great ease. Also, as the space is usually very limited in the OR, having portable devices (left) makes it much more easy to work in that environment compared to the more bulky traditional ultrasound systems (right).

able devices in the OR is that the device can easily be hand-carried from one operating room to the next with great ease. Also, as the space is usually very limited in the OR, having portable devices makes it much more easy to work in that environment (Figure 3).

### Operating Room

In the surgical suite, the portable bedside ultrasound can not only be useful for the anaesthesiologist, but also for the surgeons. More and more surgeons are doing ultrasound-guided surgeries where they will, for example, localise nodules that have to be removed in a liver. They are able to visualise tissue, vessels, nodules and other important surrounding structures. It allows them to precisely assess the anatomy and to assess for the completeness of their surgery.

What specific important features should a medical facility look for when making a buying decision?

The most important point will be to look for a device that will fulfill the needs and will

do the job in the specific environment in which it will be used in. A device that will be used in a fast paced, acute care setting like the ICU or ER will need to possess very specific important features:

It has to be a reliable device that will boot/start quickly and easily at the touch of a button. Some portable devices are working based on a Windows platform and can take up to 90-120 seconds to start up. This is way too long when you have a patient suddenly becoming in shock in front of you and that you want to assess immediately. Other devices have a different operating system that permits them to boot up and be available in less than 14 seconds.

The device has to be very solid and tough. In environments such as ERs and ICUs, devices will be submitted to a lot of movements, hits, and other challenges that they have to be able to support. Some devices made out of different forms of plastic are too fragile for such an environment.

The device has to really be portable so that you can leave with it in your hands if you want (without necessarily having to

have the accompanying cart) in case you have to, for example, run to a cardiac arrest in a remote room.

The device should be easily cleanable. With the growing rate of nosocomial infections in the ICU, it is mandatory that the portable system chosen be resistant enough to be safely cleaned with "disinfectants" between two patients.

An interesting, versatile portable device should have the possibility to have different kind of probes connected to it (including TEE) and should have the capability of recording clips, images, and data.

Depending on the specific needs of the buyers, some devices may be a better choice than others if they offer very specific software or modalities (for example, the possibility of doing contrast echo), if they can offer a TEE probe, or if they can offer surgical probes.

Finally, service and warranty are important aspects of the buy and they should be looked at carefully before choosing a specific device.



**MyLab30**

The Ultrasound Unit  
Optimized for  
Pediatrics

Performance and portability without compromise.

- High Frequency Phased Array Transducers
- All Modalities: 2D, PD&CW Doppler, CFM
- Superb Onboard Digital Management
- Weighs less than 20 lbs.

**biosound**  
**esaote**

www.biosound.com  
877-US-MYLAB



## Perspective

Bedside ultrasonography has become an indispensable tool in the management of critically ill patients for the rapid assessment of cardiac function, for placement of central and peripheral venous catheters, and for assessment and safe drainage of pleural and intra-abdominal fluid collections. The new generation of portable, battery-powered, inexpensive, hand carried ultrasound devices is ideally suited for use by the intensivist at the bedside. The safety and utility of bedside ultrasonography performed by adequately trained intensivists has now been well demonstrated.

The importance of adequate training and subsequent maintenance of competence cannot be overemphasized, as inappropriate use or misapplication could potentially temper the acceptance of bedside ultrasound by the intensivist. Training of intensivists and emergency room physicians in performance of emergency bedside ultrasound should provide rapid answers to clinical questions that may profoundly affect medical and surgical management decisions. Training in echocardiography and general ultrasonography should be incorporated in the critical care fellowship as part of the training program.

Equipping critical care physicians with HCUs and training them to perform point-of-care examinations will potentially translate into improved patient care. The utility and impact of HCU at the bedside of critically ill patients can no longer be denied.

## References

- Waydhas C. Intrahospital transport of critically ill patients. *Crit Care* 1999; 3:R83-R89.
- Warren J, Fromm RE, Jr., Orr RA et al. Guidelines for the inter- and intrahospital transport of critically ill patients. *Crit Care Med* 2004; 32:256-262.
- Joseph MX, Disney PJS, Da Costa R, Hutchison SJ. Transthoracic echocardiography to identify or exclude cardiac cause of shock. *CHEST* 2004; 126: 1592-97.
- Stamos TD, Soble JS. The use of echocardiography in the critical care setting. *Crit Care Clin* 2001; 17:253-270.
- Price S, Nicol E, Gibson DG, Evans TW. Echocardiography in the critically ill: current and potential roles. *Intensiv Care Med* 2006; 32:48-59.
- Salen P, Melniker L, Chooljian C, et al. Does the presence or absence of sonographically identified cardiac activity predict resuscitation outcomes of cardiac arrest patients? *Amer J Emer Med* 2005; 23: 459-62.
- Fontes ML, Bellows W, Ngo L et al. Assessment of ventricular function in critically ill patients: limitations of pulmonary artery catheterization. Institutions of the McSPI Research Group. *J Cardiothor Vasc Anesth* 1999; 13:521-527.
- Benjamin E, Griffin K, Leibowitz AB et al. Goal-directed transesophageal echocardiography performed by intensivists to assess left ventricular function: comparison with pulmonary artery catheterization. *J Cardiothor Vasc Anesth* 1998; 12:10-15.
- Costachescu T, Denault A, Guimond JG et al. The hemodynamically unstable patient in the intensive care unit: hemodynamic vs. transesophageal echocardiographic monitoring. *Crit Care Med* 2002; 30:1214-1223.
- Bouchard MJ, Denault A, Couture P et al. Poor correlation between hemodynamic and echocardiographic indexes of left ventricular performance in the operating room and intensive care unit. *Crit Care Med* 2004; 32:648.
- Richards MJ, Edwards JR, Culver DH et al. Nosocomial infections in medical intensive care units in the United States. National Nosocomial Infections Surveillance System. *Crit Care Med* 1999; 27:887-892.
- Merrer J, De Jonghe B, Golliot F et al. Complications of femoral and subclavian venous catheterization in critically ill patients: a randomized controlled trial. *JAMA* 2001; 286:700-707.
- Hind D, Calvert N, McWilliams R, et al. Ultrasonic locating devices for central venous cannulation: meta-analysis. *BMJ* 2003;327:361-368.
- Milling TJ, Rose J, Briggs WM, et al. Randomized, controlled clinical trial of point-of-care limited ultrasonography assistance of central venous cannulation: The Third Sonography Outcomes Assessment Program (SOAP-3) Trial. *Crit Care Med* 2005; 33: 1764-69.
- Making Health Care Safer: A Critical Analysis of Patient Safety Practices (2001). Electronic document available at: [www.ahrq.gov/clinic/ptsafety/](http://www.ahrq.gov/clinic/ptsafety/)
- The Effectiveness and Cost-effectiveness of Ultrasound Locating Devices for Central Venous Access. National Institute for Clinical Excellence (2003). Electronic document available at: [www.nice.org.uk/pdf/ULD\\_assessment\\_report.pdf](http://www.nice.org.uk/pdf/ULD_assessment_report.pdf)
- Randolph AG, Cook DJ, Gonzales CA et al. Ultrasound guidance for placement of central venous catheters: a meta-analysis of the literature. *Crit Care Medicine* 1996; 24:2053-2058.
- Vignon P, Chastagner C, Berkane V, et al. Quantitative Assessment of Pleural Effusion in Critically Ill Patients by means



Barth Syndrome  
Foundation

## The Barth Syndrome Foundation

P.O. Box 974, Perry, FL 32348

Tel: 850.223.1128

[info@barthsyndrome.org](mailto:info@barthsyndrome.org)

[www.barthsyndrome.org](http://www.barthsyndrome.org)

**Symptoms:** Cardiomyopathy, Neutropenia, Muscle Weakness, Exercise Intolerance, Growth Retardation

of Ultrasonography. Crit Care Med 2005; 33: 1757-63.

19. Lichtenstein D, Hulot JS, Rabiller A et al. Feasibility and safety of ultrasound-aided thoracentesis in mechanically ventilated patients. Intensive Care Med 1999; 25:955-958.

20. Mayo PH, Goltz HR, Tafreshi M et al. Safety of ultrasound-guided thoracentesis in patients receiving mechanical ventilation. Chest 2004; 125:1059-1062.

21. Denys BG, Uretsky BF, Reddy P, et al. Ultrasound-assisted cannulation of the internal jugular vein: a prospective comparison to the external landmark-guided technique. Circulation 1993; 87: 1557-62.

22. Verghese ST, McGill WA, Patel RI, et al. Ultrasound-guided internal jugular venous cannulation in infants: a prospective comparison with the traditional palpation method. Anesthesiology 1999; 91: 71-77.

23. Asheim P, Mostad U, Aadahl P. Ultrasound-guided central venous cannulation in infants and children. Acta Anaesthesiol Scand 2002; 46: 390-392.

24. Chuan WX, Wei W, Yu L. A randomized-controlled study of ultrasound prelocation vs anatomical landmark-guided cannulation of the internal jugular vein in infants and children. Pediatr Anesth 2005; 15: 733-38.

25. Spurney CF, Sable CA, Berger JT, Martin GR. Use of a hand-carried ultrasound device by critical care physicians for the diagnosis of pericardial effusions, decreased cardiac function, and left ventricular enlargement in pediatric patients. J Am Soc Echocardiogr 2005; 18: 313-9.

26. Pershad J, Myers S, Plouman C, et al. Bedside Limited Echocardiography by the Emergency Physician is Accurate During Evaluation of the Critically Ill Patient. Pediatrics 2004; 114: 6: 667-671.

27. Patel JC, Tepas JJ 3rd. The efficacy of focused abdominal sonography for trauma (FAST) as a screening tool in the assessment of injured children. J Pediatr Surg 1999; 34: 44-47.

28. Chen L, Hsiao AL, Moore CL, et al. Utility of bedside bladder ultrasound before urethral catheterization in young children. Pediatrics 2005; 115: 108-11.

29. Spevack DM, Spevack DM, Tunick PA et al. Hand carried echocardiography in the critical care setting. Echocardiography 2003; 20:455-461.

30. Vignon P, Chastagner C, Francois B et al. Diagnostic ability of hand-held echocardiography in ventilated critically ill patients. Crit Care 2003; 7:R84-R91.

31. Seward JB, Douglas PS, Erbel R et al. Hand-carried cardiac ultrasound (HCU) device: recommendations regarding new technology. A report from the Echocardiography Task Force on New Technology of the Nomenclature and Standards Committee of the American Society of Echocardiography. J Am Soc Echocardiogr 2002; 15:369-373.

32. Gorcsan J, III, Pandey P, Sade LE. Influence of hand-carried ultrasound on bedside patient treatment decisions for consultative cardiology. J Am Soc Echocardiogr 2004; 17:50-55.

33. DeCara JM, Lang RM, Spencer KT. The hand-carried echocardiographic device as an aid to the physical examination. Echocardiography 2003; 20:477-485.

34. Fedson S, Neithardt G, Thomas P et al. Unsuspected clinically important findings detected with a small portable ultrasound device in patients admitted to a general medicine service. J Am Soc Echocardiogr 2003; 16:901-905.

~CCT~



Yanick Beaulieu, MD, FRCPC  
Cardiologist –  
Echocardiographer / Intensivist  
Director, Bedside Ultrasound  
Curriculum  
Division of Cardiology and  
Critical Care  
Hôpital du Sacré-Cœur de  
Montreal  
5400 Boulevard Gouin Ouest  
Montreal, Quebec  
Canada, H4J 1C5

ybeaulieu@iccuimaging.com

www.iccuimaging.ca

#### CONGENITAL CARDIOLOGY TODAY'S LIST OF PORTABLE ULTRASOUND MANUFACTURING COMPANIES

**Biosound Esaote, Inc.**  
Phone: (800) 428-4374  
[www.biosound.com](http://www.biosound.com)

**GE Healthcare**  
Phone: (800) 682-5327  
[www.gehealthcare.com](http://www.gehealthcare.com)

**Philips Medical Systems**  
Phone: (800) 285-5585  
[www.medical.philips.com/ultrasound](http://www.medical.philips.com/ultrasound)

**Siemens Medical Systems**  
Phone: (650) 969-9112  
[www.siemens.com/ultrasound](http://www.siemens.com/ultrasound)

**SonoSite, Inc.**  
Phone: (888) 482-9449  
[www.sonosite.com](http://www.sonosite.com)



**Introducing the iE33 intelligent echo system ...  
for better visualization of congenital heart defects**

Learn more at:  
[www.medical.philips.com/iE33](http://www.medical.philips.com/iE33)  
or call 800-229-6417

**PHILIPS**

## MEDICAL NEWS, PRODUCTS AND INFORMATION

At just under 8 pounds, the MicroMaxx™ hand-carried ultrasound system from SonoSite fits in crowded pediatric ICUs where traditional ultrasound units can't.

### AGA Medical Introduces New AMPLATZER TorqVue™ Delivery System

AGA Medical Corporation introduces the new AMPLATZER TorqVue™ Delivery System, offering improved delivery of AMPLATZER Occluder devices. The new TorqVue System incorporates design changes based on clinician feedback to improve function, visibility and ease of delivery. Specific key improvements include: Reinforced delivery sheath with stainless steel braid for improved flexibility and kink-resistance; Radiopaque platinum distal marker band to increase visibility, allowing for precise placement; New PTFE internal lumen coating to reduce friction, and Transition to a softer distal segment for improved maneuverability in tortuous anatomy.



The new TorqVue System is intended for use with AMPLATZER ASD, PDA, PFO and Muscular VSD Occluder devices. The new system will replace the current delivery system, and is available to clinicians as of March, 2006. For more information contact AGA Medical at + 1-888-546-4407 or visit [www.amplatzer.com](http://www.amplatzer.com)

### Engineered Heart Tissue Offers Insights into Irregular Heartbeats, Defibrillator Failure

Engineers who have induced heart cells in culture to mimic the properties of the heart, have used the tissue to gain new insight into the mechanisms that spawn irregular heart rhythms. Studies of the engineered cardiac tissue revealed that while electric shocks such as those delivered by defibrillators usually stopped aberrant waves, in some cases they cause them to accelerate and multiply.

The Duke University and Johns Hopkins University team, led by Nenad Bursac of Duke's Pratt School of Engineering, reported its findings in the Feb. 1, 2006, *Cardiovascular Research*. Bursac and study co-author, Leslie Tung, conducted the experiments at Johns Hopkins before Bursac joined the Duke faculty. The work was supported by the National Institutes of Health and the American Heart Association.

For more information: [www.duke.edu](http://www.duke.edu).



### ASSISTANT PROFESSOR OF MEDICINE IN PEDIATRIC CRITICAL CARE

The Department of Pediatrics, East Tennessee State University, is seeking candidates for a full-time position in Pediatric Critical Care Medicine at the Assistant Professor level, clinical tract. This position is contingent on outside funding.

Candidates must be board-certified in pediatrics and BC/BE in Pediatric Critical Care Medicine, Pediatric Cardiology, or Pediatric Pulmonology at time of hire.

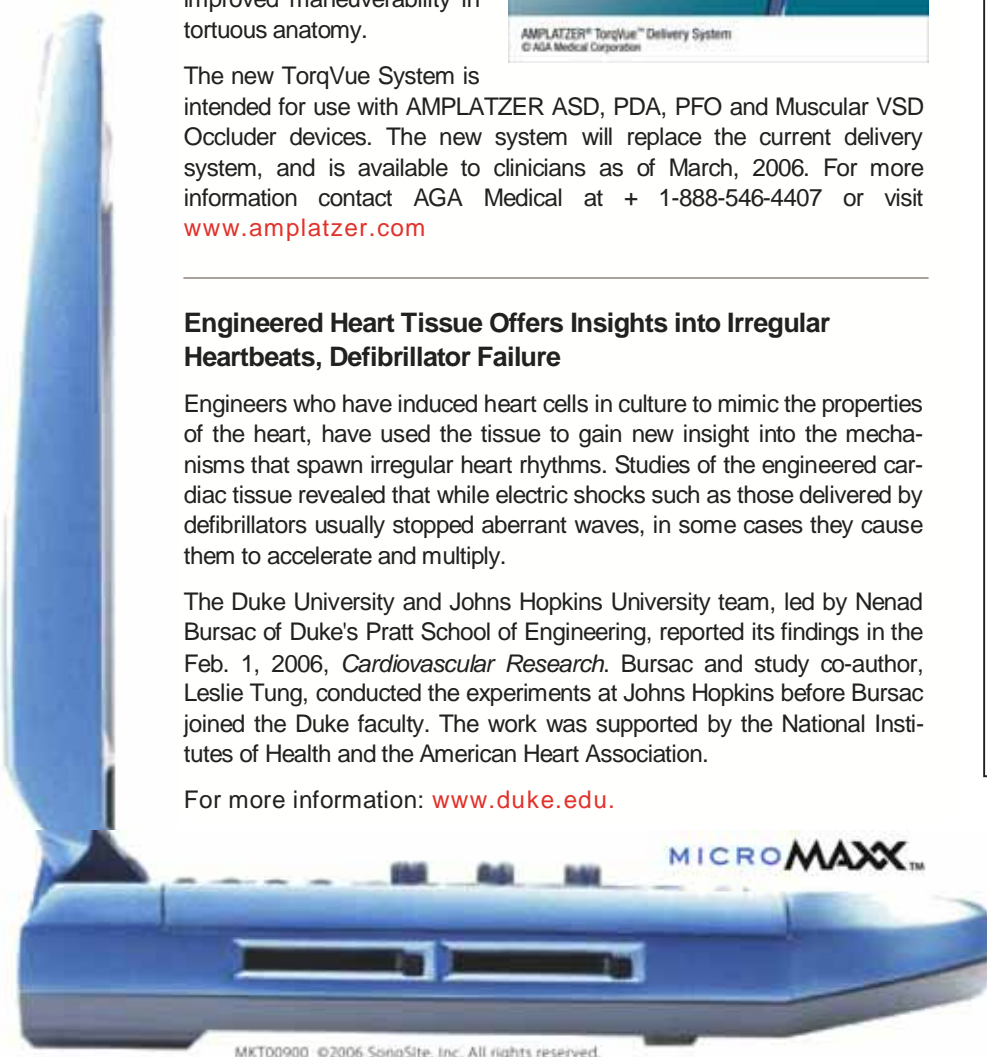
Responsibilities include a shared clinical practice in an active PICU, creation of a conscious sedation service, and teaching of medical students and pediatric residents.

Situated at the base of the Blue Ridge Mountains, our area offers a myriad of outdoor activities, low cost of living, and an unequalled lifestyle.

**Mail curriculum vitae to: David O. Chastain, MD, ETSU Department of Pediatrics, Box 70578, Johnson City, TN 37614-1708; or email: [chastain@etsu.edu](mailto:chastain@etsu.edu); or fax: 423-439-8066.**

*ETSU is an AA/EOE. Women and minorities are encouraged to apply.*

*Applications will be accepted until the position is filled.*



**SonoSite.**  
The World Leader in Hand-Carried Ultrasound



### Division of Pediatric Cardiology Saint Louis University School of Medicine Cardinal Glennon Children's Medical Center

Saint Louis University, a Catholic, Jesuit institution dedicated to student learning, research, health care, and service is seeking candidates for a faculty position as Director of Echocardiography services within the Division of Cardiology and the Department of Pediatrics at Cardinal Glennon Children's Medical Center. Candidates will be considered at the Assistant/Associate Professor rank, must be board certified/eligible in Pediatric Cardiology, and have significant experience in transthoracic, transesophageal, and fetal echocardiography. Responsibilities will include teaching, clinical care and research.

Cardinal Glennon Children's Medical Center is a 160-bed free standing hospital located in midtown Saint Louis, adjacent to Saint Louis University. The Hospital serves a diverse population from the inner city, the metropolitan area, and a 200-mile referral radius. The medical staff includes over 90 full-time Saint Louis University School of Medicine faculty, and all medical and surgical specialties are represented. Dr. Kenneth Schowengerdt will be occupying the new Wieck-Sullivan Chair of Pediatric Cardiology as division director in cardiology as of July 1, 2006. Construction of a new addition to the hospital housing an expanded Neonatal Intensive Care Unit and state-of-the-art operating rooms is underway, and related building initiatives associated with a Children's Heart Center are planned for the future.

Opportunities are available for clinical and basic science research within the Pediatric Research Institute of Cardinal Glennon Children's Medical Center and the Saint Louis University Health Sciences Center. A new 10-story tower that will serve as the Health Sciences Center Research Building is scheduled for completion in 2007.

**Interested candidates should forward correspondence and curriculum vitae to Robert Wilmott, MD, IMMUNO Professor & Chair, Department of Pediatrics, Saint Louis University School of Medicine, 1465 South Grand Blvd, St. Louis, MO 63104. Telephone: (314)-577-5360; Fax: (314)-577-5379; email [wilmottr@slu.edu](mailto:wilmottr@slu.edu).**

*Saint Louis University is an Affirmative Action, Equal Opportunity Employer, and encourages nominations of and applications from women and minorities.*



## UVA Children's Hospital



### Pediatric Electrophysiologist

The University of Virginia Children's Hospital Heart Center is actively recruiting to expand our current program of 10 faculty. The surgical volume is one of the largest in the mid-Atlantic region with 300 cases per year of pediatric and congenital heart disease. A full range of services is provided including pediatric cardiac transplantation, a dedicated adult congenital program, and a full service interventional cardiology program. There are active NIH funded research programs in the division and there is an active academic cardiology fellowship program funded by an NIH training grant.

The division seeks to expand with the following opportunity:

**Pediatric Electrophysiologist:** A pediatric Electrophysiologist is sought to further develop a dedicated interventional pediatric EP program in collaboration with our non-invasive pediatric electrophysiologist (and Dean) Dr. Tim Garson and the adult electrophysiology program headed by Dr. John DiMarco. We are seeking a faculty member with both clinical and research interests in 3D mapping and ablation of complex arrhythmias. This faculty position will collaborate with an active 5 person adult electrophysiology group and assume care for our large and growing pediatric dysrhythmia and pacemaker population. Applicants should be board eligible or certified in Pediatric Cardiology. Faculty appointment will be at the Assistant of Associate Professor level.

Positions will remain open until filled. Interested persons should send a cover letter expressing their interest and qualifications along with a curriculum vita to:

G. Paul Matherne, MD  
Professor of Pediatrics  
Division Head Pediatric Cardiology  
University of Virginia Health System  
PO Box 801356  
Charlottesville, VA 22908-1356  
phone (434)982-0260; fax (434)982-4387  
[gpm2y@virginia.edu](mailto:gpm2y@virginia.edu)

*The University of Virginia is an Equal Opportunity/ Affirmative Action Employer.*



The Heart Institute at Children's Hospital of Orange County Presents

## Pediatric Cardiology Review 2006

**Comprehensive Review and Update for All Specialists**

Ideal for Board and Recertification Examination for the Pediatric Cardiologist

June 12 - 16, 2006 • The Ritz-Carlton, South Beach • Miami, Florida

**FOR MORE INFORMATION, PLEASE CONTACT:**

The Center for Bio-Medical Communication, Inc.

Website: [www.cbcbiomed.com](http://www.cbcbiomed.com)

Phone: 201-342-5300

e-mail: [cmeinfo@cbcbiomed.com](mailto:cmeinfo@cbcbiomed.com)

On-line registration available at [www.cbcbiomed.com](http://www.cbcbiomed.com)

Program Director: Anthony C. Chang, MD, MBA. E-mail: [achang@choc.org](mailto:achang@choc.org)

## HIGHLIGHTS FROM CARDIOLOGY 2006: 9TH ANNUAL POST GRADUATE COURSE IN PEDIATRIC CARDIOVASCULAR DISEASE—STATE OF THE ART MANAGEMENT OF THE NEONATE AND INFANT WITH CARDIAC DISEASE

By Gil Wernovsky, MD



Between February 8th and 12th, 2006, The Cardiac Center at The Children's Hospital of Philadelphia (CHOP) hosted Cardiology 2006: 9th Annual Post Graduate Course in Pediatric Cardiovascular Disease at the Hyatt Regency at Gainey Ranch, Scottsdale, Arizona. Over 725 professionals in neonatal and pediatric cardiovascular disease attended the meeting from 45 states and 16 countries, including attendees from Japan, Taiwan, Australia, North and South America, Africa, the Middle East, Scandinavia and Europe. While there are many excellent subspecialty meetings throughout the year, as well as national meetings of various societies such as the American Heart Association, Society of Critical Care Medicine, American College of Cardiology and American Academy of Pediatrics, this annual meeting brings together all of us who care for pediatric heart disease, including physicians from multiple disciplines, nurses, perfusionists, physician assistants, sonographers and administrators. In addition to the faculty from the Cardiac Center at CHOP, the local faculty from the Cardiovascular Program at Phoenix Children's

Hospital was instrumental in helping to organize the program content and logistical aspects of the course.

Before the opening of the scientific meeting, a special pre-conference symposium (sponsored by Philips, Inc. and co-staffed by the echocardiography lab from the Medical University of South Carolina) was attended by nearly 60 professionals. Entitled "Cardiac Anatomy: Any Way You 'Slice' It—Past, Present and Futuristic Imaging." Professors Robert Anderson and Paul Weinberg reviewed anatomical classification and nomenclature, followed by hands-on manipulation of three-dimensional echo data sets by Dr. Girish Shirali. As you might imagine, there were some "spirited discussions" between Bob and Paul about what to name things, but for me, one of the highlights of the session was the "old school" approach to understanding complex cardiac anatomy with specimens (beautifully displayed by animated power point slides from Professor Anderson, and real specimens from the

cardiac registry at CHOP shown on the "heart-cam" by Professor Weinberg) followed by the "new school" 3D data sets from Girish and his staff. The mutual



Dr. David Nykanen (Orlando) and Dr. Neil Wilson (London).

smiles on the faces of Professors Weinberg and Anderson during the 3D data reconstructions were incredible, almost to imply: "now everyone can see and manipulate the heart the way I have been able to do!" Based upon the success of this session, preliminary plans are underway for an expanded 3-day meeting with the above staff, to include additional specimens with hands-on sessions, additional imaging such as intracardiac ultrasound, MRI and CT, intraoperative video and long term outcomes, co-sponsored by The Medical University of South Carolina in Charleston, The Hospital for Sick Children at Great Ormond Street in London and The Cardiac Center at The Children's Hospital of Philadelphia. The tentative date is May, 2007.

Four sessions were held reviewing common congenital heart disease, including transposition of the great arteries, tetralogy of Fallot, ventricular septal defect, and



Drs. Robert Anderson (London), Girish Shirali (Charleston) and Paul Weinberg (Philadelphia) after the Pre-conference workshop: Cardiac Anatomy—Any Way You Slice It.

**SickKids®**

THE HOSPITAL FOR  
SICK CHILDREN

**2ND ANNUAL TORONTO SYMPOSIUM  
CONTEMPORARY QUESTIONS IN CONGENITAL HEART DISEASE:  
THE RIGHT HEART**

June 18-20, 2006

Call: (416) 813-6132 or visit [www.sickkids.ca/cardiologysymposium](http://www.sickkids.ca/cardiologysymposium)

**20  
06**



# Meet the second-smallest thing to enter your ICU.

MICROMAXX™



In the crowded pediatric ICU, where every second counts, the MicroMaxx™ ultrasound system from SonoSite gives you the power of your echo lab in an 8-pound, hand-carried package for immediate bedside analysis. Our P10/8-4 transducer is ideal for pediatric cardiology, and a wide range of built-in cardiac calculations plus high image quality helps you make effective, efficient diagnoses. The future of portable echo is here. Just in time to improve the futures of even your tiniest patients.



*The World Leader in  
Hand-Carried Ultrasound*

[www.sonosite.com](http://www.sonosite.com)





Dr. Ziyad Hijazi (Chicago) and Dr. William E. Hellenbrand (New York).

the spectrum of left heart obstruction. Each session kicked off with anatomic specimens from CHOP's cardiac registry on the "heart-cam" as well as slide demonstrations from Dr. Anderson's collection. Preoperative imaging and postoperative management were reviewed, as well as issues that arise in outpatient follow-up. Dr. John Mayer (Children's Hospital, Boston) reviewed the arterial switch operation, Dr. Vaughn Starnes (Children's Hospital Los Angeles) reviewed repair of tetralogy of Fallot, Dr. Michael Teodori (Phoenix Children's Hospital) reviewed surgical closure, Dr. Ziyad Hijazi (C Comer Children's Hospital, Chicago) transcatheter closure of ventricular septal defect, and Dr. Thomas Spray (CHOP) updated the group on current techniques for both Stage I Norwood and the Ross procedure. Although all of the talks were excellent, a few stand out in particular. In both the tetralogy and the left heart disease session, Dr. Elizabeth Goldmuntz (CHOP) updated the attendees on new concepts of the genetic contribution to CHD. Given the increased heritability in left-sided lesions, she made a convincing argument for screening all 1st degree relatives of an affected proband, in a fashion similar to hypertrophic cardiomyopathy or prolonged

QTc. Dr. Neil Wilson reviewed the current status of percutaneous pulmonary valve replacement – a topic that will be updated at Cardiology 2007 by the 6th Annual Rashkind Lecturer, Dr. Philipp Bonhoeffer. (See [http://www.ich.ucl.ac.uk/pressoffice/pressrelease\\_00382](http://www.ich.ucl.ac.uk/pressoffice/pressrelease_00382) and <http://circ.ahajournals.org/cgi/content/abstract/112/8/1189> for more detail). Dr. Henry Sondheimer gave a thoughtful review of the natural history of patients with UN-operated ventricular septal defects, to temper the enthusiasm for surgical and interventional techniques in asymptomatic patients with normal pulmonary artery pressures. Finally, the plenary lectures and panel discussion about management options for left-sided heart disease featured experts from Boston (Drs. Bacha and Lang), Milwaukee (Drs. Ghanayem, Frommelt and Tweddell), Atlanta (Dr. Mahle) and Philadelphia (Drs. Weinberg, Goldmuntz, Rychik, Cohen, Spray, Rome and Marino). The large number of attendees in the final session was a tribute to the expertise of the faculty. To quote Dr. Neil Wilson: "I haven't seen this many people on a Sunday morning since Westminster Abbey!"

Three sessions were held to discuss clinical trials and new research, in addition to the display of 60 posters of new research by physicians and nurses from around the world. Dr. Gail Pearson updated the large multidisciplinary group on the current status of the Pediatric Heart Network (PHN) of the National Heart, Lung and Blood Institute, and the recently completed PHN trial showing no benefit of the addition of steroids to routine intravenous gamma globulin in Kawasaki Disease (presented by Annette Baker, RN, MSN, Boston). Dr. David Wessel from Children's Hospital in Boston gave an excellent overview of the benefits and current challenges conducting and participating in industry-sponsored trials, which was pro-



Drs. David Wessel and John Mayer (Boston) and Mr. Martin Elliott (London) at a break during the plenary sessions.

ceeded by a review of regulatory issues in labeling new medications for children by Dr. Skip Nelson (CHOP). A number of updates were given on the use of cardiovascular medicines in neonates and infants, including milrinone (Dr. Wernovsky—CHOP), levosimendan (Dr. Daniel Penny—Melbourne Australia), nesiritide (Dr. J. Lynn Jefferies—Texas Children's Hospital), triiodothyronine (Dr. Andrew Mackie—Boston, [now from Montreal]), esmolol (Dr. Susan Nicolson—CHOP) and dexmedetomidine (Dr. Constantinos Chrysostomou—Children's Hospital, Pittsburgh). An additional theme in the research section included ongoing study of neuroprotection during cardiac surgery, including some preliminary infor-



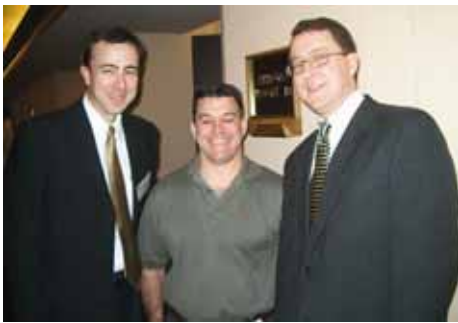
Dr. Andrew Redington (Toronto) and Dr. Daniel Penny (Melbourne)

# PICS 2006

Pediatric & Adult Interventional  
Therapies for Congenital & Valvular Heart Disease

**September 10-13, 2006 | Bellagio, Las Vegas**

mation from the important trial at Ann Arbor, Michigan where neonates with hypoplastic left heart syndrome have been randomized to either deep hypothermic circulatory arrest or continuous cerebral perfusion during the Norwood procedure. Dr. Rick Ohye presented information suggesting that the early hospital course was no different with either perfusion strategy, data that will be presented in more detail and with longer follow-up at the American Association of Thoracic Surgeons meeting this coming April in Philadelphia. Prior to the meeting, the entire course faculty



Dr. Jon Fleenor (Portsmouth), Dr. Philip Spinella (San Antonio) and Dr. Geoffrey Bird (Philadelphia).

voted for the winner of the outstanding investigator award from the 60 poster submissions; 3rd place was awarded to Dr. Maria Gonzalez from the University of Leipzig, Germany ("Cardiac Resynchronization Therapy in Congenital and Pediatric Heart Disease: A Retrospective European Multicenter Study"); 2nd place to Dr. Patrick McQuillen from the University of California, San Francisco ("Brain Injury in Neonates with Transposition of the Great Arteries: Timing and Mechanism") and the 3rd Annual Outstanding Investigator Award to Dr. Jennifer P. Habashi from Johns Hopkins University ("Angiotensin II Type 1 Receptor Antagonism Rescues the Multisystem Pathogenesis of Marfan Syndrome in a Mouse Model").

During the meeting, discipline-specific breakout sessions were held for nurses, administrators, perfusionists and sonographers, as well as subspecialties in pediatric cardiology. A special breakout session was conducted on February 10th by Dr. Jack Rychik and sonographer Margaret L. McCann, RDCS, RDMS (CHOP) with live fetal imaging. This session has been sponsored by Siemens for the past 3 years, and is always one of the favorite sessions of the pediatric cardiologists and sonographers who attend the meeting. This breakout allowed for direct interaction between the fetal heart team members and the course attendees, with useful strategies discussed for imaging the difficult patient, indications for fetal echocardiography, and new techniques and technology to more accurately diagnose patients in the prenatal period.

Perhaps one of the most popular breakout sessions this year was "Monitoring the Brain Before, During and After Cardiac Surgery," sponsored by Somanetics, Inc. Dr. Hiromi Kurosawa from Japan presented an overview of cerebral protection, and Dr. Bill Greeley (CHOP) presented his work on better understanding factors that affect cerebral blood flow after cardiopulmonary bypass. Importantly, Drs. Nancy Ghanayem and Jim Tweddell from Milwaukee presented their experience with near-infrared spectroscopy in the monitoring of cerebral and systemic perfusion. Smaller group sessions were held in postoperative care, neonatal cardiac intensive care, cardiomyopathies, arrhythmias, cardiac catheterization, echocardiography, nursing research, hemostasis and perfusion, inflammation and many others. During the general meeting, the 3rd Annual North American Pediatric Cardiac Administrators Consortium (NAPCAC) was held from Thursday February 9th through Saturday February 11th. These breakout sessions were attended by a wide variety of atten-



Dr. Gil Wernovsky and Kathy Milligan.

dees, including managers, physicians, administrators and chief executive officers. Topics included challenges in dealing with space and personnel management, data collection and reporting, quality metrics, architectural design, finances and coding. The sessions were planned by Maryanne Kessel, RN, MBA (Milwaukee) and Mary Beth Mauer, RN (CHOP) in collaboration with the course organizing committee, and the late Kathy Milligan (1954-2005). NAPCAC was partially conceived and launched by Kathy, who served a major role in the Department of Cardiac Surgery at Children's Hospital in Boston, working closely with Dr. Aldo Castañeda for many years. Kathy served an integral role in the planning of the NAPCAC sessions at Cardiology 2006, shown here with me during the planning meeting in the spring of 2005. She will be terribly missed by all who knew her.

The highlight of Cardiology 2006 was the Featured Named Lectures on Saturday, February 11th. Ms. Kathleen Mussatto (Children's Hospital of Wisconsin) deliv-



**MyLab30**

The Ultrasound Unit  
Optimized for  
Pediatrics

Performance and portability without compromise.

- High Frequency Phased Array Transducers
- All Modalities: 2D, PD&CW Doppler, CFM
- Superb Onboard Digital Management
- Weighs less than 20 lbs.

**biosound**  
**esaote**

www.biosound.com  
877-US-MYLAB





Mr. Martin Elliott (London), Ms. Kathy Mussatto (Milwaukee) and Dr. Andrew Redington (Toronto) following the Featured Plenary Session.

ered the 1st Annual T. Garrett Rauch Memorial Nursing Lecture: "Building an Interdisciplinary Research Program in a Congenital Heart Center: Why and How." The Rauch family has endowed this annual lecture in the memory of their son, who suffered an unexpected interstage death following the Norwood procedure. Kathy gave a stirring lecture, listing the necessary components of a comprehensive, multidisciplinary group, encouraging all of us to constantly ask questions, to improve our outcomes, and to work as a team to improve results through ongoing research. Kathy was followed by Mr. Martin Elliott (Great Ormond Street Hospital, London), who presented the 7th Annual C. Walton Lillehei Memorial Surgical Lecture: "To Kill a Dog on Broadway: Would Lillehei Have Even Bothered to Operate in 2006?" Professor Elliott, one of the most engaging speakers in our field, outdid himself with a humorous, informative and provocative discussion on disruptive technologies and questioning the status quo in our field. His speculation was that Lillehei would have been a pioneer even today, but he might have been an interventionalist instead of a surgeon! To round out the session, the 5th Annual William J. Rashkind Memorial Lecture was given by Dr. Andrew Redington (Hospital for Sick Children, Toronto) on his current work on "New Strategies for Whole Body Protection During Neonatal and Infant Heart Surgery." Dr. Redington's exciting new work pulls from his prior experience in animal research, adult cardiology, ischemia-reperfusion injury and cardiac function to use remote ischemic pre-conditioning to afford neuroprotec-



ARIZONA PEDIATRIC CARDIOLOGY CONSULTANTS



## PEDIATRIC CARDIOLOGIST

Phoenix, Arizona

We are seeking a BC/BE Pediatric Cardiologist to join a 12-member group practice with offices in the Phoenix and Tucson metropolitan areas. For the Phoenix area practice, we are recruiting a generalist with experience in fetal, transthoracic and transesophageal echocardiography. Annually, this premier group performs 400 catheterization cases, 400 fetal echocardiograms and close to 12,000 echocardiograms (over 5,000 are done in the office). The practice is engaged in clinical research and covers teaching rotations for residents and medical students.

While living in Phoenix, enjoy 325 days a year of sunshine, 200 picturesque golf courses, world-class dining, exhilarating outdoor adventure, trendy shopping and enriching culture.

Receive a competitive income plus outstanding benefits, including health, life and disability insurances, paid malpractice insurance and generous CME allowance.

**For more information, please contact**  
**Lori Abolafia, Physician Relations Specialist**  
[lori\\_abolafia@pediatrix.com](mailto:lori_abolafia@pediatrix.com)

**Pediatrix Medical Group**  
**1301 Concord Terrace**  
**Sunrise, FL 33323**

800.243.3839 ext. 5209

[www.pediatrix.com](http://www.pediatrix.com)

Arizona Pediatric Cardiology Consultants, an  
affiliate of Obstetrix Medical Group, Inc.



**International Symposium on the Hybrid  
Approach to Congenital Heart Disease (ISHAC)**  
*with live case presentations*

June 28-30, 2006  
[www.hybridsymposium.com](http://www.hybridsymposium.com)







The "Milwaukee Crew" at Taliesen West: Dr. Michelle Frommelt, Dr. Jim Tweddell, Ms. Kathy Mussatto, Dr. Skip Nelson (now in Philadelphia), Dr. Nancy Ghanayem, Dr. Peter Frommelt.

tion (and whole body protection) during infant heart surgery. We look forward to the outcomes of this stimulating research in the near future.

In addition to the scientific content, Cardiology 2006 was held in a spectacular venue under clear skies and with beautiful temperatures. A number of formal receptions and informal get-togethers took place throughout the meeting, and gave us all a chance to see old friends and meet new ones. The attendance by a multidisciplinary group of nurses, sonographers, perfusionists and all types of physicians – including neonatologists, cardiologists, surgeons, anesthesiologists and intensivists, highlights the teamwork necessary to provide optimal outcomes for our patients. The organizing committee is actively planning Cardiology 2007: Current and Emerging Practices in Intraoperative and Cardiac Intensive Care, Imaging, Catheterization and Cardiovascular Nursing. The preliminary program includes anatomic sessions on double outlet right ventricle, heterotaxy syndrome and atrioventricular septal defect. Plenary sessions will include topics such as outcomes analysis, staff recruitment and retention, patient safety and new ICU therapies. Breakout sessions will be held for echocardiographers, nurses, perfusionists and

administrators, and multiple hands-on sessions will take place on temporary and permanent pacing, near-infrared spectroscopy, echocardiography, ECMO, cardiopulmonary resuscitation and much more. More audience interaction is planned, including an audience response system in addition to the small group sessions and hands-on sessions. The meeting will take place at Disney's Yacht and Beach Clubs in Orlando Florida, February 21-25, 2007. Abstract submission for the 4th Outstanding Investigator Award will be open from September through December 2006 (dates not yet finalized); for the first time, three of the submissions will be chosen for oral presentation in the plenary session. Additional ideas for course content can be sent to me at [wernovsky@email.chop.edu](mailto:wernovsky@email.chop.edu). Hope to see you there!

~CCT~



Gil Wernovsky, MD, FACC, FAAP  
Staff Cardiologist, Cardiac Intensive Care Unit  
Director, Program Development  
The Cardiac Center  
Professor of Pediatrics at  
The Children's Hospital of Philadelphia  
University of Pennsylvania School of Medicine mailing address:  
Pediatric Cardiology  
34th St and Civic Center Blvd.  
Philadelphia PA, 19104 USA  
215-590-6067 (office)  
215-590-5825 (fax)

[wernovsky@email.chop.edu](mailto:wernovsky@email.chop.edu)

© 2006 by Congenital Cardiology Today  
(ISSN 1554-7787-print; ISSN 1554-0499-online)  
Published monthly. All rights reserved

#### Publishing Management

Tony Carlson, Founder & VP/Sales

[TonyC@CCT.bz](mailto:TonyC@CCT.bz)

Richard Koulbanis, Publisher & Editor-in-Chief

[RichardK@CCT.bz](mailto:RichardK@CCT.bz)

John W. Moore, MD, MPH, Medical Editor/  
Editorial Board

[JWMoore@mednet.UCLA.edu](mailto:JWMoore@mednet.UCLA.edu)

#### Editorial Board

Teiji Akagi, MD

Zohair Al Halees, MD

Mazeni Alwi, MD

Felix Berger, MD

Fadi Bitar, MD

Jacek Bialkowski, MD

Philipp Bonhoeffer, MD

Anthony C. Chang, MD, MBA

John P. Cheatham, MD

Bharat Dalvi, MD, MBBS, DM

Horacio Faella, MD

Yun-Ching Fu, MD

Felipe Heusser, MD

Ziyad M. Hijazi, MD, MPH

Ralf Holzer, MD

Marshall Jacobs, MD

R. Krishna Kumar, MD, DM, MBBS

Gerald Ross Marx, MD

Tarek S. Momenah, MBBS, DCH

Toshio Nakanishi, MD, PhD

Carlos A. C. Pedra, MD

Daniel Penny, MD

James C. Perry, MD

Shakeel A. Qureshi, MD

Andrew Redington, MD

Carlos E. Ruiz, MD, PhD

Girish S. Shirali, MD

Horst Sievert, MD

Hideshi Tomita, MD

Gil Wernovsky, MD

Zhuoming Xu, MD, PhD

William C. L. Yip, MD

Carlos Zabal, MD

#### To Contact an Editorial Board Member

Email to: [BOARD@CCT.bz](mailto:BOARD@CCT.bz). Place the Board Member's name in the Subject line.

#### FREE Subscription

Congenital Cardiology Today is available free to qualified professionals worldwide in pediatric and congenital cardiology. International editions available in electronic PDF file only; North American edition available in print. Send an email to [Subs@CCT.bz](mailto:Subs@CCT.bz). Be sure to include your name, title, organization, address, phone, fax and email.

#### Contacts and Other Information

For detailed information on author submission, sponsorships, editorial, production and sales contact, current and back issues, see website:

[www.CongenitalCardiologyToday.com](http://www.CongenitalCardiologyToday.com)

Sponsored By

**B | BRAUN**

For information, please call **1-800-BBRAUN2 (227-2862)** or visit [www.bbraunusa.com](http://www.bbraunusa.com)



In the last 20 years, there has been a revolution in caring for children with congenital heart disease. Thanks to advances in diagnostics, surgery and treatment, many of these children are living into adulthood and enjoying active lives. With dedicated pediatric cardiology capabilities, the iE33 echo system answers your need for high-performance, non-invasive diagnostic imaging for these patients.

From fetal echo to mature adult, the iE33 system supports the assessment of congenital heart disease through every stage of life and provides new diagnostic information that is changing patient management. Everything about the system is designed to meet the specific needs of pediatric cardiology. Unique ergonomic features make it possible to successfully image the tiniest premie or the largest teenager in many

different environments. Pediatric analysis follows your workflow. And advanced technologies provide best-in-class 2D imaging and Live 3D Echo and give clinicians and surgeons structural information to make decision making more efficient and outcomes more effective.

A full complement of cardiac transducers, including pediatric and adult TEEs, enables you to image a complete range of patient types – regardless of age, disease state or body composition.

In addition, a unique analysis package truly fol-

lows the patient the way you do – so you don't have to fit your requirements into an analysis package designed for adult echocardiography.

The biggest breakthrough in transducer material in 40 years, PureWave crystal

***Pediatric cardiology imaging capabilities from fetal echo up to the mature adult for complete Congenital Heart Disease assessment with analysis capabilities that looks at inflow and outflow of information within the pediatric heart. Listen to the Podcast: <http://tinyurl.com/s42k6>***



Live 3D Echo



PureWave Crystal Technology..

technology provides significantly better acoustic properties for a radical leap forward in 2D image quality.

Dedicated to your pediatric cardiology clinical and workflow requirements, our commitment goes beyond the system and its technologies. Global educational programs, outstanding service and worldwide centers of excellence help you to get the most out of your system every day.

***Pediatric echo from Philips... it just makes sense.***

#### FOR MORE INFORMATION

Philips Medical Systems  
22100 Bothell Everett Highway  
Bothell, WA 98021  
+1 (425) 487 7000  
1 (800) 285-5585

[www.medical.philips.com/ultrasound](http://www.medical.philips.com/ultrasound)

**PHILIPS**