

# CONGENITAL CARDIOLOGY TODAY

Timely News and Information for BC/BE Congenital/Structural Cardiologists and Surgeons

May 2016; Volume 14; Issue 5  
North American Edition

## IN THIS ISSUE

### Pericardial Effusion with a Properly Placed Umbilical Venous Catheter

By Ahmad A. Aboaziza, MD;  
Darshan Shah, MD; Jennifer  
Gibson, MD; Otto H. Teixeira, MD  
~Page 1

### Non-Compaction Cardiomyopathy in a Patient with Holt-Oram Syndrome: A Case Report

By Kritika Patel, BS; Khalisa  
Syeda, DO, Andrew J. Griffin, MD,  
FACC, FAAP, FCCP; Maria  
Serratto, MD, FACC, FAAP, FCCP  
~Page 5

### Early Detection - China California Heart Watch Mission in Yunnan Province

By Meredith Yang  
~Page 10

### Medical News, Products & Information

~Page 14

## Upcoming Medical Meetings

### 24<sup>th</sup> Parma International Echo Meeting - From Fetus to Young Adult

May 27-28, 2016; Parma, Italy  
Contacts: Umberto Squarcia, MD, FACC  
- [squarciaumberto@gmail.com](mailto:squarciaumberto@gmail.com) or  
Donald J Hagler, MD -  
[hagler.donald@mayo.edu](mailto:hagler.donald@mayo.edu)

ASE Scientific Sessions 2016  
Jun. 10-14, 2016; Seattle, WA USA  
[asescientificsessions.org](http://asescientificsessions.org)

## CONGENITAL CARDIOLOGY TODAY

Editorial and Subscription Offices

16 Cove Rd, Ste. 200  
Westerly, RI 02891 USA  
[www.CongenitalCardiologyToday.com](http://www.CongenitalCardiologyToday.com)

Official publication of the CHiP Network

© 2016 by Congenital Cardiology Today  
Published monthly. All rights reserved.

Recruitment ads on pages:  
4, 7, 8, 11, 13, 14, 15

## Pericardial Effusion with a Properly Placed Umbilical Venous Catheter

By Ahmad A. Aboaziza, MD; Darshan  
Shah, MD; Jennifer Gibson, MD; Otto H.  
Teixeira, MD

### Introduction

Pericardial effusion caused by Umbilical Venous Catheter (UVC) is described with intracardiac location of the tip of the UVC. Mechanisms of injury range from direct myocardial perforation to thrombus formation and myocardial necrosis.

### Case Presentation

A preterm, 27-week, appropriate-for-gestational age female was immediately transferred to the Neonatal Intensive Care Unit (NICU) after delivery due to prematurity and Respiratory Distress Syndrome (RDS). Her Apgar scores were 6 and 8 at 1 and 5 minutes, respectively.

***“Pericardial effusion caused by Umbilical Venous Catheter (UVC) is described with intracardiac location of the tip of the UVC. Mechanisms of injury range from direct myocardial perforation to thrombus formation and myocardial necrosis.”***

A physical exam revealed an active preterm female in moderate respiratory distress with subcostal retractions. Vital signs included: a temperature of 100.9° F, a pulse 189bpm, respiratory rate 61bpm, blood pressure 57/27mmhg, and weight 1335g. On lung auscultation there were diffuse rhonchi over both lung fields. Mild hypotonia was present. The remainder of the exam was unremarkable.

Umbilical artery and venous lines were placed upon arrival to the NICU. As demonstrated in Figure 1, the umbilical arterial catheter tip was located at the level of the T6, and the umbilical venous catheter tip projected at the cavoatrial junction.

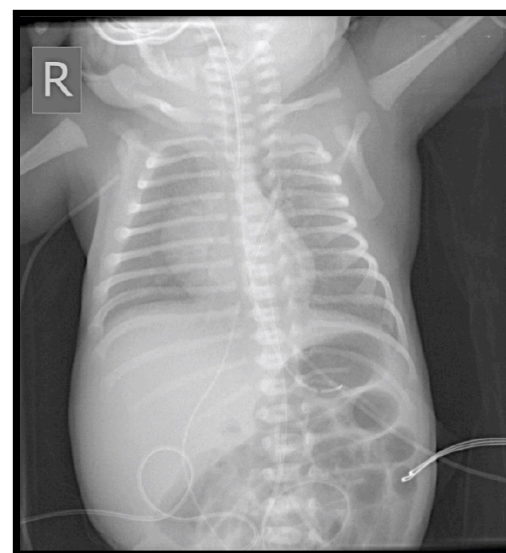


Figure 1. Chest- X-ray (PA view) showing UVC and UAC line placements.

## CONGENITAL CARDIOLOGY TODAY

### CALL FOR CASES AND OTHER ORIGINAL ARTICLES

Do you have interesting research results, observations, human interest stories, reports of meetings, etc. to share? Submit your manuscript to: [RichardK@CCT.bz](mailto:RichardK@CCT.bz)



**We are committed to the  
lifetime management of  
congenital heart disease.**

Transcatheter and Surgical  
Heart Valves

RVOT Conduits

Ablation Technologies

ICDs

Oxygenators and Filters

Cannulae

Pacemakers

Pulse Oximetry Monitoring  
for CCHD Screening

3rd Generation PFO, ASD,  
and PDA Occluders\*

Cerebral/Somatic Monitoring

\*These products are not  
available in the US.

**Melody-TPV.com**

**Medtronic** | Minneapolis, MN 55432-5604

Toll-free: 1 (800) 328-2518

UC201601683 EN ©2015 Medtronic.

All rights reserved. 08/2015

# INNOVATIVE TECHNOLOGIES. EVERY STEP OF THE WAY.

**Medtronic**  
Further, Together



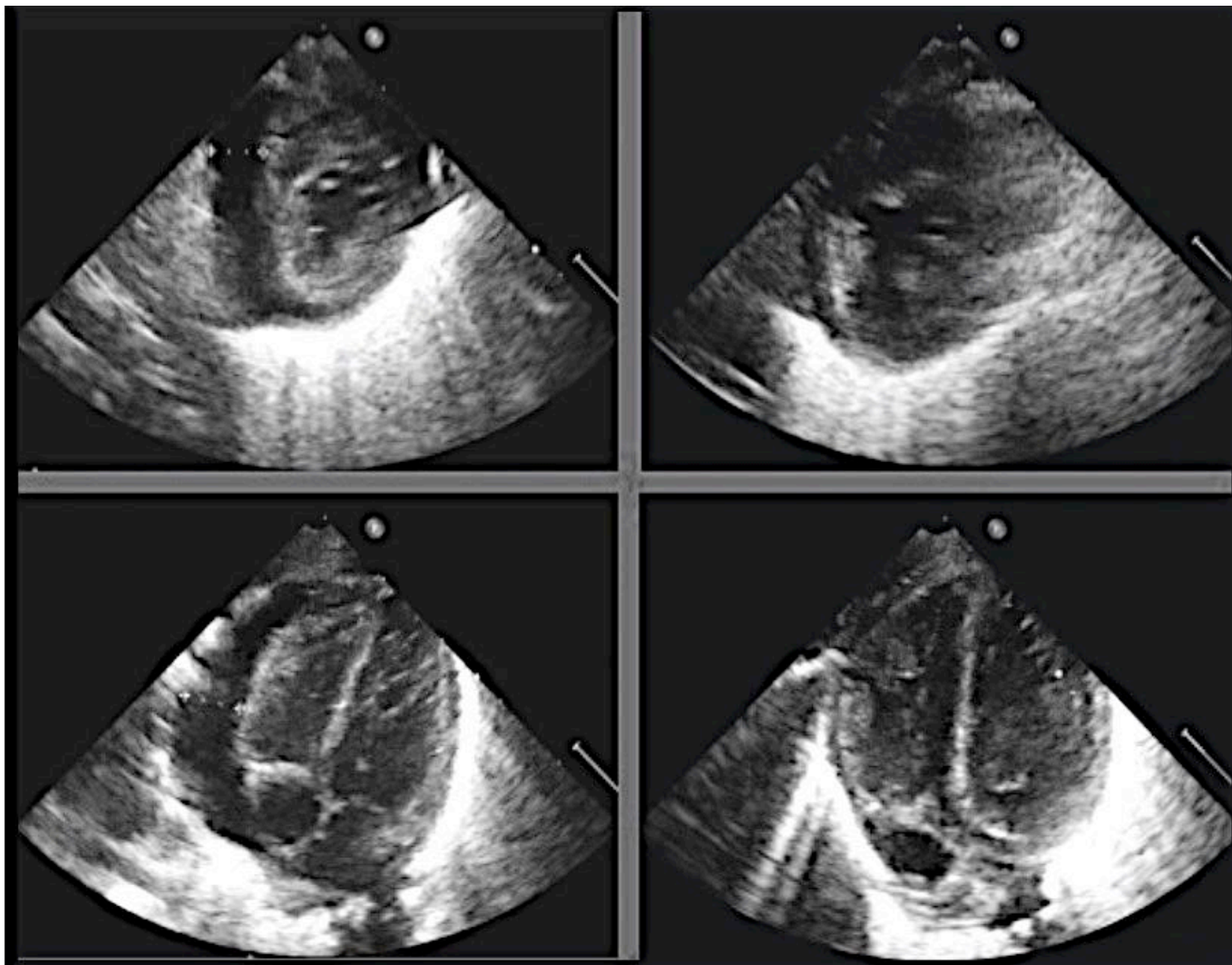


Figure 2. Echocardiograms (apical 4-chamber and short axis view) before and after UVC removal.

On Day of Life (DOL) 1, an echocardiogram did not show any pericardial effusion.

Repeat imaging showed the arterial line with its tip at the T7 level and the venous line with its tip at the T6 level.

On DOL 3, an echo showed a small circumferential pericardial effusion. The X-ray showed 'optimal position' of the UVC. Echocardiograms failed to show the catheter tip in the heart on Day 1 or on Day 3. Ejection fraction was 91.7%. Clinically, the infant deteriorated and required intubation for worsening blood gas.

On DOL 4, a repeat echo showed a moderate circumferential pericardial effusion with no evidence of cardiac tamponade. The effusion was mainly located posteriorly, and was slightly larger compared to the previous day. Ejection fraction remained unchanged. In view of these findings, the umbilical lines were then removed, and a PICC line was placed.

On DOL 5, the pericardial effusion had decreased as the infant remained stable on vent support.

By DOL 7, there was no pericardial effusion seen on echocardiogram.

## Discussion

It is possible for a properly placed UVC to cause pericardial effusion as happened with our patient. Even if the UVC is not in the heart, it is always important to take it out ASAP in the event of pericardial

---

***“It is possible for a properly placed UVC to cause pericardial effusion as happened with our patient. Even if the UVC is not in the heart, it is always important to take it out ASAP in the event of pericardial effusion. Pericardial effusion associated with UVC may be treated conservatively if signs of cardiac tamponade are absent.”***

---

effusion. Pericardial effusion associated with UVC may be treated conservatively if signs of cardiac tamponade are absent.

Possible causes of pericardial effusion in this setting include direct trauma to the endothelial wall during UVC placement or irritation to the endothelial lining caused by hyperosmolar infusates.

## References

1. Sehgal A, Cook V, Dunn M. Pericardial effusion associated with an appropriately placed umbilical venous catheter. *J Perinatol* 2007;27:317–319.
2. Beardsall K, White DK, Pinto EM, Kelsall AWR. Pericardial effusion and cardiac tamponade as complications of neonatal long lines: are they really a problem? *Arch Dis Child Fetal Neonatal* ed 2003;88:F292–F295.
3. Jouvence IP, Tourneux P, Perez T, Sauret A, Nelson JR, Brissaud O et al. Central catheters and pericardial effusion: results of a multicentric retrospective study. *Arch Pediatr* 2005;12(10):1456–1461.
4. Nowlen TT, Rosenthal GL, Johnson GL, Tom DJ, Vargo TA. Pericardial effusion and tamponade in infants with central catheters. *Pediatrics* 2002;110(1):137–142.

**CCT**

## Corresponding Author



Ahmad A. Aboaziza, MD  
PGY2  
Pediatric Resident  
East Tennessee State University  
Department of Pediatrics  
Ground Floor  
325 North State of Franklin  
Johnson City, TN, 37604 USA  
Phone: 571.277.2091  
Aboaziza@mail.etsu.edu



Jennifer Gibson, MD  
Assistant Professor  
East Tennessee State University  
Department of Pediatrics  
Ground Floor  
325 North State of Franklin  
Johnson City, TN, 37604 USA



Darshan S. Shah, MD  
Associate Professor  
East Tennessee State University  
Department of Pediatrics  
Ground Floor  
325 North State of Franklin  
Johnson City, TN, 37604 USA



Otto H. P. Teixeira, MD  
Associate Professor  
East Tennessee State University  
Department of Pediatrics  
Carl A Jones Hall (VA Bldg 1)  
Room 2-06  
PO Box: 70578  
Johnson City, TN, 37604 USA



## Interventional Cardiologist

The Department of Cardiology at Boston Children's Hospital seeks an experienced interventional cardiologist to join a thriving, well-established, academic practice at a Harvard teaching hospital. The applicant will be board certified/eligible in pediatric cardiology, have completed advanced training in congenital interventional catheterization, will be an active (>200 cases/yr) practicing pediatric interventionalist, with considerable past experience as an independent operator, and a record of academic accomplishment.

Applicants with unique areas of clinical expertise, or a successful record of program development, will be given priority as potential additions to a diverse existing staff of 6 interventional providers. Robust clinical and translational resources and opportunities exist within the Department. In addition to procedural responsibilities, the position entails participation in fellowship training, quality initiatives, and limited inpatient service.

The catheterization facilities at Boston Children's Hospital consist of 3, state-of-the-art, mixed-vendor, biplane cardiac catheterization laboratories with rotational angiography capability, in addition to a 4th biplane lab and a single plane lab for accommodation of invasive electrophysiology procedures. These procedural areas are supported by a central, 10 bed recovery and post-anesthesia unit, in close proximity to a dedicated cardiac MRI suite and inpatient echocardiography lab.

**Interested candidates should forward their CV to:**

Dr. Audrey Marshall  
Boston Children's Hospital  
300 Longwood Avenue  
Boston, MA 02115

Email:

[Audrey.Marshall@cardio.chboston.org](mailto:Audrey.Marshall@cardio.chboston.org)

*Boston Children's Hospital is an equal opportunity employer.*



**Archiving Working Group**  
**International Society for Nomenclature of**  
**Paediatric and Congenital Heart Disease**  
[ipccc-awg.net](http://ipccc-awg.net)



# Non-Compaction Cardiomyopathy in a Patient with Holt-Oram Syndrome: A Case Report

By Kritika Patel, BS; Khalisa Syeda, DO,  
Andrew J. Griffin, MD; Maria Serratto, MD

## Abstract

Holt-Oram Syndrome is a genetic disease characterized by cardiac and upper extremity abnormalities. The presentation is variable, with those affected displaying multiple bone abnormalities in their upper extremities, most commonly carpal bone fusion or malformations, and cardiac issues, classically a septal defect. In the case of this Holt-Oram Syndrome patient, on follow-up for Atrial Septal Defect (ASD), it was noted that she had an atypical form of non-compaction involving the lower one-third of the myocardium.

## Case Report

A 22-month-old female with Holt-Oram Syndrome and bilateral polydactyly presented to Pediatric Cardiology clinic for evaluation of a heart murmur and failure to thrive. The patient was a foster child with no birth or family history available. On physical exam, a III/VI systolic ejection murmur heard best at the left sternal border was appreciated. Initial echo showed secundum-type ASD that was 11 mm at its maximum diameter, and significant right ventricular dilation. The ASD was percutaneously repaired with a 20 mm ASO Amplatzer device. The patient was lost to follow-up for several years. At age 11-years-old, she returned for follow-up; she continued to be asymptomatic with no complications since the ASD repair. Her most recent echo, done at age 14-years-old, revealed non-compaction in the left ventricular chamber, largely in the apical region.

## Echo

The results of her initial echo (Figure 1) at age 14-years-old were essentially normal, with the exception of the finding of non-compaction in the apical region of the left ventricle; however, the contractility of the left ventricle was not quantitatively affected due to the non-compaction being

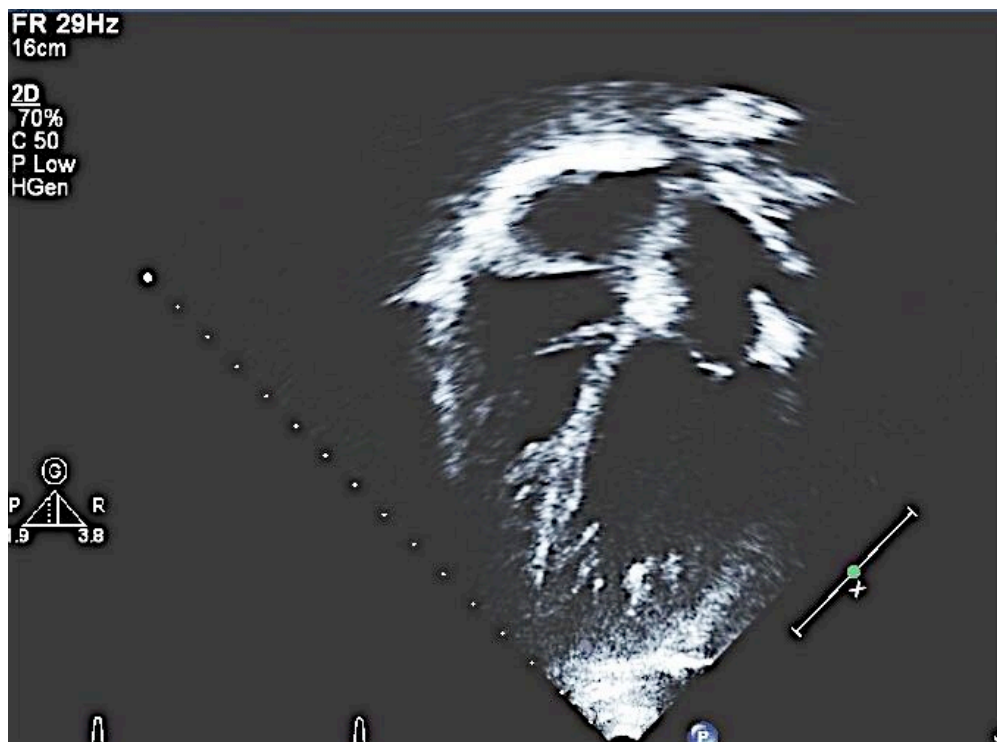


Figure 1. Echo demonstrating non-compaction in the apical region of the left ventricle.

largely confined to the apical region. A repeat echo showed a systolic non-compacted to compacted endomyocardial layer ratio (NC:C) of about 2, and a diastolic X/Y ratio of 0.3, both of which confirm the diagnosis of non-compaction in this patient.

## Genetics

Holt-Oram Syndrome is caused by mutations in the TBX5 gene located on chromosome 12q24. The TBX5 gene codes for the transcription factor T-box 5, which is involved in the development of the radial ray, the cardiac septum, and the cardiac conduction system. Normally, the TBX-5 protein interacts with the NKX2-5 and GATA4 proteins to promote normal cardiac septation and normal development of the AV canal. In addition, cells designated for the cardiac conduction system highly express TBX-5; its role is to promote the development of

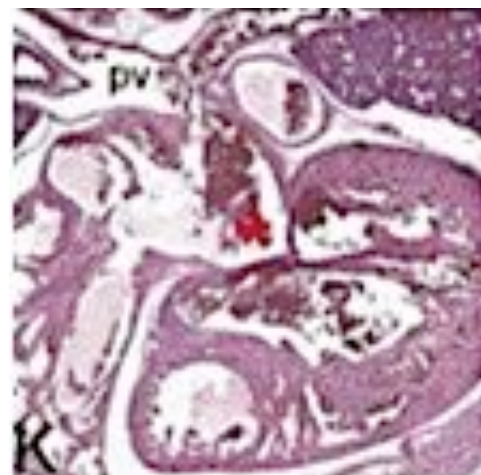


Figure 2. Left ventricle of mouse fetus with TBX5 haploinsufficiency.

the cardiac conduction system and upregulate CX40 expression, which is involved in the development of normal AV node conduction, and activate TBX-3, which



Volunteer / Get Involved  
[www.chimsupport.com](http://www.chimsupport.com)

## HOW WE OPERATE

The team involved at C.H.I.M.S. is largely a volunteering group of physicians nurses and technicians who are involved in caring for children with congenital heart disease.

The concept is straightforward. We are asking all interested catheter laboratories to register and donate surplus inventory which we will ship to help support CHD mission trips to developing countries.



# PROVEN PERFORMANCE. SIMPLY DELIVERED.

MELODY TPV  
DELAYS CONDUIT  
REPLACEMENT

**98%**

Patients at 2 years

**91%**

Patients at 5 years

Data from US IDE Study



**Melody<sup>®</sup>**  
Transcatheter Pulmonary Valve Therapy

**Melody-TPV.com**  
**Medtronic** | Minneapolis, MN 55432-5604  
Toll-free: 1 (800) 328-2518

UC201601525a EN ©2015 Medtronic.  
All rights reserved 08/2015

**Medtronic**  
Further. Together

#### Important Labeling Information for United States

**Indications:** The Melody TPV is indicated for use as an adjunct to surgery in the management of pediatric and adult patients with the following clinical conditions:

- Existence of a full (circumferential) RVOT conduit that was equal to or greater than 16 mm in diameter when originally implanted AND
- Dysfunctional RVOT conduits with a clinical indication for intervention, AND:
  - regurgitation:  $\geq$  moderate regurgitation, AND/OR
  - stenosis: mean RVOT gradient  $\geq$  35 mm Hg

**Contraindications:** None known.

#### Warnings/Precautions/Side Effects

- DO NOT implant in the aortic or mitral position. Preclinical bench testing of the Melody valve suggests that valve function and durability will be extremely limited when used in these locations.
- DO NOT use if patient's anatomy precludes introduction of the valve, if the venous anatomy cannot accommodate a 22-Fr size introducer, or if there is significant obstruction of the central veins.
- DO NOT use if there are clinical or biological signs of infection including active endocarditis. Standard medical and surgical care should be strongly considered in these circumstances.
- Assessment of the coronary artery anatomy for the risk of coronary artery compression should be performed in all patients prior to deployment of the TPV.
- To minimize the risk of conduit rupture, do not use a balloon with a diameter greater than 110% of the nominal diameter (original implant size) of the conduit for pre-dilation of the intended site of deployment, or for deployment of the TPV.
- The potential for stent fracture should be considered in all patients who undergo TPV placement. Radiographic assessment of the stent with chest radiography or fluoroscopy should be included in the routine postoperative evaluation of patients who receive a TPV.
- If a stent fracture is detected, continued monitoring of the stent should be performed in conjunction with clinically appropriate hemodynamic assessment. In patients with stent fracture and significant associated RVOT obstruction or regurgitation, reintervention should be considered in accordance with usual clinical practice.

Potential procedural complications that may result from implantation of the Melody device include the following: rupture of the RVOT conduit, compression of a coronary artery, perforation of a major blood vessel, embolization or migration of the device, perforation of a heart chamber, arrhythmias, allergic reaction to contrast media, cerebrovascular events (TIA, CVA), infection/sepsis, fever, hematoma, radiation-induced erythema, blistering, or peeling of skin, pain, swelling, or bruising at the catheterization site.

Potential device-related adverse events that may occur following device implantation include the following: stent fracture,\* stent fracture resulting in recurrent obstruction, endocarditis, embolization or migration of the device, valvular dysfunction (stenosis or regurgitation), paravalvular leak, valvular thrombosis, pulmonary thromboembolism, hemolysis.

*\*The term "stent fracture" refers to the fracturing of the Melody TPV.*

*However, in subjects with multiple stents in the RVOT it is difficult to definitively attribute stent fractures to the Melody frame versus another stent.*

For additional information, please refer to the Instructions For Use provided with the product.

**CAUTION:** Federal law (USA) restricts this device to sale by or on the order of a physician.

Melody is a registered trademark of Medtronic.



### Medical Director and Staff Level Pediatric Cardiovascular Critical Care Physicians General Pediatric Cardiologist Pediatric Cardiac Interventionalist Geneticist

Medical City Children's Hospital has an unwavering focus on patient care and offers world-renowned excellence in comprehensive pediatric services. Since 1996, our specialists haven't let anything distract them from serving children. As a result, we've helped thousands of children from more than 75 countries. We are a comprehensive children's hospital with specialists in virtually every pediatric subspecialty. Medical City is the only facility in north Texas where fetal diagnosis, maternal, neonatal and pediatric transport, high risk delivery stabilization in the NICU, corrective surgery, state of the art postoperative monitoring and care and long term follow-up of patients with complex congenital heart disease can all be delivered under one roof.

The Congenital Heart Surgery Unit (CHSU) accommodates around 400 children annually who undergo heart operations performed by Dr. Eric Mendeloff. 30% of our cases are neonates and 58% are under the age of 2 years. Cases range in complexity from palliation of hypoplastic left heart syndrome to closure of atrial and ventricular septal defects. Highly specialized care in the CHSU is provided by subspecialty-trained physicians and an excellent group of long term nurses and respiratory therapists. This focus on pediatric cardiac critical care has resulted in superlative patient outcomes that exceed national norms. The heart program's success has attracted referrals from across the country. With the addition of a second Congenital Heart Surgeon to our already robust program, we anticipate growth that will require a sixth member for our CICU team in addition to our need for a Medical Director of the Unit. Preferred candidate for the director level position will possess leadership attributes with evidenced experience, along with a strong clinical skill set.

All candidates are preferred to be BC/BE in Pediatric Cardiology and Pediatric Critical Care or boarded in one of these with additional training in Pediatric Cardiac Critical Care. Those with certification in one discipline and solid experience in the alternate subspecialty should also apply. Positions are employed and offer a competitive salary and excellent benefits packet.

Our hospital has immense current capabilities and is positioned to grow.

**Kathy Kyer**  
National Director of Pediatric Subspecialty Recruitment  
[Kathleen.Kyer@HCAHealthcare.com](mailto:Kathleen.Kyer@HCAHealthcare.com)  
937.235.5890





Figure 3. Hearts from 8-week-old mice with TBX5 haploinsufficiency.

promotes the differentiation of precursor cells into conduction system cells instead of myocardial cells. As mentioned previously, the most common cardiac manifestation in Holt-Oram Syndrome is a septal defect, commonly a secundum type Atrial Septal Defect. In addition, there have been multiple other cardiac anomalies observed in this syndrome, including cardiac conduction abnormalities, leading to manifestations such as: heart block, fibrillation, or bradycardia.

Cardiomyopathy has not previously been described in Holt-Oram Syndrome; more specifically, non-compaction has never been described in this entity. A study done by Brunea et al. looked at the cardiac and forelimb abnormalities in an animal model of Holt-Oram Syndrome. It was noted that in mice with TBX5 haploinsufficiency, one mouse fetus was noted to have a deformed left ventricle (Figure 2). The ventricles of 8-week-old

***“Our case is the first to describe an association between non-compaction and Holt-Oram Syndrome. While this may be an incidental relationship, it may be useful to carefully evaluate the echo of patients with Holt-Oram Syndrome for not only the classical cardiac abnormalities associated with it, such as ASD, but also more subtle cardiac anatomical abnormalities, especially given the implications of non-compaction long-term.”***



**OSF**

**HEALTHCARE SYSTEM**

**Pediatric Echosonographer Coordinator/  
Educator**

**Children's Hospital of Illinois – Peoria, IL**

We are currently seeking qualified candidates for a Pediatric Echosonographer Coordinator/Educator position at Children's Hospital of Illinois in Peoria, IL.

We are looking for a competent, ambitious professional who is enthusiastic about patient care as well as teaching, and who enjoys working with children of all ages and their families. This position will join a group of four dedicated pediatric sonographers and ten pediatric cardiologists. We are a teaching hospital with exceptional surgical and interventional catheterization programs. Our sonographers perform echocardiograms on inpatients and outpatients at Children's Hospital of Illinois and at outreach clinics in the central Illinois region.

Children's Hospital of Illinois is a state-designated Level 1 Pediatric Trauma Center. It is the only one in Illinois outside Chicago. In addition, it is also the first state-designated pediatric critical care hospital. We are the area's Regional Perinatal Center in combination with Illinois' only Level IV Neonatal Intensive Care Unit and Level I Trauma Center – both the highest level of care available. Our Congenital Heart Center is one of the Midwest's top heart programs. We are also home to the only St. Jude Midwest Affiliate and Pediatric Diabetes Resource Center in downstate Illinois. Children's Hospital of Illinois also operates the Pediatric Surgery Center, which brings together ten surgical specialties, including the only pediatric neurosurgeon in Illinois outside of Chicago.

**MINIMUM QUALIFICATIONS:**

Pediatric Registry (ARDMS) or Cardiac Ultrasound certification (RDCS).

Current CPR certification (Issued by American Heart Association)

**PREFERRED QUALIFICATIONS:**

Pediatric and Fetal Registry (Fetal certification must be obtained within two years of hire)

5+ years of experience

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



For more information:  
Sara Meslow, Executive Director  
Camp Odayin  
651.351.9185 – phone; 651.351.9187 – fax  
[sara@campodayin.org](mailto:sara@campodayin.org)  
[www.campodayin.org](http://www.campodayin.org)





mice with TBX5 haploinsufficiency were also noted to have a bulbous appearance (Figure 3).

## Conclusion

Non-compaction is felt to be a developmental abnormality present at birth, but not found until later in life because of the variable manifestations it can cause related to ventricular function. The etiology of non-compaction has yet to be completely elucidated. While it does not appear to have a single mutation associated with it, it has been associated with mutations in cytoskeleton, sarcomere, and mitochondrial encoding genes. Our case is the first to describe an association between non-compaction and Holt-Oram Syndrome. While this may be an incidental relationship, it may be useful to carefully evaluate the echo of patients with Holt-Oram Syndrome for not only the classical cardiac abnormalities associated with it, such as ASD, but also more subtle cardiac anatomical abnormalities, especially given the implications of non-compaction long-term.

## Citations

1. Al-Qattan, Mohammad M., and Hussam Abou-Al Shaar. "Molecular Basis of the clinical features of Holt-Oram syndrome resulting from missense and extended protein mutations of the TBX5 gene as well as TBX5 intragenic duplications." *Gene* (2015); 560(2): 129-36.
2. Chrysostomidis, Gregory, Meletios K. Kanakis, Vassiliki Fotiadou, Cleo Laskari, Theophil Kousi, Christos Apostolidis, Prodromos Azariadis, and Andrew Chatzis. "Diversity of congenital cardiac defects and skeletal deformities associated with the Holt-Oram syndrome." *International Journal of Surgery Case Reports* (2014); 5(7): 389-392.
3. Kumar, Vikas, Vikas Agrawal, Dharmendra Jain, and Om Shankar. "Tetralogy of Fallot with Holt-Oram syndrome." *Indian Heart Journal* (2012); 64(1): 95-98.
4. Brunea, Benoit G., Georges Nemer, Joachim P. Schmitt, Frederic Charron, Lynda Robitaille, Sophie Caron, David A. Conner, Manfred Gessler, Mona Nemer, Christine E. Seidman, and J.G. Seidman. "A Murine Model of Holt-Oram Syndrome Defines Roles of the T-Box Transcription Factor Tbx4 in

Cardiogenesis and Disease." *Cell* (2001); 106(6): 709-21.

5. Towbin, Jeffrey A., Angela Lorts, and John Lynn Jefferies. "Left ventricular non-compaction cardiomyopathy." *The Lancet* (2015); 386(9995): 813-25.

## CCT

### Corresponding Author



*Kritika Patel, BS  
University of Illinois College of Medicine  
Department of Pediatrics  
Division of Pediatric Cardiology  
840 S. Wood Street  
Chicago, IL 60612 USA  
Phone: 312.996.6605; Fax: 312.413.3373  
kritikapatel928@gmail.com*

*Khalisa Syeda, DO  
Children's Hospital University of Illinois  
Chicago, IL 60612 USA*

*Andrew J. Griffin, MD, FACC, FAAP, FCCP  
Assistant Professor of Pediatrics-Cardiology  
Children's Hospital University of Illinois  
Chicago, IL 60612 USA*

*Maria Serratto, MD, FACC, FAAP, FCCP  
Professor of Pediatrics-Cardiology  
Children's Hospital University of Illinois  
Pediatric Cardiology  
Clinical Science Building (856)  
840 S. Wood St.  
Chicago, IL 60612 USA  
mserratt@uic.edu*

## CONGENITAL CARDIOLOGY TODAY

### CALL FOR CASES AND OTHER ORIGINAL ARTICLES

Do you have interesting research results, observations, human interest stories, reports of meetings, etc. to share? Submit your manuscript to: [RichardK@CCT.bz](mailto:RichardK@CCT.bz)



**PICS-AICS**  
Pediatric and Adult Interventional Cardiac Symposium

**SAVE THE DATE**  
**JAN. 16-19, 2017**

**LOEWS MIAMI BEACH HOTEL**

**MIAMI**

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



**LIVE CASE DEMONSTRATIONS • ABSTRACT  
SESSIONS • "MY NIGHTMARE CASE IN THE  
CATH LAB" • HOT DEBATES • WORKSHOPS  
• SMALLER BREAKOUT SESSIONS •**

**SPECIALTY  
REVIEW IN Pediatric  
Cardiology**

**Specialty Review in Pediatric Cardiology**  
**| September 19-23, 2016 | Chicago**

Sponsor | American Academy of Pediatrics Section on Cardiology & Cardiac Surgery in collaboration with Society of Pediatric Cardiology Training Program Directors

<http://PediatricCardiology2016.com>

# Early Detection - China California Heart Watch Mission in Yunnan Province

Meredith Yang

As I stared at her pulsing, swollen belly, I couldn't tell if she was pregnant or not. I tried not to look, but I could only stare. My eyes traced the veins on her stomach along the surface of her belly. Her ankles were swollen like balloons.

"Edema...patient presents abdominal swelling as a result of congestive heart failure," Dr. Robert Detrano said as he pressed the ultrasound head against her chest. I watched in awe. Edema had only been a textbook concept to me a few months ago, an indicator in a long list of a series of variables that would qualify a child as "deprived" or not.

Dr. Detrano finished the examination, and prescribed her a few medications to relieve her pulmonary hypertension and help her feel better. She'll need to go to the hospital to renew her prescription after 3 months. "They're 10,000 RMB per box," he said. Her mother looked distraught. Dr. Detrano asked me, "How much do they make?" I looked down nervously. I had just previously asked for their average family income a year and written it down on the intake sheet: "2,000 RMB a year," I read. The equivalent of about \$300 USD.

After the pair had left, Dr. Detrano told us that the 17-year old girl probably had one more year left of her life, at most two. Having been diagnosed as a child, her parents had rushed her to surgery. The surgery drained both her

parents' finances. I listened as Dr. Detrano explained, "But the doctor should have never performed the surgery. They shouldn't have closed the VSD." A VSD (Ventricular Septal Defect) is a hole in the ventricular wall of the heart. Literally, it is a hole in the heart.

"They shouldn't have done it," he repeated. "At the time, she had progressed too far with Eisenmenger's Syndrome. Once you reach that stage, your pulmonary arteries become too resistant, and your right heart isn't strong enough to push blood through to them. With a VSD, the right heart can at least push the rest of the deoxygenated blood into the left heart so that it empties properly... But then, if you close the VSD, the right heart isn't strong enough to empty itself, so the system backs-up. The blood in the veins that would be draining into the right heart instead pools into the lower body."

As I listened, I tried to ascertain whose fault it was that she slipped through the cracks. Was it the system? Was it a faulty assessment by her doctor? Was it her parents' need to just get her to surgery, in hopes that it would solve everything? Or was it more her lack of circumstance? Had she been born in Shanghai or Beijing, there is no doubt that her condition would have been detected early and immediately treated. She could have lived well into old age.

China California Heart Watch ([www.chinacal.org](http://www.chinacal.org)), founded by cardiologist Dr. Robert Detrano, believes that the simple act of proper screening of newborns could have prevented her case. In the West and in many developed countries, virtually all newborns are screened for congenital heart defects within the first 24 hours and during their first year of life. Undiagnosed congenital cardiac shunt lesions with pulmonary hypertension and Critical Congenital Heart Disease (CCHD) kill 3 to 4 of every thousand

children in developing countries. If detected early, these cases are completely curable.

The sheer number of complex cases that Dr. Detrano has seen in children and adolescents in Yunnan alone grossly outnumbers those that he sees in the United States. After traveling and providing general clinical care in rural villages for nearly a decade—through his experience and through the recognition of a societal need—Dr. Detrano embarked on a training programme of village doctors in rural Yunnan.

To date, China Cal has visited 52 hospitals within half a year, and plans to visit all hospitals in Yunnan, totaling 125 hospitals. He and his team train doctors in how to listen for heart murmurs using a stethoscope, in combination with pulse oximetry to conduct a proper neonatal cardiac examination.

Pulse oximetry is a noninvasive method to monitor a person's oxygen saturation levels using a sensor device placed on the patient's finger, or in an infant's case, across the foot. Masimo Corporation, headquartered in San Diego, California, has additionally gifted 125 pulse oximeters to be used in each of the rural Yunnan county hospitals for screening newborns. Pulse oximeters are valued at around \$180 to \$200 USD each.

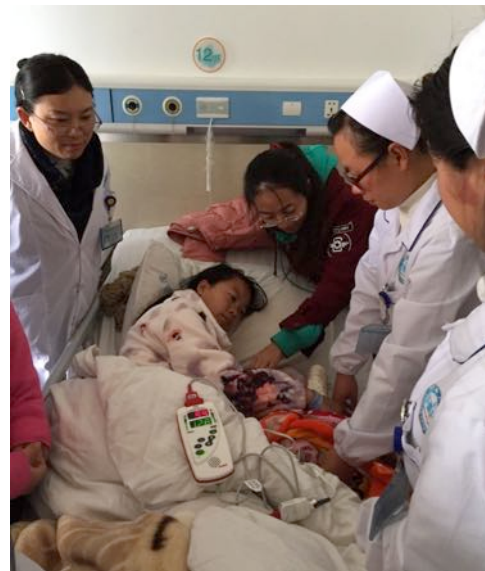
This combined strategy has been proven as an effective screening method to detect



ChinaCal staff using a dummy baby to train doctors how to listen for heart murmurs.



Traveling across rural Yuxi county, Yunnan, in ambulances.



Doctor Zhao from Kunming First Affiliate Medical University training doctors in pulse oximetry on a neonate. China Cal sources doctors from locally renowned universities to act as trainers in the training programme.





CCHD in its early stages by many studies, including a landmark study by Dr. Qu-ming Zhao et al and the Children's Hospital of Fudan University in Shanghai. The addition of pulse oximetry to clinical assessment alone improved detection from 77.4% to 93.2% ([www.ncbi.nlm.nih.gov/pubmed/24768155](http://www.ncbi.nlm.nih.gov/pubmed/24768155)). The study concluded that this simple and accurate method is feasible and reliable for the detection of major Congenital Heart Disease (CHD) and should be used widely in maternity hospitals.

Doctor Zhao, from Kunming First Affiliate Medical University, has been training doctors in pulse oximetry on neonates. China Cal sources doctors from locally renowned universities to act as trainers in the training programme.

Together, Dr. Detrano and his wife Shan Shan have saved over 400 children, providing free screening services, diagnosis, referral, and follow-up. There are another 100 children are on their list, for who they monitor, helping rural families in terms of prescriptions, medical bills, navigating hospitals, making appointments for surgery, and giving advice on how to use the rural insurance system. As one China Cal staff worker recounted, "the hardest part of my job is communicating with rural families and letting them know what documents are required and how to get to the hospitals...I have to repeat over and over, until my mouth is dry (口水都说干掉了)."

What struck me most is China Cal's practice and success in utilizing and implementing both an individual and societal approach, combining the strengths of both clinical practice and the efficiency of public health solutions. In Yunnan alone, it is estimated that approximately 400 infants



## Chief of Pediatric Cardiology

The Department of Pediatrics at the University of Tennessee Health Science Center – College of Medicine Chattanooga seeks an energetic and imaginative leader to serve as Chief of Pediatric Cardiology at the Children's Hospital at Erlanger. Opportunities exist for the chief to develop imaginative regional models of care delivery and to influence the design of the new Children's Hospital, which will begin construction late 2016.

The foremost qualities necessary for this position are leadership, vision and energy. The individual selected for this position will be a strategic and highly communicative leader. As Chief of Pediatric Cardiology, the individual reports to the Chair of Pediatrics and will work collaboratively with the Chief of Adult Cardiology in the continued development of cutting edge adolescent and adult congenital programs. This individual will be a MD or MD/PhD who is board certified in Pediatric Cardiology.

### Please contact:

William Pruitt at (817) 807-3535 or via e-mail at [William.Pruitt@millicansolutions.com](mailto:William.Pruitt@millicansolutions.com) for more details about this position.

All inquiries and referrals will remain confidential without your prior approval.

*The Children's Hospital at Erlanger is an Equal Opportunity/Affirmative Action Employer.*



## 24<sup>th</sup> Parma International Echo Meeting - From Fetus to Young Adult

Universita' di Parma | Associazione Medical Care - Development – Peace

Parma, Italy | May 27-28, 2016

Centro S.Elisabetta | University Campus | Parma, Italy

**For more information, contact:** Professor Umberto Squarcia, MD, FACC - [squarciaumberto@gmail.com](mailto:squarciaumberto@gmail.com) or Professor Donald J Hagler, MD - [hagler.donald@mayo.edu](mailto:hagler.donald@mayo.edu)



Dr. Detrano screens a patient in the basement of his home.

die from heart defects every year. It is hard to imagine that their training programme will not have a hand in preventing the deaths of hundreds of future infants in Yunnan. As I quote from China Cal's site, "If nothing is done, by 2050, twelve million Chinese people (equal to the population of New York City), will die every year from heart disease and stroke."

Dr. Detrano became inspired to help Yunnan province after cycling through the region and meeting kind and very impoverished villagers who offered him a bed for the night. For the next 15 years, he learned Chinese, allowing him to communicate with patients, and diagnose their conditions. He established strong connections with regional hospital in Chengdu and Kunming in order to refer patients to not only local, but also trusted expertise. His hard work is testament to the person that he is. Dr. Detrano first trained as a physicist. After earning his PhD and realizing that he wanted to pursue medicine, he went on to study for a medical degree in Rome, Italy, eventually becoming a renowned cardiologist in the United States. He moved to China when he was 60-years old.

As I think back to China Cal's message, work, and purpose, I am heartened to realize that sometimes the best solutions are the simplest. Watching a 72-year old American doctor devote his life to rural China gives me hope.

As we travelled with Dr. Detrano through Yuxi county in Yunnan, we set up clinics essentially wherever was possible—in a free room in the hospital, in his motel room, and even in the basement of his home. I was



China Cal is headquartered in Dali, Yunnan, China

enamored by the simplicity of the work: from diagnosing patients to diagnosing the root of the problem. I felt a very real connection from my work to the people for whom it was intended - no bells and whistles.

I'd like to think that early detection is a broadly applicable concept, beyond CCHD. I leave the experience with a profound belief in the value of time-sensitive, early childhood interventions. From education and health, to proper parental care, often an individual's outcomes are shaped most profoundly in the first two years of life. World-renowned Heckman (2008) and his team have successfully translated this into the language of economics, highlighting that the early childhood period is the most "cost effective for delivering returns." Beyond economics, beyond ROIs, beyond cost effectiveness, I am reminded that intervening early, as in the case of the 17-year old girl with edema, can very simply—save a life.

China Cal is headquartered in Dali, Yunnan, and welcomes the donation of money and equipment, and volunteers who would like to help ([www.chinacal.org](http://www.chinacal.org)).

CCT

Ms. Meredith Yang  
meredithfanyang@gmail.com

Ms. Meredith Yang currently works as a researcher in social policy for children. She is particularly interested in health-based interventions. She is based in Shanghai, China.

## CHiP NETWORK

CONGENITAL HEART INTERNATIONAL PROFESSIONALS

### Get involved with CHiP (Congenital Heart International Professionals Network)

We need your help:

- Finding news stories.
- Creating journal watch.
- Keeping track of upcoming meetings.
- Building our presence on LinkedIn, Facebook, and Twitter.
- Creating more value for our readers/subscribers.
- Engaging our partner organizations.
- Fundraising to support our activities.

Step up! Here's how to contact us:

[www.chipnetwork.org/Contact](http://www.chipnetwork.org/Contact)

We'd like to know WHO you are,  
WHERE you are, and WHAT you do.

Please go to [www.chipnetwork.org](http://www.chipnetwork.org) and let us know more about you. It only takes two minutes. Then we'll be able to send you messages targeted to your interests.

I hope you will consider joining the CHiP Network and help foster a strong congenital heart care community.

Sincerely,

Gary Webb, MD  
CHiP Network  
215-313-8058  
[gary.webb@cchmc.org](mailto:gary.webb@cchmc.org)



The CHIP Network, the Congenital Heart Professionals Network, is designed to provide a single global list of all CHD-interested professionals.

## SIXTH ANNUAL FETAL ECHOCARDIOGRAPHY SYMPOSIUM AT UCLA: *Practical Essentials of Fetal Cardiac Screening*

Mattel Children's Hospital **UCLA**

Course Chair: Mark Sklansky, MD  
October 15, 2016

UCLA Meyer & Renee Luskin Conference Center; Los Angeles, CA  
Partnering with Hopeful Hearts, ACC (California Chapter), CME Office of Continuing Education - David Geffen School of Medicine of UCLA

<https://www.cme.ucla.edu/courses>





# Opportunity for BC/BE Pediatric Cardiologist in Laredo, Texas

## About the practice:

- ✓ Single-physician practice (retiring physician will provide part-time coverage for 6-12 months to assist with transition)
- ✓ Active outpatient practice where patients are seen in conjunction with a pediatric nurse practitioner and echo tech
- ✓ Inpatient coverage provided at Laredo Medical Center (a 17-bed, Level-III NICU with approximately 3,500 annual births) and Doctors Hospital (a 20-bed Level-III NICU with approximately 2,300 births annually)
- ✓ Vacation and one weekend per month coverage provided by affiliated practice in San Antonio

## About the location:

- ★ With a current population of 250,000, Laredo is a perfect blend of culture, language, culinary influences and ambience that can only be found deep in the heart of South Texas
- ★ Located 154 miles south of San Antonio
- ★ Safe and promising environment for families and entrepreneurs alike
- ★ An average of 320 sunny days a year
- ★ No shortage of activities, from water sports to nature trails, birding, camping and golfing
- ★ No state income tax in Texas

## Benefits:

We offer competitive salaries and excellent benefits including:

- ✓ Health (choice of two PPO options), life, vision, dental and disability insurance
- ✓ 401(k)
- ✓ Annual CME allowance
- ✓ Potential for relocation assistance
- ✓ Employee stock purchase plan
- ✓ Stability in an organization with more than 35 years of healthcare industry experience
- ✓ Opportunities to participate in research and quality improvement initiatives
- ✓ Professional liability insurance and assistance with mandatory hospital credentialing and state licensing, and reimbursement of associated fees



Pediatrix Cardiology is an Equal Opportunity Employer

### To apply for this opportunity:



Visit

[pediatrix.com/clinicalcareers](https://pediatrix.com/clinicalcareers)



Call

800.243.3839, ext. 5589



Email

Janet Friedman

[janet\\_friedman@pediatrix.com](mailto:janet_friedman@pediatrix.com)

# Medical News, Products & Information

## Digisonics Introduces New enhancements for Cardiovascular Information System Solutions at ACC.16

Digisonics (Booth #11103) will exhibit its latest functionality for Cardiovascular Information System (CVIS) Solutions at the *American College of Cardiology's 65<sup>th</sup> Annual Scientific Session & Expo* in Chicago, Ill. Digisonics will showcase significant enhancements to streamline cardiovascular workflows, particularly for Adult and Pediatric cath labs. Integration with hemodynamics systems creates workflow efficiency by autopopulating demographics, hemodynamic measurements, medications and other data directly into clinical report. An interactive display tablet with drawing pen provides an easy way to label and reference coronary anatomy. A complete library of Mullins congenital heart and peripheral vascular procedure-based diagrams can be edited to display in the cardiovascular reports.

Utilizing a consistent, structured format for cardiovascular reporting creates a solid database for data mining with the Digisonics Search and Business Analytics Package. Clinicians use the Digisonics tool to gain insight into patient populations, measure performance, determine areas for improvement and plan for future growth.

Digisonics solutions are standards-based and vendor-neutral, combining image review, structured reporting, an integrated clinical database and powerful PACS image archive into one complete solution for all cardiovascular modalities. Coupled with seamless integration to incumbent 3<sup>rd</sup> party systems, the Digisonics system creates a streamlined workflow to facilitate improved efficiency, greater reporting accuracy and faster report turnaround times.

Digisonics structured reporting solutions combine high performance image review workstations, a powerful PACS image archive, an integrated clinical database, comprehensive analysis capabilities and highly configurable reporting for multiple modalities. Key applications are complemented with interfaces to information systems and 3<sup>rd</sup> party vendors, providing facilities with a seamless, efficient clinical workflow. For more information, [www.digisonics.com](http://www.digisonics.com).

## Penumbra Introduces POD® Packing Coil for the Embolization of Peripheral Vessels and Aneurysms

Penumbra, Inc., a global interventional therapies company, announced the U.S. launch of its new POD® Packing Coil, designed to be used as a complementary device with Penumbra's Ruby® and POD (Penumbra Occlusion Device) embolization products. This latest launch adds to the company's rapidly expanding peripheral vascular product portfolio. Nearly 900,000 Americans each year suffer from peripheral vascular conditions involving acute clots or aneurysms that occur outside the brain or heart, and this represents a large and growing patient population.

Penumbra has developed a suite of thrombectomy and embolization products for use in a range of peripheral vascular conditions, and these products are driving significant growth:

- Penumbra's embolization platform includes Ruby and POD and the new POD Packing Coil, which is uniquely designed to pack very densely behind Ruby and POD to occlude arteries and veins throughout the peripheral vasculature, including aneurysms.
- Penumbra's next-generation Indigo® System is a continuous aspiration thrombectomy device designed to remove fresh, soft emboli and thrombi from the peripheral arteries and veins. The Indigo System includes four catheter sizes (CAT 3, 5, 6 and 8). The aspiration lumen is paired with a proprietary continuous vacuum aspiration pump to evacuate clots effectively and efficiently.

## DIRECTOR of ADULT CONGENITAL HEART DISEASE PROGRAM AT CHILDREN'S HOSPITAL OF PITTSBURGH OF UPMC

The Division of Cardiology at Children's Hospital of Pittsburgh of UPMC / University of Pittsburgh School of Medicine is recruiting for the Director of the Adult Congenital Heart Disease (ACHD) program. The applicant should have expertise in the management of adult congenital heart disease with prominent clinical, teaching and research skills. In addition, he or she should have sufficient experience to serve as director of the ACHD program, working closely with division chief and hospital leadership to lead program development. Candidates must possess an MD (or equivalent) degree and be board-eligible/certified in cardiovascular diseases and in adult congenital heart disease.

The Heart Institute provides comprehensive pediatric and adult congenital cardiovascular services to the tri-state region and consists of 23 pediatric cardiologists, 4 pediatric cardiothoracic surgeons, 5 pediatric cardiac intensivists and 8 cardiology fellows along with 12 physician extenders and a staff of over 100. The Heart institute is currently ranked 10<sup>th</sup> in the US News and World report ranking for pediatric cardiac programs. The well-established adult congenital heart disease program is staffed by a second ACHD physician, two dedicated mid-level providers, a dedicated ACHD RN, ACHD research coordinator and supported by a clinical social worker. The ACHD team works in close conjunction with the Heart-Vascular Institute of UPMC-Presbyterian adult hospital as well.

Children's Hospital of Pittsburgh of UPMC has been named to *U.S. News & World Report's* 2014-15 Honor Roll of Best Children's Hospitals, one of only 10 hospitals in the nation to earn this distinction. Consistently voted one of America's most livable cities, Pittsburgh is a great place for young adults and families alike.

The positions come with a competitive salary and faculty appointment commensurate with experience and qualifications at the University of Pittsburgh School of Medicine. The University of Pittsburgh is an Equal Opportunity/Affirmative Action Employer. Interested individuals should forward letter of intent, curriculum vitae and three (3) letters of references. Informal inquiries are also encouraged.

Contact information:

**Vivek Allada, MD**

**Interim Chief, Division of Pediatric Cardiology  
Children's Hospital of Pittsburgh of UPMC  
4401 Penn Avenue, Pittsburgh, PA 15224**

**Telephone: 412-692-3216**

**E-mail: [Vivek.Allada@chp.edu](mailto:Vivek.Allada@chp.edu)**

**[www.chp.edu/CHP/heart+institute](http://www.chp.edu/CHP/heart+institute)**

"With the Indigo System and POD, Penumbra has recently introduced products that have had significant impact on the treatment of vascular disease. Indigo represents a significant advancement in the treatment of thrombotic and embolic disease, which until now has had limited treatment options," said Corey Teigen, MD, at Sanford Health in Fargo, ND, who uses Penumbra's peripheral vascular products. "With the Indigo System, physicians now have the ability to remove limb- and life-threatening clots quickly and efficiently. Likewise the POD, Ruby



and now, the POD Packing Coil optimize embolization procedures by decreasing procedure time while providing increased control."

"Our embolization platform and the Indigo System are examples of our commitment to innovating new technologies for challenging vascular conditions for which there are significant unmet clinical needs," said Adam Elsesser, Chairman and CEO of Penumbra. "We are intent on changing treatment paradigms to improve clinical outcomes across two large and growing markets: neuro and peripheral vascular."



NATIONWIDE CHILDREN'S  
When your child needs a hospital, everything matters.™



THE OHIO STATE UNIVERSITY  
COLLEGE OF MEDICINE

## Congenital Cardiac Intensivist

The Heart Center (THC) at Nationwide Children's Hospital, the primary pediatric teaching facility for The Ohio State University in Columbus Ohio, is recruiting an attending physician, at any academic level, for the Cardiothoracic Intensive Care Unit (CTICU). This individual would join a group of seven multi-background academic cardiac intensivists and eight dedicated nurse practitioners devoted to the CTICU providing 24/7 in house coverage.

Our current independently-managed free-standing CTICU is a 20 bed unit with approximately 800 total admissions per year (medical and surgical) and an average daily census of 12. Candidates must have completed fellowship training in pediatric cardiac anesthesia, critical care and/or cardiology that includes advanced cardiac intensive care training. Preference will be given to those who are boarded in pediatric cardiology.

THC embraces a culture of patient safety and quality, transparency, translational/outcome research, education, cost-containment and public health awareness. These create ample participation and leadership opportunities for the candidate's professional growth. THC is comprehensive with services including an active hybrid palliation center, a comprehensive single ventricle program, thoracic organ transplantation program, blood conservation strategies, and cardiac mechanical support team. The CTICU is supported by world-class and innovative interventional cardiology, cardiac imaging, cardiothoracic surgery and adult congenital heart experts. Current annual clinical metrics for THC includes: over 500 cardiothoracic surgeries, over 700 cardiac catheterizations and EP procedures, and over 13,000 cardiology outpatient visits. We have a pediatric and pediatric/adult combined cardiology fellowship programs. We participate in numerous multicenter clinical trials and quality initiatives including the JCCHD QI Collaborative. We are directly linked to our Center for Cardiovascular and Pulmonary Research which has an NIH T-32 training grant.

**Interested candidates are encouraged to submit their curriculum vitae to:**

Janet Simsic, MD  
Director of the Cardiothoracic Intensive Care Unit,  
Nationwide Children's Hospital  
T2296  
700 Children's Drive  
Columbus, OH 43205  
or [janet.simsic@nationwidechildrens.org](mailto:janet.simsic@nationwidechildrens.org)

Peripheral vascular disease includes blood clots or aneurysms that affect the vessels of the upper and lower extremities and all other parts of the body, except the brain and heart. There are nearly 900,000 people in the U.S. annually who suffer from acute clots or aneurysms in the body that may be treated by thrombectomy or embolization procedures.

Penumbra's peripheral vascular product portfolio currently focuses on thrombectomy and embolization therapies:

- Peripheral thrombectomy involves the removal of blood clots. There are an estimated 850,000 people in the U.S who develop such conditions, and approximately 150,000 are treated per year with existing procedures including catheter-directed thrombolysis (clot-busting drugs).
- Peripheral embolization involves obstructing blood flow to target vessels, aneurysms and vascular anomalies, and assisting with the treatment of oncological disease. There are approximately 50,000 patients treated each year in the U.S for such conditions.

For more information, [www.penumbrainc.com](http://www.penumbrainc.com).

### The Children's Cardiomyopathy Foundation (CCF) Announces the Availability of One-Year Research Grants for Studies Focused on All Forms of Pediatric Cardiomyopathy

CCF's research grant program aims to advance medical knowledge on the causes and mechanism of pediatric cardiomyopathy and to develop diagnostic guidelines and targeted therapies.

- **Eligibility:** Principal investigators must hold an MD, PhD or equivalent degree, reside in the United States or Canada, and have a faculty appointment at an accredited U.S. or Canadian institution.
- **Funding:** US \$25,000 to US \$50,000 for one year of total direct costs.
- **Application Process:** CCF requires a letter of intent in advance of the grant application. The 2016 deadline for letters of intent is Wednesday, June 15<sup>th</sup> by 5:00 pm EST. Only investigators who have submitted a letter of intent and have been invited to submit a formal grant application will be considered for CCF funding.

Visit CCF's website [www.childrenscardiomyopathy.org](http://www.childrenscardiomyopathy.org) (click on Research/ Grants & Awards) for application guidelines and to view past grant awards.

### CONGENITAL CARDIOLOGY TODAY

© 2016 by Congenital Cardiology Today (ISSN 1554-7787-print; ISSN 1554-0499-online). *Published monthly. All rights reserved.*  
[www.CongenitalCardiologyToday.com](http://www.CongenitalCardiologyToday.com)

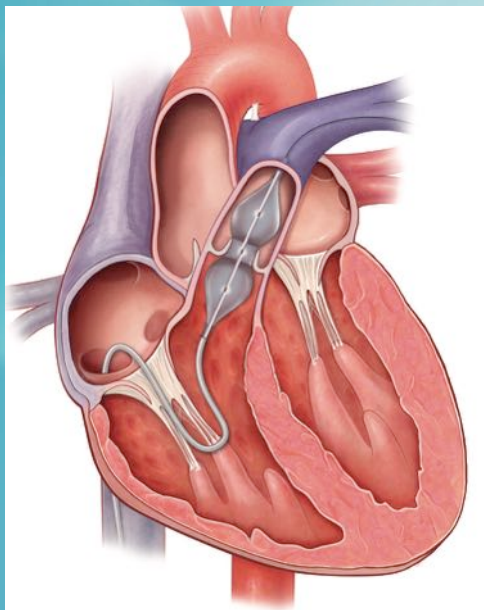
#### Publishing Management:

- Tony Carlson, Founder, President & Sr. Editor - [TCarlsonmd@gmail.com](mailto:TCarlsonmd@gmail.com)
- Richard Koulbanis, Group Publisher & Editor-in-Chief - [RichardK@CCT.bz](mailto:RichardK@CCT.bz)
- John W. Moore, MD, MPH, Group Medical Editor - [JMoore@RCHSD.org](mailto:JMoore@RCHSD.org)

**Editorial Board:** Teiji Akagi, MD; Zohair Al Halees, MD; Mazeni Alwi, MD; Felix Berger, MD; Fadi Bitar, MD; Jacek Bialkowski, MD; Mario Carminati, 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; John Lamberti, MD; Gerald Ross Marx, MD; Tarek S. Momenah, MBBS, DCH; Toshio Nakanishi, MD, PhD; Carlos A. C. Pedra, MD; Daniel Penny, MD, PhD; James C. Perry, MD; P. Syamasundar Rao, 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

**Free Subscription to Qualified Professionals:** Send your name, title(s), hospital or practice name, work address and url, phone, fax and email to: [sub@cct.bz](mailto:sub@cct.bz).

*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.*



# When Precise Sizing is the Heart of the Matter

**Tyshak NuCLEUS™ PTV Catheters**

**PTS-X™ Sizing Balloon Catheters**



## **Rx only**

CV9018 - 6/15

©2015 B. Braun Interventional Systems Inc.

Tyshak NuCLEUS™ and PTS-X™ are registered trademarks of NuMED, Inc.

The Tyshak NuCLEUS™ PTV Balloon Dilatation Catheters are recommended for Percutaneous Transluminal Valvuloplasty (PTV) of the pulmonary valve in the following: A patient with isolated pulmonary stenosis. A patient with valvular pulmonary stenosis with other minor congenital heart disease that does not require surgical intervention. The PTS-X™ Sizing Balloon Catheters are recommended for use in those patients with cardiovascular defects wherein accurate measurement of the defect is important to select the appropriately sized occluder device. Refer to the Instructions for Use for relevant warnings, precautions, complications, and contraindications.

Manufactured for:

**B. Braun Interventional Systems Inc.**

824 Twelfth Avenue | Bethlehem, PA 18018 | USA

Tel: 877-VENA CAV (836-2228) (USA) | Fax: 610-849-1334

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

