

CONGENITAL CARDIOLOGY TODAY

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

January 2014; Volume 12; Issue 1
North American Edition

IN THIS ISSUE

Surgical Strategy for Thrombosed Unilateral Absence of a Pulmonary Artery

By Mark Cartoski, MD; Jessica M. Parson, BS; Alexander Ellis, MD; Elliot Tucker, MD; Felix W. Tsai, MD
~Page 1

An Unusual Case of Totally Anomalous Pulmonary Venous Connection

By Shazia Bhombal MD and Grace C. Kung, MD
~Page 7

Wrap-Up LAA Frankfurt 203

By Sameer Gafoor, MD
~Page 10

DEPARTMENTS

Medical News, Products and Information

~Page 12

CONGENITAL CARDIOLOGY TODAY

Editorial and Subscription Offices
16 Cove Rd, Ste. 200
Westerly, RI 02891 USA
www.CongenitalCardiologyToday.com

Upcoming Medical Meetings

(See website for additional meetings)

4th Vietnam Congress of Congenital and Structural Heart Disease

Jan. 8-10, 2014; Ho Chi Minh City, Vietnam
www.congenitalheartdisease.net.vn/en/Default.aspx

The First Bangkok International Fetal Echocardiography

Jan. 15-17, 2014; Bangkok, Thailand
<http://bkkfetalecho.com>

Cardiology 2014

Feb. 19-23, 2014; Orlando, FL USA
<http://www.chop.edu/professionals/educational-resources/continuing-medical-education/cardiology-2014/home.html>

Congenital Cardiology Today is The official publication of the CHiP Network (www.chipnetwork.org)

© 2014 by Congenital Cardiology Today ISSN: 1544-7787 (print); 1544-0499 (online).
Published monthly. All rights reserved.

Recruitment Ads on Pages: 12, 13, 14,
15

Surgical Strategy for Thrombosed Unilateral Absence of a Pulmonary Artery

By Mark Cartoski, MD; Jessica M. Parson, BS; Alexander Ellis, MD; Elliot Tucker, MD; Felix W. Tsai, MD

Introduction

Unilateral absence of a pulmonary artery (UAPA), first described by Frantzel in 1868, is a rare cardiac anomaly thought to develop from the persistence of the hilar components of the pulmonary artery to the distal sixth aortic arch with concurrent involution of the proximal portion of the same arch.^{1,2} It is a rare defect with an estimated prevalence in adult males of 1 in 200,000.¹ It is often associated with other cardiovascular anomalies such as Tetralogy of Fallot, pulmonary atresia, and Ventricular Septal Defect (VSD); however, UAPA may occur as an isolated finding.^{2,3} Left-sided defects, while UAPA is more often diagnosed with other cardiac defects while right-sided UAPA is more likely to be seen as a solitary finding.⁴ UAPA treatment strategies have mostly been limited to older presentations from single institution case reports; none have discussed neonatal presentations or strategies.^{1,4}

Case Description

A previously healthy two-day-old term female infant was referred to our center for evaluation of Congenital Heart Disease following an

“Unilateral absence of a pulmonary artery (UAPA), first described by Frantzel in 1868, is a rare cardiac anomaly thought to develop from the persistence of the hilar components of the pulmonary artery to the distal sixth aortic arch with concurrent involution of the proximal portion of the same arch.^{1,2}”

episode of desaturation to 80% at 16 hours of life. An echocardiogram demonstrated only a single left pulmonary artery with a small ipsilateral Patent Ductus Arteriosus (PDA) with bidirectional flow. Following transfer to our hospital, the infant was started on prostaglandin (PGE) infusion. After several hours of PGE infusion and clinical stability with oxygen saturations of 95%, a repeat echocardiography was not able to show any discernible right pulmonary artery flow. No

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

NIT-OCCLUD[®]

COIL SYSTEM FOR PDA CLOSURE



A SAFER, EASIER WAY TO CLOSE

The Nit-Occlud[®] coil system for PDA closure is designed to match individual morphologies and sizes

The delivery system facilitates optimal device positioning

The Nit-Occlud[®] PDA coil is repositionable and retrievable prior to release

Tight and compact windings ensure efficient occlusion

The Nit-Occlud[®] PDA coil was determined to be MRI conditional

Radiopaque

For more information or to place an order, contact your B. Braun Interventional Systems Inc. representative or call 1-877-VENA-CAV (836-2228)

pfmmedical

Manufacturer:
pfm medical, ag
Wankelstraße 60
50996 Köln, Germany
T +49 (0)2236 9641-10
F +49 (0)2236 9641-20



B. BRAUN

Interventional
Systems

Distributed by:
B. Braun Interventional Systems Inc.
824 Twelfth Avenue
Bethlehem, PA 18018 USA
Tel: 1-877-VENA CAV (836-2228) (USA)
Fax: 1-610-849-1334
www.bisusa.org

Indication: The Nit-Occlud[®] PDA coil is a permanently implanted prosthesis indicated for percutaneous, transcatheter closure of small to moderate size patent ductus arteriosus with a minimum angiographic diameter less than 4mm. Nit-Occlud Brief Statement: Do not implant the Nit-Occlud PDA into patients who have endocarditis, endarteritis, active infection, pulmonary hypertension (calculated PVR greater than 5 Wood Units), thrombus in a blood vessel through which access to the PDA must be obtained, thrombus in the vicinity of the implantation site at the time of the implantation or patients with a body weight < 11 lbs (5 kg). An angiogram must be performed prior to implantation for measuring length and diameter of the PDA. Only the pfm medical implantation delivery catheter should be used to implant the device. Administration of 50 units of heparin per kg body weight should be injected after femoral sheaths are placed. Antibiotics should be given before (1 dose) and after implantation (2 doses) in order to prevent infection during the implant procedure. Do not implant the Nit-Occlud PDA in an MR environment. Do not pull the Nit-Occlud coil through heart valves or ventricular chambers. Contrast media should not be injected through the implantation catheter. The catheter must not be connected to high pressure injectors. Patients may have an allergic response to this device due to small amounts of nickel that has been shown to be released from the device in very small amounts. If the patient experiences allergic symptoms, such as difficulty in breathing or swelling of the face or throat, he/she should be instructed to seek medical assistance immediately. Antibiotic prophylaxis should be performed to prevent infective endocarditis during first 6 months after coil implantation. Potential Adverse Events: Air embolism, Allergic reaction to drug/contrast, Apnea, Arrhythmia requiring medical treatment or pacing, Arteriovenous fistula, Bacterial endocarditis, Blood loss requiring transfusion, Chest pain, Damage to the tricuspid or pulmonary valves, Death, Embolization of the occluder, requiring percutaneous or surgical intervention, Endarteritis, False aneurysm of the femoral artery, Fever/Headache/migraine, Heart failure, Hemolysis after implantation of the occluder, Hypertension, Hypotension or shock, Infection, Myocardial infarction, Occluder fracture or damage, Perforation of the heart or blood vessels, Stenosis of the left pulmonary artery or descending thoracic aorta, Stroke/TIA, Thromboembolism (cerebral or pulmonary), Valvular Regurgitation, Vessel damage at the site of groin puncture (loss of pulse, hematoma etc.)

aortic collaterals were noted going to the right lung and no right-sided pulmonary venous flow could be seen. Right ventricular enlargement, PDA bidirectional flow, and interventricular septal flattening were all suggestive of elevated right heart pressures.

Prostaglandin therapy was continued. Computed tomographic arteriography was suggestive of a distal right pulmonary artery (RPA) that originated from an occluded right-sided PDA (Figure 1A and 1B). The lumen and size of the RPA could not be established as no contrast entered it. The right lung was otherwise well developed with normal pulmonary venous return. Cardiac catheterization with pulmonary venous wedge angiography confirmed the diagnosis of anomalous origin of the RPA from the innominate artery via an occluded right-sided ductus, as well as the presence of thrombus in the distal RPA (Figure 2A and 2B).

The next day, the patient was taken to the operating room to re-establish branch pulmonary artery continuity. The operation was performed through a median sternotomy without cardiopulmonary bypass. Upon opening the chest, the right lung was noted to be clearly paler than the left lung. A portion of the pericardium was harvested and formed into a 6 mm diameter tube using 7-0 Prolene suture. The patient was then systemically heparinized with 150 units/kilogram. In addition, PGE infusion was maintained and inhaled nitric oxide was started at 20 parts per million to avoid right ventricular failure during repair. Once snares were placed around the right-sided PDA, as well as the right upper and lower pulmonary artery branches, an incision was made in the right lower lobe branch. A Fogarty catheter was passed to remove all intraluminal clots within the RPA. The pericardial tube was then connected to the right pulmonary artery in an end-to-side fashion. The tube was clamped and the right sided snares were released, allowing continuous blood flow to the right lung via the right PDA. The pericardial roll was placed behind the aorta, trimmed to the appropriate length, and sewn in an end-to-side fashion to the main pulmonary artery after placement of a side biting clamp. Both right and left ducti were then ligated, which did not significantly change systemic or pulmonary blood flow. The chest was closed and the patient was transferred to the Intensive Care Unit in stable condition. Her post-operative course was

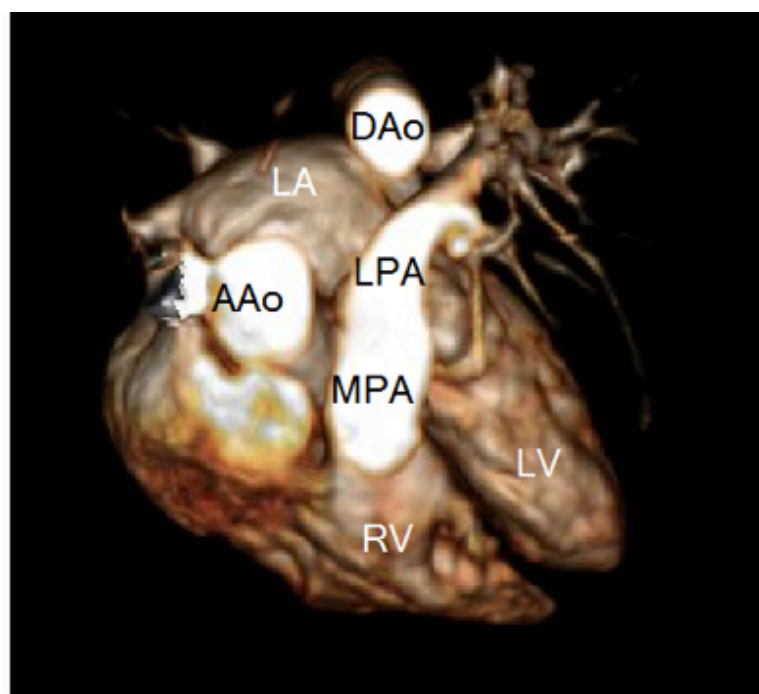
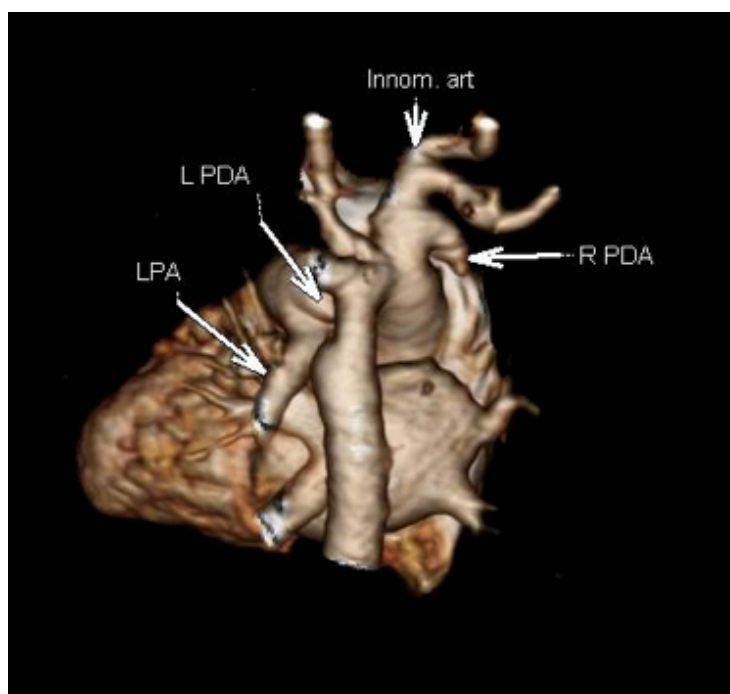
uneventful and she was discharged six days after the operation on daily furosemide and prophylactic aspirin.

Post-operative echocardiography showed persistent patency of the pericardial tube; however, she was lost to follow-up for several months. When she returned for care at 6 months, an echocardiogram revealed the interval development of some RPA stenosis. Cardiac catheterization revealed narrowing of the reconstructed RPA with the minimal diameter of 3-4 mm (Figure 3A). Initial RPA angioplasty with a 7 mm balloon resulted in a residual waist in the RPA. An 8 mm diameter, 18 mm length Valeo stent was placed. Initial dilation to 14 atmospheres of pressure resulted in residual stenosis. Subsequent dilatation with an 18 mm Conquest balloon taken to 23 mm atmospheres of pressure showed complete resolution of the waist, with angiographic equivalency of RPA and LPA flow. Prior to stent placement, right ventricular pressure was 27/5 mmHg and RPA pressure was 17/11 mmHg. Following angioplasty and stent placement, right ventricular pressure was 27/8 mmHg and RPA pressure was 20/8 mmHg. Repeat cardiac catheterization done 15 months postoperatively showed a widely patent RPA with a right ventricular pressure of 22/7 mmHg. She is doing well without clinical or echocardiographic evidence of recurrent RPA stenosis. She is off aspirin.

Discussion

The natural history of UAPA typically involves a progression of recurrent respiratory infections, hemoptysis due to congestion of collateral arterial circulation, and pulmonary hypertension. Signs and symptoms in infancy may include: murmur, failure to thrive, cyanosis, heart failure, and less commonly, respiratory distress or signs of pulmonary hypertension. As patients may remain asymptomatic or have vague symptoms, the diagnosis of UAPA can be difficult to make in infancy, which contributes to the later age at presentation with resultant difficulties in repair and effects on symptoms and outcomes.^{5,6}

Anatomic repair can be delayed by using a temporary modified Blalock-Taussig shunt to re-establish pulmonary perfusion.⁷

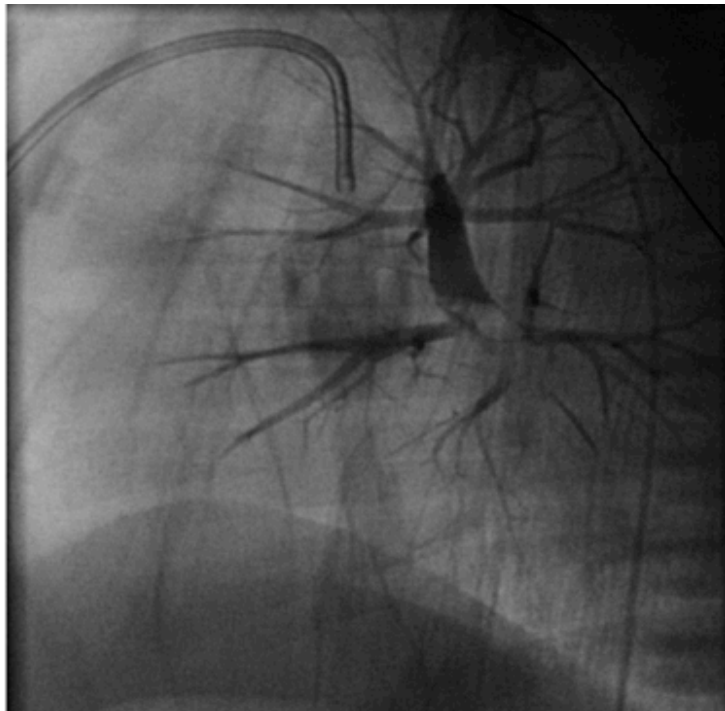
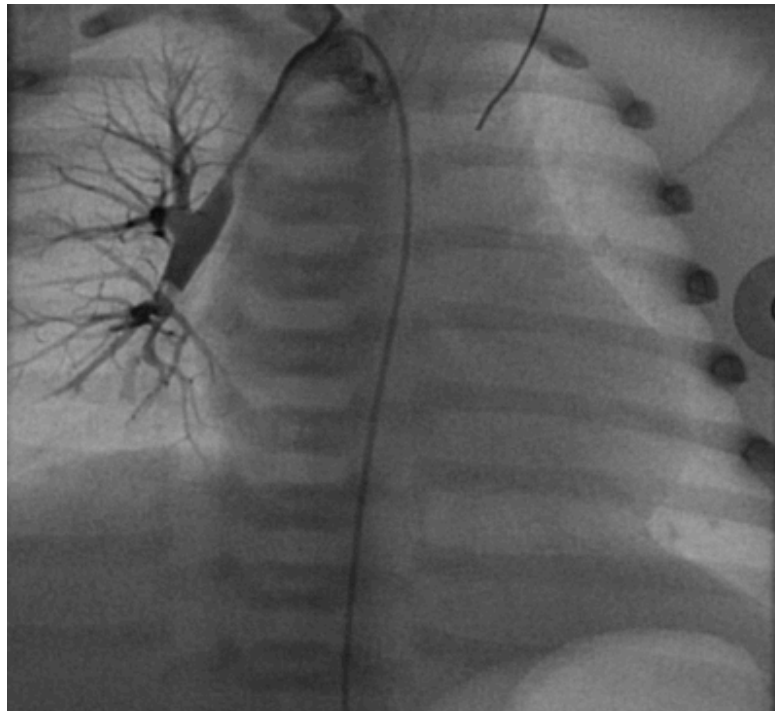


Figures 1. Computed tomography angiogram illustrating complete absence of proximal RPA and presence of occluded right ductus arteriosus (R PDA). Left pulmonary artery (LPA), MPA (main pulmonary artery), AAo (ascending aorta), LA (left atrium), RV (right ventricle), LV (left ventricle).

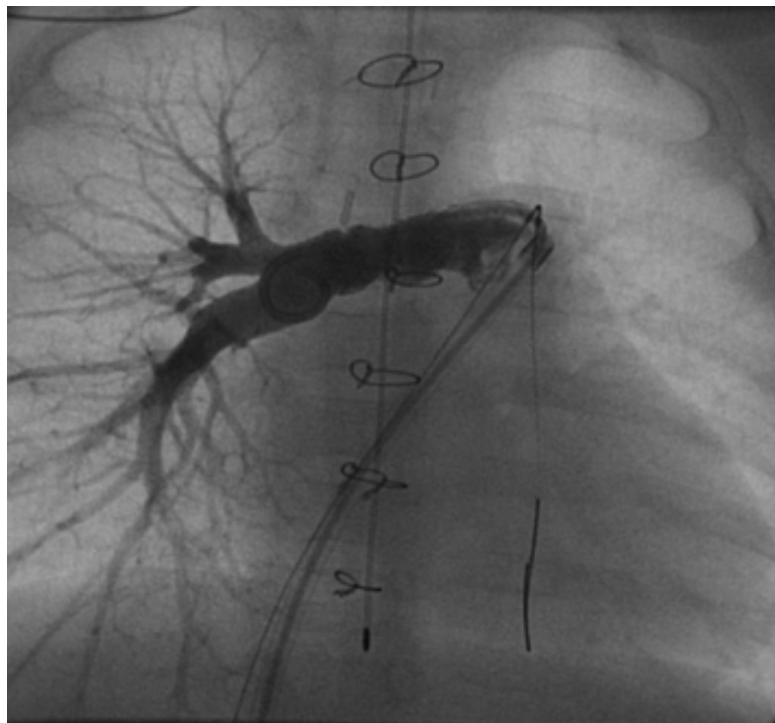
Previous case reports describe surgical palliation of UAPA utilizing artificial conduits such as polytetrafluoroethylene (PTFE) initially or repair with native tissue, such as a main pulmonary artery flap or pericardium to augment the anterior wall.^{2,3} The present case differs in that we describe a single-stage surgical approach for repairing UAPA utilizing only an autologous pericardial tube.

An artificial graft in our patient would have been unable to grow with the patient, a critically important issue in the pediatric population. In a previous study, the diameters of PTFE grafts used in infant UAPA

repairs measured 5 mm-8 mm, whereas the diameter of an adult right or left pulmonary artery is at least 15 mm.³ Using a graft that does not enlarge over time requires a child to undergo subsequent staged operations to ensure they have a normally-sized PA and attendant adequate blood flow to the affected lung. An autologous pericardial tube, however, has the demonstrated potential to grow with the patient.⁸ In addition, although anatomic placement of the pericardial roll behind the aorta may result in external compression, pericardial rolls have demonstrated enough compliance to withstand transcatheter ballooning and stenting as needed.⁸



Figures 2. Cardiac catheterization with anterior (Figure 2A) and lateral (Figure 2B) views illustrating right ductus arteriosus off innominate artery giving rise to RPA with thrombus present in right lower pulmonary artery. Figure 2A has right PDA opened with #3 French pigtail catheter.



Figures 3. Cardiac catheterization at nearly 7 months of life showing anterior views before (Figure 3A) and after (Figure 3B) stent placement. Figure 2A demonstrates 3-4 mm narrowing of the RPA prior to stent placement.



Medtronic

Technologies to Manage
Congenital Heart Disease

Every Step of the Way

**Melody® Transcatheter Pulmonary Valve
Ensemble® Transcatheter Valve Delivery System**

Indications: The Melody TPV is indicated for use in a dysfunctional Right Ventricular outflow Tract (RVOT) conduit (≥ 16 mm in diameter when originally implanted) that is either regurgitant (\geq moderate) or stenotic (mean RVOT gradient ≥ 35 mm Hg)

Contraindications: None known.

Warnings/Precautions/Side Effects:

- DO NOT implant in the aortic or mitral position.
- 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.
- 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: 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, and pain at the catheterization site.

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

For additional information, please refer to the Instructions for Use provided with the product or call Medtronic at 1-800-328-2518 and/or consult Medtronic's website at www.medtronic.com.

Humanitarian Device. Authorized by Federal law (USA) for use in patients with a regurgitant or stenotic Right Ventricular Outflow Tract (RVOT) conduit (≥ 16 mm in diameter when originally implanted). The effectiveness of this system for this use has not been demonstrated.

Melody and Ensemble are trademarks of Medtronic, Inc.
UC201303735 EN © Medtronic, Inc. 2013;
All rights reserved.

The Melody® TPV offers children and adults a revolutionary option for managing valve conduit failure without open heart surgery.

Just one more way Medtronic is committed to providing innovative therapies for the lifetime management of patients with congenital heart disease.

Innovating for life.

“As patients may remain asymptomatic or have vague symptoms, the diagnosis of UAPA can be difficult to make in infancy, which contributes to the later age at presentation with resultant difficulties in repair and effects on symptoms and outcomes.^{5,6}”

Our patient presented with cyanosis and imaging evidence of an UAPA associated with acute distal RPA thrombus, and concerns for the subsequent development of an isolated right lung and pulmonary hypertension. Revascularization was achieved with thrombectomy and placement of a native pericardial tube to reconnect the main pulmonary artery and RPA. The Valeo stent placed is capable of dilatation to 18 mm, minimizing the need for future staged surgical intervention as our patient grows.

References

1. Derk Jan Ten Harkel A, Blom NA, Ottenkamp J. Isolated Unilateral Absence of a Pulmonary Artery: A Case Report and Review of the Literature. *Chest*. 2002;122:1471-1477.
2. Ishii Y, Miyamoto T, Kobayashi T, Kobayashi T. Isolated unilateral agenesis of the pulmonary artery: surgical repair with an artificial graft. *Pediatr Cardiol* 2011;32:509-511.
3. Kim GB, Ban JE, Bae EJ, et al. Rehabilitation of pulmonary artery in congenital unilateral absence of intrapericardial pulmonary artery. *J Thoracic Cardiovasc Surg* 2011;141:171-178.
4. Turner DR, Vincent JA, Epstein ML. Isolated right pulmonary artery discontinuity. *Images Paediatr Cardiol* 2000;2(3): 24-30.
5. Perez-Pampin E, Campos-Franco J, Martinez-de Alegria A, et al. Isolated

unilateral artery agenesis. *Intern Med*. 2012;51(2):233. Epub 2012 Jan 15.

6. Simsek PO, Ozcelik U, Celiker A, et al. A case of congenital agenesis of the right pulmonary artery presenting with hemoptysis and mimicking pulmonary hemosiderosis. *Eur J Pediatr*. 2009;168:217-220.
7. Hiramatsu T, Komori S, Okamura Y, et al. Surgical correction of isolated unilateral absence of right pulmonary artery. *Heart Vessels* 2010;25:353-355.
8. Moreno-Cabral RJ, McNamara JJ, Reddy VJ, et al. Unilateral absent pulmonary artery: Surgical repair with a new technique. *Journal of Cardiovascular Surgery* 1991;102(3): 463-465.

CCT

Mark Cartoski, MD, AAP
Chief Resident
Associate Instructor
Eastern Virginia Medical School
Children's Hospital of the King's Daughters
Department of Pediatrics
601 Children's Lane
Norfolk, VA 23507 USA
P: (757) 668-9759; F: (757) 668-9625
Mark.cartoski@chkd.org

Jessica M. Parson BS
Eastern Virginia Medical School
Norfolk, VA 23501 USA

Alexander Ellis, MD
Eastern Virginia Medical School
Children's Hospital of the King's Daughters
Department of Pediatrics
Department of Cardiology
Norfolk, VA 23507 USA

Elliot Tucker, MD
Eastern Virginia Medical School
Children's Hospital of the King's Daughters
Department of Pediatrics
Norfolk, VA 23507 USA

Felix W. Tsai, MD
Department of Cardiac Surgery
Children's Hospital of the King's Daughters
601 Children's Lane
Norfolk, VA 23507 USA



PICS-AICS

Pediatric and Adult Interventional Cardiac Symposium

SAVE THE DATE
JUNE 7-10, 2014
Marriott Chicago
DOWNTOWN
CHICAGO

WWW.PICSYMPOSIUM.COM

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



RUSH UNIVERSITY
MEDICAL CENTER

Sponsored for CME credit by Rush University Medical Center



Children's
Healthcare of Atlanta

20th Annual Pediatric Echocardiography Conference: Screening, Diagnosing, and Following the Patient with Congenital Heart Disease

March 21- 22, 2014

Atlanta Marriott Buckhead Hotel & Conference Center, Atlanta, GA

For more information: www.choa.org/cmeevents



ASE American Society of
Echocardiography

An Unusual Case of Totally Anomalous Pulmonary Venous Connection

By Shazia Bhombal MD and Grace C. Kung, MD

Introduction

Totally Anomalous Pulmonary Venous Connection (TAPVC) is defined as failure of the development of the common pulmonary vein and, as a result, drainage of the pulmonary veins into the systemic venous system. TAPVC is commonly classified by the location of the end point of drainage, i.e. supracardiac (Type I, most common), cardiac (Type II), infracardiac (Type III), or mixed (Type IV).¹ Thoroughly defining the course of each anomalous vein along with a confluence, if present, is important to determine surgical approach and to ensure normal physiology. We present an interesting case of TAPVC with pulmonary veins that entered a large confluence which drained via a vertical vein below the diaphragm, then ascended superiorly back into the chest and inserted into the innominate vein. Although the initial vein descended below the diaphragm, the ultimate site of drainage was to the innominate vein, thus classifying it as a Type I.

To our knowledge, this has not been previously described.

Case Report

The patient is a full-term female neonate with a prenatal diagnosis of a single ventricle and pulmonary stenosis. Initial oxygen saturations were 20% on 100% oxygen. An echocardiogram was concerning for obstructed infracardiac TAPVC, and she was transferred to a higher care facility for further

“We present an interesting case of TAPVC with pulmonary veins that entered a large confluence which drained via a vertical vein below the diaphragm, then ascended superiorly back into the chest and inserted into the innominate vein.”

evaluation and management. Echocardiogram on admission to our institution demonstrated an unbalanced atrioventricular canal with hypoplastic left ventricle and dilated right ventricle, mild common atrioventricular valve insufficiency, common atrium, double outlet right ventricle with L-transposition of the great arteries, mild subpulmonary narrowing, and four pulmonary veins that drained into a vertical confluence. This constellation of findings was consistent with those associated with Heterotaxy Syndrome. The vertical confluence coursed below the diaphragm into the liver (Figure 1), then made a hairpin turn and drained upwards into the innominate vein. (Figure 2). The patient was taken to the operating room shortly after arrival to our institution and underwent repair of TAPVC, placement of 3.5 modified Blalock-Taussig shunt, and ligation of main pulmonary artery.

Obstruction of the pulmonary veins were not definitively seen by transthoracic echocardiogram, nor by transesophageal echocardiogram in the operating room, however, initial sats were as low as 20% on 100% FiO₂ and CXR on arrival to our hospital demonstrated bilateral diffuse edema, clinically consistent with obstruction. Abdominal ultrasound demonstrated a transverse liver and asplenia, consistent with heterotaxy syndrome. The infant underwent Ladd's procedure for malrotation during the initial hospitalization and was discharged home tolerating full enteral feeds. She underwent dilations of her pulmonary vein anastomotic site in the catheterization lab twice due to obstruction. She has had her bidirectional Glenn palliation and has been doing well.

Discussion

The incidence of TAPVC has been reported at 0.008% of live births, with an incidence of approximately 2.2% of patients with congenital heart disease.² It is more frequent in heterotaxy patients, occurring in 65-90% of patients.³ Type I (supracardiac, 45%) involves drainage to the systemic venous system by a left-sided vertical vein (an embryological remnant of the left cardinal system) most commonly to the innominate vein or directly to the right superior vena cava (RSVC). Type II (cardiac, 26%), drains directly into the heart usually via the coronary sinus (CS) or directly to the right atrium. Type III (infracardiac, 24%) involves drainage via a descending vein coursing below the diaphragm and joining the inferior vena cava, hepatic veins or, most commonly, the portal system. Type III is usually

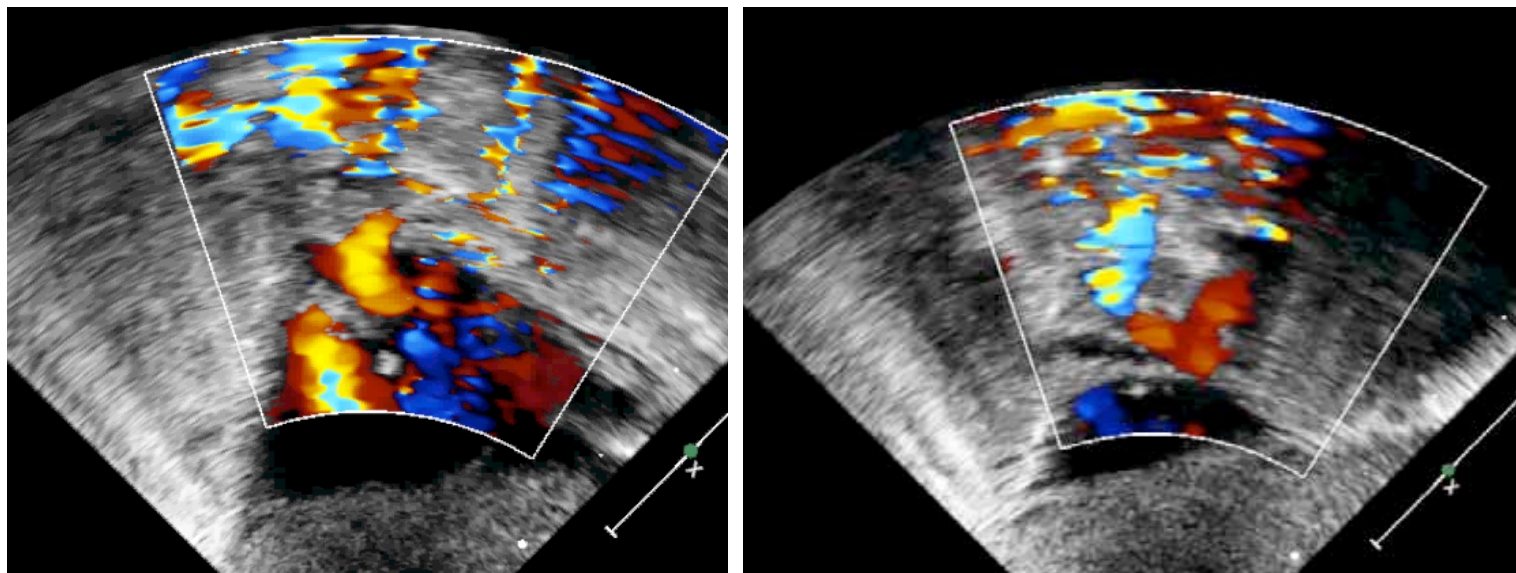


Figure 1. Two-dimensional transthoracic echocardiographic image with color Doppler from a subcostal coronal view A Christmas tree appearance to the confluence, with upper veins (UV) and B lower veins (LV) entering at different levels.

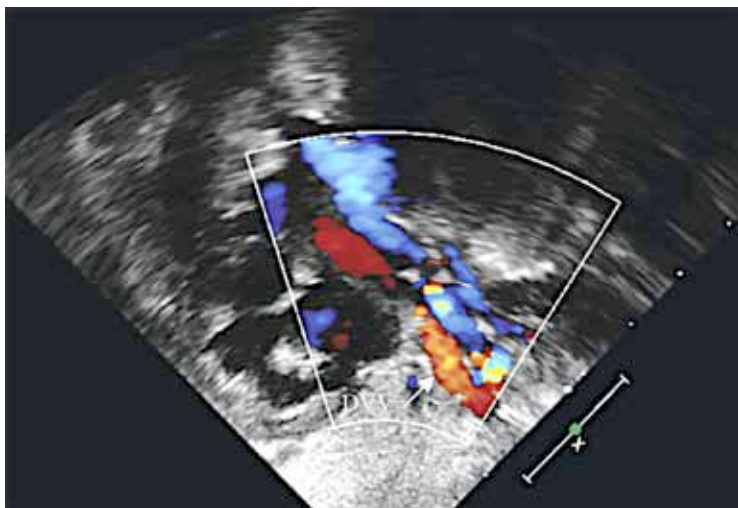


Figure 2. Two-dimensional transthoracic echocardiographic image with color Doppler from a modified sagittal subcostal view showing red flow towards the transducer in the descending vertical vein (DVB) which then makes a hairpin turn below the diaphragm and ascends back into the thorax.

associated with obstruction of the pulmonary venous return, potentially at the level of the diaphragm or the liver capillary bed. Type IV (mixed, 5%) involves multiple sites of drainage.^{4,5} To our knowledge, TAPVC with features of Type I and Type III has not previously been described, and its embryologic nature is unclear. One can hypothesize this curious course occurred potentially due to the persistence of the left cardinal and umbilicovitelline system, however this is only speculative.

As stated above, heterotaxy patients have a high incidence of TAPVC, most commonly supracardiac. In a review of 72 postmortem cases, Rubino et al described the plethora of variations of TAPVC in the heterotaxy patients.⁶ In their series, 58% of patients with heterotaxy had TAPVC, with the largest group of patients having extracardiac connections (42/72), most commonly supracardiac (30/72). Obstruction was found in 55% of cases of TAPVC. The presence of potential obstructed or obstructed TAPVC in heterotaxy patients may require early surgical intervention.⁷ Careful examination of pulmonary veins and courses is prudent in patients with heterotaxy.

Our case is unusual in that it appears to have started as a form of infracardiac TAPVC, but then had an altered and reversed course, ascending above the diaphragm to eventually drain into the innominate vein. Its initial course is that of a Type III, but in actuality, it is a Type I. However, given its circuitous course crossing the diaphragm twice, the chance of obstruction is potentially higher than the usual Type I. While no definitive evidence of obstruction was seen by echocardiography, the patient presented clinically with obstructed veins with findings including respiratory distress and edema on CXR. In this patient, two-dimensional echocardiography with color flow Doppler clearly delineated the course of the wandering vertical vein. Other studies have demonstrated the accuracy of echocardiography with color flow Doppler in establishing a diagnosis of total anomalous pulmonary venous connection.⁸

This case demonstrates the importance of tracing the entire course of the vein and not simply its origin or end-destination.

References

1. Darling RC, Rothney WB, Craig JM. Total pulmonary venous drainage into the right side of the heart; report of 17 autopsied cases not associated with other major cardiovascular anomalies. *Lab Invest.* 1957 Jan-Feb;6(1):44-64.
2. Ferencz C, Rubin JD, McCarter RJ, Brenner JJ, Neill CA, Perry LW, et al. Congenital heart disease: prevalence at livebirth. The Baltimore-Washington Infant Study. *Am J Epidemiol.* 1985 Jan; 121(1):31-6.
3. Thompson LD, McElhinney DB, Reddy VM, Jue KL, and Hanley FL. Infradiaphragmatic totally anomalous pulmonary venous return with two separate descending veins in association with right atrial isomerism. *Ann Thorac Surg* 2000; 70: 1400-1402.
4. Delisle G, Ando M, Calder AL, Zuberbuhler JR, Rothenmacher S, Alday LE et al. Total anomalous pulmonary venous connection: Report of 93 autopsied cases with emphasis on diagnostic and surgical considerations. *Am Heart J.* 1976 Jan;91(1):99-122.
5. Walsh MJ, Ungerleider RM, Aiello VD, Spicer D, and Giroud JM. Anomalous pulmonary venous connections and related anomalies: nomenclature, embryology, andatomy, and morphology. *World J Pediatr Congenit Heart Surg.* 2013; 4(1): 3043.
6. Rubino M, Van Praagh S, Kadoba K, Pessotto R, and Van Praagh R. Systemic and pulmonary venous connections in visceral heterotaxy with asplenia: diagnostic and surgical considerations based on seventy-two autopsied cases. *J Thorac Cardiovasc Surg* 1995; 110: 641-650.
7. Heinemann MK, Hanley FL, Van Praagh S, Fenton KN, Jonas RA, Mayer JE, and Castaneda AR. Total anomalous pulmonary venous drainage in newborns with visceral heterotaxy. *Ann Thorac Surg* 1994; 57: 88-91.
8. Kung GC, Gao H, Wong PC, Sklansky MS, Uzunyan MY, Wood JC. Total anomalous pulmonary venous return involving drainage above, below, and to the heart: a mixed bag. *J Am Soc Echocardiogr* 2004; 17(10): 1084-5.

CCT

Special thanks to Dr. Robert Anderson for reviewing this case and providing insights.

Corresponding Author

Shazia Bhombal, MD
Divisions of Cardiology and Neonatology
Children's Hospital Los Angeles
4650 Sunset Blvd, MS #34
Los Angeles, CA 90027 USA
Phone: 323-361- 5932; Fax: 323-361-7927
SBhombal@chla.usc.edu

Grace C. Kung, MD
Division of Cardiology
Children's Hospital Los Angeles and Department of Pediatrics
Keck School of Medicine
University of Southern California Los Angeles
Los Angeles, CA USA



Archiving Working Group
International Society for Nomenclature of
Paediatric and Congenital Heart Disease
ipccc-awg.net

TRANSFORMING QUALITY OF LIFE AND LONG-TERM OUTCOMES FOR CHILDREN WITH COMPLEX, CONGENITAL HEART DISEASE.

To learn more about The Ward Family Heart Center and our transformative cardiovascular research and treatment, visit childrensmercy.org/transform



The Ward Family Heart Center at Children's Mercy consistently outperforms survival outcomes of 111 North American children's hospitals contributing to the Society of Thoracic Surgeons Congenital Heart database. Now, the heartland's premier pediatric heart team has established a Neurodevelopmental Clinic to move beyond survival to improving quality of life and neurodevelopmental outcomes for children with complex congenital heart disease. Utilizing our patented HeartCenter software, innovative research, and advanced medical and surgical care, we are not only transforming lives, but changing the standard for how pediatric cardiac outcomes are measured.

Surgical Mortality Percentage Categorized by Complexity of Procedure				
RACHS-1* Category	CM** 1 Year Average	STS*** 1 Year Average	CM 4 Year Average	STS 4 Year Average
1 (least complex)	0.0	0.5	0.0	0.7
2	0.0	1.1	1.1	1.1
3	2.9	3.3	3.7	3.7
4	5.1	7.1	8.2	7.1
5 & 6 (most complex)	15.4	14.3	20.8	16.4

*Risk Adjustment for Congenital Heart Surgery classification

**Children's Mercy

***Society of Thoracic Surgeons



Wrap-Up LAA Frankfurt 2013

By Sameer Gafoor, MD

The CSI-LAA 2013 - "How to Close the LAA Appendage" took place November 22-23, 2013 at the Marriott Hotel in Frankfurt, Germany. This amazing conference is unique for its ability to deal with both the theory and practice of LAA closure, all while complementing the conference with numerous live cases. This was done with the help and assistance of world leaders in the field. Over 250 attendees from 31 different countries participated this year in LAA Frankfurt 2013, contributing to the success of the meeting by taking part in the vivid discussions.

The conference began with "Transseptal Puncture," taught by Matthew Price, Randall Lee, and Carsten Israel. This was followed by the crucial imaging component - answering both the questions: "Which imaging to use (TEE, angiography, ICE, dynaCT, MRI, or CT) and When?" This topic was presented with excellent pictures from Dr. Jai-Wun Park, Olaf Franzen, and Sergio Berti.

After this came device-specific sessions for: WATCHMAN; Amplatzer Cardiac Plug; Coherex; and the Lariat system. Each session followed a similar format:

- Why was this device designed the way it is?
- How it compares to other devices
- How to select patients for this device with step-by-step, and case examples.

Then the conference circled back to the basic question, "When and why do we close the LAA?" Jennifer Franke discussed the balance of stroke and bleeding risk, followed by Martin Bergmann with antithrombotic strategies. New arenas included: Stefan Bertog's talk about LAA closure in valvular afib and Randall Lee's talk about LAA closure before and after Atrial fibrillation ablation. To round out the session came the debate between Drs. Jai-Wun Park and Dr. Tom de Potter, on "Whether LAA closure is indicated only if anticoagulants are contraindicated, or in all patients."

The first day led us into the second day of talks, which started with "Building a Program." This covered building a referral network (Dr. Richard Folkeringa), picking a device for an LAA, and the new topic of residual leaks closure (Dr. Simon Lam).

This was followed by evidence for LAA closure by device (Dr. Krzysztof Bartus for Lariat; Dr. Matthew Price for WATCHMAN; Dr. Apostolos

Tzikas for ACP/Amulet; Dr. Dhjanunjaya Lakkireddy for Lariat; and Dr. Vivek Reddy for Coherex Wavecrest). We learned both randomized and registry data for each device, allowing the consolidation of data to determine risk of stroke, bleeding, thrombus, and residual leak.

As one knows, the technology is ever changing and growing. Next the conference members discussed design considerations and experiences with the Amplatzer Amulet device (Dr. Apostolos Tzikas); Lifetech LAA Closure device (Dr. YY Lam); the Atricure device (Dr. Mokrack); and other LAA closure devices in early stages (Dr. Simon Lam).

As is usual for the CSI conferences, the last session was on challenging cases, discussed by Drs. Brendan Gunalingam, Kevin Walsh, and Neil Wilson.

In addition, eight live cases of LAA closure were shown, including the techniques and tips using a step-by-step approach. TEE and ICE were both used for these cases, showing the advantages and challenges of each approach. Cases were performed using a variety of devices, including: WATCHMAN, ACP, Coherex, and Lifetech. Materialise 3D models were also used prior to the certain selected cases, helping to determine procedural challenges and also best fit for device selection.

This amazing conference happens yearly in Frankfurt. Due to the popular demand, we are replicating this conference with one specifically devoted to the physicians in Asia-Pacific. Our conference entitled, LAA Asia Pacific (www.csi-laa-asia-pacific.org) will take place April 18-19, 2014 in Shanghai, China. We look forward to more exciting developments and discussion and invite you to be part of this conference as we discuss and grow in this exciting field.

CCT

Sameer Gafoor, MD
Advanced Cerebrovascular, Structural
Heart, and Peripheral Vascular
Interventions Fellow
Cardiovascular Center Frankfurt
Frankfurt Germany

s.gafoor@cvcfrankfurt.com



Volunteer / Get Involved
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.

JOIN US FOR THE 2014 ANNUAL
INTERNATIONAL SYMPOSIUM FOR
ADULT CONGENITAL HEART DISEASE.

Why?

BECAUSE YOUR PATIENTS
TURN TO YOU AS THE
**EXPERT IN CONGENITAL
HEART DISEASE.**

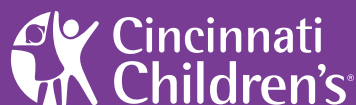
EARLY REGISTRATION ENDS SOON!

JUNE 10-13, 2014

CINCINNATI, OHIO

**SPACE IS LIMITED,
PLEASE REGISTER TODAY
BY VISITING**

cincinnatichildrens.org/achdprogram



Heart Institute

Discover the latest in adult congenital heart disease (ACHD) care and treatment during "Congenital Heart Disease in the Adult: An International Symposium." Continuing medical education credits will be awarded.

Pediatric and adult cardiovascular specialists and nurse practitioners worldwide are invited to learn about:

- Perioperative & critical care management
- Cardiac catheterization, including congenital & other structural interventions
- Exercise physiology, pathology & rehabilitation
- Electrophysiology: consensus guidelines for clinical management
- Pregnancy & heart disease
- Transitional medicine in congenital heart disease: concepts and practices

Presented by the Adolescent and Adult Congenital Heart Disease Program, part of the Heart Institute at Cincinnati Children's Hospital Medical Center.

Cincinnati Children's Hospital Medical Center is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians. This activity has been approved for AMA PRA Category 1 Credit™.

Contact hours will be awarded to nurses who attend the entire program and complete an evaluation tool. Cincinnati Children's Hospital (OH-046, 9/1/2015) is an approved provider of continuing nursing education by the Ohio Nurses Association (OBN-001-91), an accredited approver by the American Nurses Credentialing Center's Commission on Accreditation.

Medical News, Products & Information

Dr. Ziyad M. Hijazi Appointed Clinical Chief for Pediatrics at Sidra Medical and Research Center, and Chair of Pediatrics at Weill Cornell Medical College in Qatar



Sidra Medical and Research Center. Doha, Qatar announced in November 2013 that Dr. Ziyad M. Hijazi has been appointed Clinical Chief for Pediatrics. In this role, the pioneering and highly experienced clinician will drive the strategic direction of the Department of Pediatrics and integrate research and education priorities into a program of excellent clinical service delivery. He will also hold the position of Chair of Pediatrics at Weill Cornell Medical College – Qatar, Sidra's partner for medical education.

"Sidra will be a beacon of excellence for pediatric care in Qatar and the Middle East so this is a key appointment for us," said Sidra's Chief Medical Officer, Dr. Edward S. Ogata. "Dr. Hijazi's wide-ranging clinical and academic expertise in both pediatrics and cardiology, and his passion for research of the highest quality – evident from his exceptional record of publications – perfectly complement our vision for Sidra. I am particularly pleased that he will be here when Sidra hosts the *Excellence in Pediatrics Conference* in December 2013, the first time that this major conference has ever been held here in the Middle East."

Dr. Hijazi graduated from the University of Jordan School of Medicine before attending Yale University School of Medicine where he completed a Master of Public Health degree, a residency in Pediatrics and a fellowship in Pediatric Cardiology. He spent eight years on the faculty at Tufts University School of Medicine and another eight years at the University of Chicago. In 2007 he was appointed Professor, Pediatrics and Internal Medicine, Director, Rush Center for Congenital and Structural Heart Disease, and Section Chief, Pediatric Cardiology at Rush University Medical Center.

Dr. Hijazi specializes in treating congenital and structural heart disease in both children and adults. He is a pioneer in the non-surgical repair of congenital and structural heart defects and a Past President of the Society for Cardiovascular Angiography and Interventions (SCAI).

"It's an honor to join Sidra and its prestigious leadership team. It's also a personal pleasure for me to come back to the region where my love for medicine began. I hope to bring back what I have learned and contribute a small part to improving the lives of women and children in Qatar and the region. I'm optimistic that my work with transcatheter septal defect closure in children, which will be the focus of my presentation at the Excellence in Paediatrics Conference, is helping find alternatives to the



Primary Children's Hospital is Recruiting BE/BC Pediatric Cardiologists

The Division of Pediatric Cardiology at the University of Utah School of Medicine and based at Primary Children's Hospital is recruiting BE/BC pediatric cardiologists with a major interests and expertise in:

- 1) **Noninvasive Imaging,**
- 2) **Heart Transplant/Heart Failure and**
- 3) **Adult Congenital Heart Disease.**

The Pediatric Cardiologists will join a 26-member division (including 9 involved with noninvasive imaging) with an active, growing clinical service which includes providing noninvasive imaging through echocardiography (transthoracic, transesophageal, fetal, and 3D), cardiac MRI, and CT angiography. There will be protected time and mentoring available within the Division for clinical research. The Division has a very active clinical research program and is one of the core participating centers in the Pediatric Heart Network funded by the NIH.

The successful candidates will receive a faculty appointment in the Department of Pediatrics on the Clinical or Tenure track at the academic level commensurate with experience and qualifications. The University of Utah and Department of Pediatrics offer an excellent benefits package that includes 20.2% retirement contributions that vest immediately and excellent health care choices. The Department offers an education loan repayment program, departmental research core with mentoring, as well as education and leadership opportunities. The area offers an excellent quality of life with immense cultural and recreational opportunities.

To read more about each opportunity and to apply, please go to:

Noninvasive Imaging Position -

<http://utah.peopleadmin.com/postings/27961>

Heart Transplant/Heart Failure Position -

<http://utah.peopleadmin.com/postings/25450>

Adult Congenital Heart Disease Position -

<http://utah.peopleadmin.com/postings/25454>

For additional information, please contact:

Lloyd Y. Tani, MD (Division Chief)

lloyd.tani@imail.org

The University of Utah is an Equal Opportunity/Affirmative Action employer and educator. Minorities, women, and persons with disabilities are strongly encouraged to apply. Veteran's preference. Reasonable accommodations provided. Additional information is available at: <http://www.regulations.utah.edu/humanResources/5-106.html>.



BASIC AND ADVANCED FETAL CARDIOLOGY SYMPOSIUM WORKSHOP 2014

1ST ANNUAL MEETING

SAVE THE DATE JUNE 5-6, 2014; CHICAGO IL USA

<http://fetalcardiacsymposium.com>



The Ward Family Heart Center at Children's Mercy Hospitals & Clinics in Kansas City in affiliation with the University of Missouri – Kansas City School of Medicine is recruiting a:

- **Medical Director, and**
- **Surgical Director for our Pediatric Heart Transplantation Program**

Candidates for both positions must be board-certified (in Pediatric Cardiology for the Medical Director, and in Thoracic Surgery for the Surgical Director) and have greater than 5 years of experience in the field.

Successful candidates will support the development and growth of the Heart Transplant Program in our high-volume, tertiary-quaternary center. They will have the opportunity to direct and expand the existing program in Pediatric Heart Failure in collaboration with an outstanding local clinical program for adult heart failure, assist devices, and transplantation. Both positions offer the opportunity to develop research programs in collaboration with established, funded programs such as clinical pharmacology, genomics, and tissue engineered heart valve research.

Surgical Director, Heart Transplantation and Mechanical Assist Devices

We seek a Surgeon who is experienced in pediatric cardiac transplantation and ventricular assist devices. Qualified candidates will meet the UNOS Heart Transplant Primary Surgeon training and volume requirements.

Medical Director, Heart Transplantation and Mechanical Assist Devices

We seek a Pediatric Cardiologist with experience in pre-, peri-, and post heart transplant, heart failure and ventricular assist device management.

The Ward Family Heart Center serves a population of over 5 million in the heart of the USA, through our main campus and outreach locations in and around Kansas City, extending to Western Missouri and throughout the state of Kansas. Our team includes 19 Board-Certified Pediatric Cardiologists (expanding to 24 this year), 2 Cardiovascular Surgeons, 17 Advance Practice Nurses and a Transplant Coordinator.

Annually we perform:

- over 400 major cardiac operations
- 400 hemodynamic / interventional catheterizations
- over 130 EP catheterizations
- 12,000 outpatient visits
- 14,000 echocardiograms
- 20,000 EKG's

Our preoperative and postoperative ICUs include a 70-bed NICU and a 41-bed PICU with a new 16-bed Cardiac Wing including a dedicated cardiac critical care team. The recently inaugurated Elizabeth Ferrell Fetal Health center provides our free-standing Children's Hospital the facility for in-house births of high-risk babies. Our ACGME-accredited, three-year Pediatric Cardiology Fellowship Program currently admits one fellow in pediatric cardiology per academic year (expanding to 2 fellows per year in 2015) and is a partner in the cardiothoracic surgical residency program at the University of Kansas Medical Center. Our ongoing integration with the University of Kansas Medical Center provides the impetus for comprehensive, seamless care and programmatic growth.

Qualified applicants are invited to apply.

Salary and academic range are commensurate with experience and qualifications. EOE/AAP

For additional information contact:

Girish Shirali, MD (gsshirali@cmh.edu)

Cardiology Division Director and

Co-Director of the Ward Family Heart Center

Send Curriculum Vitae to: physicianjobs@cmh.edu

invasive open heart surgery which is especially traumatic for pediatric patients and I look forward to bringing these techniques to Sidra," said Dr. Hijazi.

Hosted by Sidra, the *5th Annual Excellence in Pediatrics Conference* took place in Doha on December 4-7, 2013, at the Qatar National Convention Centre. The conference brought together international academics, scientists and clinicians to share cutting edge research and best practice with the aim of improving care for pediatric patients. It was expected to be one of the largest international pediatric conferences of the year and was attended by more than 3,000 healthcare professionals from 98 countries.

Sidra Medical and Research Center is a groundbreaking hospital, research and education institution, based in Doha, Qatar, that will focus on the health and wellbeing of women and children regionally and globally. Sidra will be a fully digital facility, incorporating the most advanced information technology applications in clinical, research and business functions. Sidra will initially have around 400 beds with infrastructure to enable expansion to 550 beds in a subsequent phase.

Sidra represents the vision of Her Highness Sheikha Moza bint Nasser, who serves as its Chairperson. The high-tech facility will not only provide world-class patient care but will also help to build Qatar's scientific expertise and resources. Sidra will be funded by a US\$7.9 billion endowment from Qatar Foundation, one of the largest endowments of its kind in the world.

Sidra is part of a dynamic research and education environment in Qatar that includes leading international institutions, including Sidra's academic partner Weill Cornell Medical College in Qatar. Through strong partnerships with leading institutions around the world, Sidra is creating an intellectual ecosystem to help advance scientific discovery through investment in medical research.

Sidra will have a unique working structure with inter-professional collaboration at the heart, providing the best holistic care for patients and an unparalleled learning environment for its medical professionals. Sidra will combine the best in design, technology, operations and practices from medical centers around the world to offer its employees an environment that is at once familiar and extraordinary.

BJC Healthcare Selects Digisonics Cardiovascular Information System for Pediatric Cath

BJC Healthcare (www.bjc.org) in St. Louis, MO, will implement the Digisonics Cardiovascular Information System (CVIS) for their pediatric cath studies. The Digisonics CVIS will provide the facility with a comprehensive clinical database, high-powered PACS and structured pediatric reporting in one complete system.

The Digisonics CVIS will provide BJC Healthcare with functionality designed specifically for the pediatric cardiology workflow including Mullins and Mayer congenital heart diagrams which can quickly be modified using graphical drawing tools and drop down labels. An added HemoLink interface between the Digisonics cardiovascular information system and the hospital's hemodynamics system will autopopulate the demographics, hemodynamic measurements, medications and other data. Hemodynamic measurements including



Heart Failure Transplant Cardiologist - Phoenix

Phoenix Children's Hospital is seeking a highly skilled Pediatric Faculty Cardiologist/Heart Failure Transplant Cardiologist to join our growing, highly developed heart program. Experienced candidates may qualify for Directorship of Heart Transplant/Advanced Heart Failure.

Position Responsibilities

- Treat pediatric and congenital patients in end-stage heart failure
- Provide and coordinate state-of-the-art care to pre- and post-transplant patients
- Manage outpatient subspecialty clinics in advanced heart failure, cardiomyopathy and heart transplant
- Work with a transplant team of 2 surgeons, 3 extenders, 3 cardiologists and staff support

Qualifications

- Formal training or experience in pediatric heart transplantation, advanced heart failure and ventricular assist device management
- Board Certified in Pediatric Cardiology
- 3-5 years experience in Heart Transplant / Advanced CHF
- Specific expertise or interest in antibody mediated rejection and mechanical support preferred
- Willingness to apply for academic position with the University of Arizona and Mayo Clinic

Our Heart Center

- 30 Cardiologists, 2 surgeons, 15 NPs, 2 PAs
- Outpatient Clinic within new hospital facilities includes 16 exam room, 6 echo suites and stress lab
- Integrated CV surgery, Critical Care and Cardiology services with office space within clinic area
- 24 bed Cardiac Intensive Care Unit staffed 24/7 by Heart Center Cardiac Intensivists and NPs

Our Hospital

- Nationally respected hospital with six Centers of Excellence and 70 subspecialties
- Newly constructed facilities (2011), 345 licensed beds with capabilities of 626 beds
- Level 1 Pediatric Trauma Center
- One of the most rapidly growing pediatric areas in the U.S.

Send your resume to:

Stephen Pophal, MD - spophal@phoenixchildrens.com or
John Nigro, MD - jnigro@phoenixchildrens.com

www.phoenixchildrens.com



EOE



Assistant or Associate Professor (In Residence, Adjunct, or Clinical)

THE UNIVERSITY OF CALIFORNIA, SAN DIEGO, DEPARTMENT OF PEDIATRICS (<http://www-pediatrics.ucsd.edu>) AND CHILDREN'S SPECIALISTS OF SAN DIEGO (<http://childrensspecialists.com>) are committed to academic excellent and diversity within the faculty, staff, and student body and are jointly recruiting a Medical Director of Cardiac Transplantation for the unified Division of Pediatric Cardiology at Rady Children's Hospital, San Diego. This 300-bed facility serves as a major regional tertiary care hospital for children and is the major teaching facility for the Department of Pediatrics of the UCSD School of Medicine.

The Director position is a unique opportunity to develop an exceptional Cardiac Transplantation Program in San Diego. The successful candidate must have training and experience in a UNOS certified pediatric cardiac transplant center and should possess the qualifications for academic appointment at the rank of Assistant or Associate Professor. The academic series will be determined based on the background and qualifications of the successful candidates. Candidates must be Board Certified in Pediatric Cardiology and licensed or licensable to practice medicine in the State of California. This appointment will require demonstrated administrative capabilities, excellent skills in clinical care and teaching, and research accomplishment. Preference will be given to candidates who demonstrate a commitment toward building an equitable and diverse scholarly environment.

The Division provides a full range of Pediatric Cardiology services. It currently has 13 pediatric cardiologists, three cardiothoracic surgeons, and an ACGME approved fellowship program. The Division supports a program with approximately 400 surgical procedures yearly. Extensive opportunities to perform clinical, epidemiologic or basic science research exist at UCSD and Children's Hospital, San Diego.

Salary commensurate with qualifications and based on University of California pay scales.

Review of applications will begin January 31, 2014 and continue until the position is filled.

Please apply via <https://apol-recruit.ucsd.edu/apply/JPF00487> to the following job opening:

Assistant or Associate Professor (In Residence, Adjunct, or Clinical) (10-695)

For consideration, you will be asked to submit:

- A curriculum vitae including a list of publications and professional activities,
- The names and email addresses of 3 references, and
- A separate personal statement summarizing past or potential contributions to diversity

(see <http://facultyequity.ucsd.edu/Faculty-Applicant-C2D-Info.asp> for further information).

UCSD is an Affirmative Action/Equal Opportunity Employer with a strong institutional commitment to excellence through diversity.

pressures and flow measurements will be autopopulated directly onto the congenital heart diagram for fast and easy review. The Digisonics cardiovascular information system will also be integrated directly with Cedaron for IMPACT Registry data submission.

HL7 interfaces between the hospital's EMR and the Digisonics cardiovascular information system will facilitate a fully electronic workflow. A DigiLink add-on to the HL7 Results Out interface provides their clinicians with access to PDFs of the finalized pediatric cath reports within their EMR. DICOM Modality Worklist will automate transfer of patient demographics to the facility's imaging modalities, creating a list of scheduled patient studies and significantly reducing manual data entry time. Legacy images will be migrated and forwarded to BJC Healthcare's vendor neutral archive. Access of archived images will be via Digisonics DICOM Query & Retrieve with Prefetch module.

For further information, www.digisonics.com.

CONGENITAL CARDIOLOGY TODAY

© 2014 by Congenital Cardiology Today (ISSN 1554-7787-print; ISSN 1554-0499-online). Published monthly. All rights reserved.

Mailing Address: PO Box 444, Manzanita, OR 97130 USA

Tel: +1.301.279.2005; Fax: +1.240.465.0692

Editorial and Subscription Offices: 16 Cove Rd, Ste. 200, Westerly, RI 02891 USA

www.CongenitalCardiologyToday.com

Publishing Management:

Tony Carlson, Founder, President & Sr. Editor -

TCarlsonmd@gmail.com; Richard Koulbanis, Group. Publisher & Editor-in-Chief - RichardK@CCT.bz;

John W. Moore, MD, MPH, Group Medical Editor -

JMoore@RCHSD.org

Caryl Cornell, Assistant Editor

Virginia Dematatis, Assistant Editor

Loraine Watts, Assistant Editor

Rob Hudgins, Special Projects Production

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

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.



Global Heart Network Foundation (GHN)

a global non-profit organization with a mission to connect people and organizations focused on the delivery of cardiovascular care across the Globe to increase access to care.

Contact: annabel@globalheartnetwork.net

www.globalheartnetwork.net



TINY HEARTS

inspired

HYBRID LABS WITH ACCESS FOR BIG TEAMS.

Fixing a heart from birth through adulthood takes big teams working together. So we examined the needs of leading clinicians when designing our hybrid solutions. The result: our Infinix™-i with 5-axis positioners and low profile detectors, stays out of the way, but right where needed, providing the best possible access to patients. To lead, you must first listen. medical.toshiba.com



youtube.com/toshibamedical



[@ToshibaMedical](https://twitter.com/ToshibaMedical)