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Spontaneous Intermittent Closure of Patent Ductus Arteriosus in a Three-Year-Old Child: Angiographic Documentation

By Manoj Kumar Rohit, MD; Pushpendra Kumar Garg, MD, DM; Nand Kumar, MD; and Anju Gupta, MD

Introduction

Delayed closure of patent ductus arteriosus (PDA) is well described in preterm infants and less commonly in term infants. Intermittent closure due to spasm and subsequent patency of PDA has been described in term neonates but is rare in older children. We described a three-year-old child with PDA

who developed transient complete closure noticed during catheterization which re-opened spontaneously after a few minutes.

Case Report

A three-year-old full-term born girl was presented to us with a history of recurrent respiratory tract infections since birth. On examination, she had a continuous murmur in the



Figure 1. Lateral view showed no flow across PDA.

“This case demonstrates that ductal spasm occur spontaneously and emphasizes the importance of prior good echocardiographic assessment of the PDA for proper sizing of the ductus.”



Pediatric Cardiology Positions

The Cardiology Division in the Department of Pediatrics at the University of Arkansas for Medical Sciences College of Medicine and The Heart Center at Arkansas Children's Hospital are seeking Board Eligible/Board Certified Pediatric Cardiologists focused in **imaging, cardiac intensive care, heart failure and transplant cardiology, and electrophysiology** to join our highly successful and busy program. Positions at both the assistant and associate professor level are available.

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The Arkansas Children's Heart Center serves a six state region. With over 300 open heart surgeries, The Heart Center boasts a 15 bed dedicated cardiac intensive care unit, a 16 bed telemetry unit, and two dedicated operating rooms. The surgical results achieved in the Heart Center are literally among the best in the world with greater than 98% overall hospital survival including a better than 98% hospital survival of Norwood stage 1 procedures. One hundred-seventy children and adults with congenital heart disease have undergone heart transplantation at the Heart Center and the center has an active cardiac assist device program. Imaging facilities include two pediatric cardiac catheterization laboratories, transthoracic, transesophageal, and 3D echocardiography, magnetic resonance imaging, and multi-slice computed tomography. Approximately 10,000 echocardiograms are read in our echocardiography laboratory, greater than 500 catheterizations are performed in our two dedicated pediatric catheterization laboratories, with 153 EP procedures performed annually by our electrophysiology service.

The Arkansas Children's Heart Center is located in the Arkansas Children's Hospital. The hospital has over 400 physician staff and approximately 10,000 admissions per year in its 290 inpatient beds. The Cardiology Division of UAMS Department of Pediatrics offer robust research opportunities through the Arkansas Children's Hospital Research Institute and the University of Arkansas for Medical Sciences. We also offer competitive salary and benefits through the University of Arkansas for Medical Sciences College of Medicine.

The UAMS Department of Pediatrics employs over 210 faculty members and over 80 residents. Arkansas Children's Hospital is among the largest children's hospitals in the United States and was listed one of two hospitals listed in Fortune Magazine as one of the top 100 places to work in the United State in 2008. Located in the foothills of the Ozark Mountains, Little Rock is an exceptionally family-oriented community combining Southern civility and friendliness, affordable housing, quality school options, a mild climate, excellent cultural and artistic venues, professional minor league sports, world class hunting, fishing and other outdoor recreational opportunities, plus extraordinary natural beauty. With a population in excess of 500,000, Greater Little Rock offers the most desirable features of large cities without sacrificing ease of access and convenience. For more information, please see our website: www.uams.edu/pediatrics.

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Table 1: Oximetry Data

Site	Oxygen saturation (PDA spasm) %	Oxygen saturation (PDA open) 0%
SVC	67.1	65.3
RA	68	65.6
RV	67.3	65.8
LPA	67.4	79.2
AORTA	95.0	96.0

SVC=superior vena cava, RA=right atrium, RV=right ventricle, LPA=left pulmonary artery

Table 2: Pressure Data

Site	Pressure (PDA spasm) mm Hg	Pressure (PDA open) mm Hg
LPA	16/3/9	50/25/30
RV	25	50/25/30
RA	4/3/4	4/3/4
LV	108	120
AORTA	110/69/88	120/45/88

SVC=superior vena cava, RA=right atrium, RV=right ventricle, LPA=left pulmonary artery

left second intercostals space. Echocardiography revealed a 5 mm PDA with left to right shunt. She was taken up for device closure of PDA. During cardiac catheterization, aortic angiogram showed ampulla of PDA which was completely closed with no flow in pulmonary arteries. (Figure 1, Tables 1 and 2). Pressure data and oximetry studies at this point revealed no shunt. On auscultation, the continuous murmur also disappeared. As PDA was documented on echocardiography before catheterization, repeat angiogram was done after 30 minutes, which showed a trickle flow of dye into the pulmonary artery through the PDA (Figure 2). An angiogram repeated at 45 minutes showed 5 mm PDA (Figure 3). Mean pulmonary artery pressure was 30 mmHg and mean aortic pressure was 88 mmHg. A step-up of 15% was noted from right ventricle to pulmonary artery (Tables 1

and 2). A 10×8 mm Amplatzer PDA occluder device was deployed successfully without any residual flow. Follow up echocardiograph showed complete closure of PDA (Figure 4).

Discussion

Several factors affecting the closure of PDA have been elucidated over the years. The partial pressure of oxygen (PO_2), acid base status and responsiveness of pre-capillary pulmonary arterioles regulate pulmonary vascular resistance and hence, the degree of shunting and closure of duct. Catecholamine, bradykinin and acetylcholine have been also shown to affect ductal constriction. Intermittent closure of the ductus due to neurohormonal factors has been described in the neonatal period and, in pre-term in-

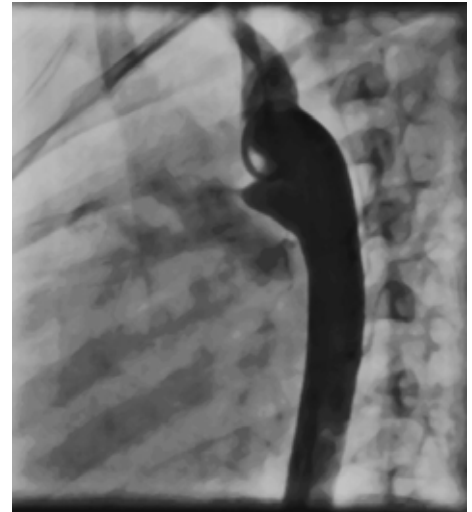


Figure 2. Lateral view showed trickling of flow across PDA with opacification of pulmonary arteries.



Figure 3. Lateral view showed crossing of wire from pulmonary artery to aorta through PDA.

fants with Respiratory Distress Syndrome, being managed on ventilator[1].

The concept of intermittent closure has however been questioned by some authors[2]. Angiographic and echocardiographic studies have shown and that once a ductus closes spontaneously

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Figure 4. PDA occluder device insitu.

it almost invariably stays closed. The "winking ductus," which opens and closes, is most unusual though it can occur rarely in the cases of extreme prematurity (less than 25 weeks or under 700 gms) following pharmacological ductal closure. Such a phenomenon in older children is exceeding rare, and described in a very few case reports in literature[3].

Partial spasm of the ductus has been reported in literature due to catheter manipulation or only after the coil used to occlude the duct. Partial ductal spasm has lead to under estimation of size of the PDA, and resulted in embolization of the device or coil on subsequent days[4-5].

However, unlike previous reports of partial closure, our patient had total closure of the duct demonstrated angiographically by oximetry and by hemodynamic studies. We cannot rule out the accidental unnoticed touching of catheter with ampulla of PDA.

This case demonstrates that ductal spasm may occur spontaneously and emphasizes the importance of prior good echocardiographic assessment of the PDA for proper sizing of the ductus. Ductal spasm should be carefully excluded when angiographic size and echocardiographic measurement do not correlate.

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Highlights from the 17th Utah Conference on Congenital Cardiovascular Disease, February 24-27, 2008

By Collin Cowley, MD

The 17th Utah Conference on Congenital Cardiovascular Disease took place in the mountains of Snowbird, Utah from February 24th -27th, 2008. This year's meeting celebrated the collaborative efforts of a world-class faculty in the incredible mountain setting where the year's cumulative snowfall has been 45 feet!

First held in 1980, this year's meeting covered a broad spectrum of topics presented by faculty from across the United States and Canada. Reflecting a departure from topics commonly considered at pediatric cardiology meetings, the session entitled "Oh My Heck! What Are We Doing?" examined some of the difficulties faced by patients, families, and clinicians when dealing with complex congenital heart disease. Dr Brian McCrindle (University of Toronto) opened the session by explaining how little we actually know about short and long-term outcomes for this heterogeneous group of patients. Dr McCrindle discussed many of the obstacles that continue to hinder our understanding of the broader implications of our treatment decisions early in life for patients requiring palliative procedures to allow survival. Dr Jeffrey Botkin (University of Utah) examined the ethical issues surrounding the early discussion of treatment options and the impact that practitioner's personal beliefs have on how options are presented. Dr Kate Faulkner (Tufts University) presented the option of palliative or comfort care for patients with life threatening disease requiring near-heroic treatment attempts. And finally, rounding out this session, Dr William McDonnell (University of Utah) presented an overview of some of the forces

impacting the current crisis in health care costs.

Among more conventional topics, Dr Tom Graham (Vanderbilt University) presented an historical overview of modern day pediatric cardiology and congenital cardiac surgery. Surgeons William Williams (University of Toronto), John Hawkins (University of Utah), James Tweddell (Medical College of Wisconsin), Peter Kouretas (University of Utah), and Thomas Yeh (Tulane University) collaborated in presenting the state of the art of many aspects of surgery for congenital cardiovascular disease. Doctors David Nykanen (Arnold Palmer Medical Center, Orlando, FL), Mark Galantowicz (Ohio State University), Shelley Miyamoto (University of Colorado), and Robert Gray (University of Utah) presented topics related to the role of diagnostic and interventional cardiac catheterization. University of Utah physicians Elizabeth Saarel, Angela Yetman, Lloyd Tani, Hassan Yaish, and Melanie Everitt presented data and made recommendations related to a number of common problems encountered in pediatric cardiology.

A chronologic perspective on congenital heart disease was initiated by Dr Jason Su (University of Utah) who presented insight into the impact of fetal detection of congenital heart disease. Dr Jack Rychik (University of Pennsylvania) presented the pioneering work in fetal intervention being performed at the Children's Hospital of Philadelphia. Dr Kirtly Parker-Jones (University of Utah) gave an entertaining presentation on contraception in adolescents and adults with congenital heart disease, stressing the importance of prevention, especially among an increasingly sexually active adolescent population. Dr Craig Broberg (University of

Oregon) was the final speaker of the meeting who provided sobering insights into the long-term ramifications of interventions undertaken earlier in life and the diverse personal and social challenges that many of these patients face during adulthood.

A highlight of the meeting every year, the Gore Cup ski race was again well attended with skiers and snowboarders of all ages working their way through the dual giant slalom course. Dr Mark Galantowicz, Co-Director of Nationwide Children's Heart Center in Columbus, Ohio demonstrated his prowess with the fastest time on the course. In comparison, Dr William Williams, Emeritus Professor of Surgery, University of Toronto, earned recognition for the most spectacular fall during the competition.

Scheduled for February 21 – 24, 2010, the 18th Utah Conference on Congenital Cardiovascular Disease promises to be another excellent opportunity to hear from a superb faculty about a variety of topics related to pediatric cardiology. The meeting is always structured to allow attendees time to ski or take advantage of a myriad of opportunities unique to the Mountain West. We hope to see you in 2010.

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Figures 1-3: Dr William Williams, Professor Emeritus, University of Toronto, and many time faculty member of the Utah Conference on Congenital Cardiovascular Disease, demonstrates his "winning" form during the Gore Cup Ski Race.

Inter-professional Congenital Cardiothoracic Education: Internationalising the Curriculum

By Kerry Cook, RGN, RN (Child),
BA(Hons), ENB 160, MSC(ANP) and
Imran Ali, Learning Technologist

In September 2006 the first cohort of the Post Graduate Certificate in Paediatric Cardiothoracic Care commenced with 12 students from around the United Kingdom and Southern Ireland. This cohort represented the views and experiences of national paediatric cardiac units; however, with two students working in Southern Ireland, an additional dimension was added, aiding further critical analysis of professional policies, procedures and strategies that underpin care delivery.

The first cohort had the unfortunate task of being the guinea pigs for a new programme, which was not without its teething problems. Administrative, technical and logistical issues arose, from which we have learned new strategies to improve the experience for future students. The most important factor identified was that in order for students to find the course successful and stress-free, comprehensive IT skills are essential for enabling them to get the most out of the e-resources available (Cook & Ali, 2007).

During the creation stage of the course some international networking took place; however, the global possibilities for marketing the course are being realised as the realms of e-technologies expand. Internationalisation of such an educational programme not only meets the progressive strategies of the university and academia, but accompanies the nature of advancing clinical practice. Health care professionals are continually learning with and from their colleagues internationally, about their practice and skills in an attempt to share "best practice" and, therefore, enhance the health care experience of the child, young person and their family. The sheer complexity of the specialism means that there is a 'limited' pool of individuals internationally that possess the relevant skills and knowledge to meet the needs of the service and the children, young people and their families.

Sharing of information, skills and knowledge globally is, therefore, an extremely important aspect of ensuring that care is up-to-date and evidence-based. It is also essential that the course reflects changes



Figure 1. Second-generation technology - Access to the Experts' lectures - www.cardiacmorphology.com

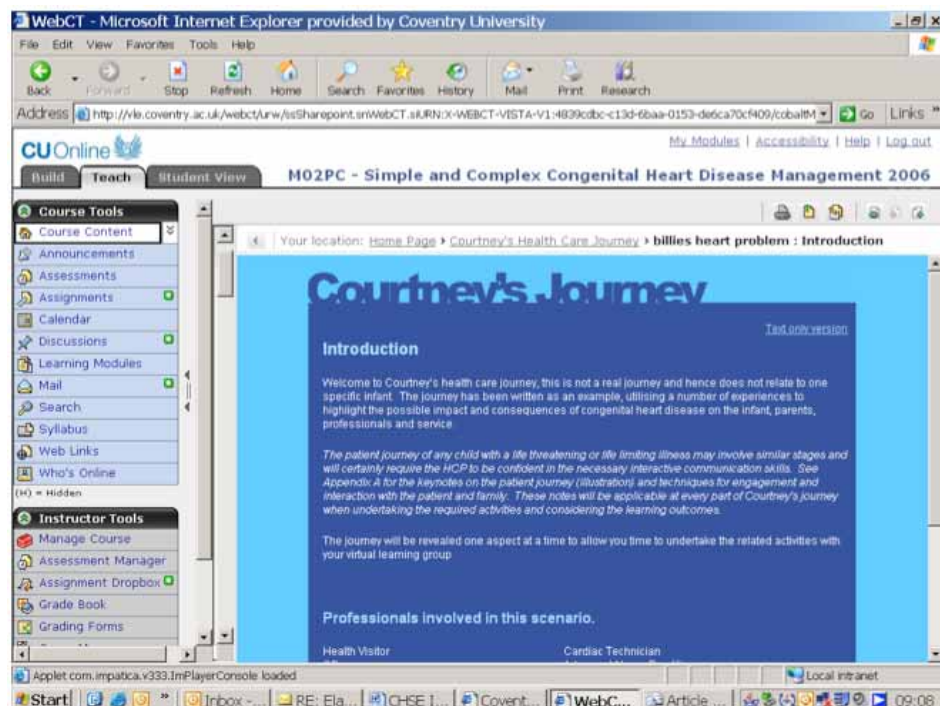


Figure 2. Fourth-generation technology - virtual patient journeys (from CUonline, www.coventry.ac.uk)

in service provision and delivery. E-learning is a beneficial medium to exchange, discuss and critique information and practice. Advances in computer technology and the availability of e-resources have enabled improved accessibility to specialist courses, allowing internationalisation to occur more readily.

Delivery, of the course, is entirely online, utilising various generations of technology (Dirckinck-Holmfeld, 2002) and styles of learning object to deliver relevant material to the students. The course is further enriched by: access to online video clips of teaching sessions delivered by clinical experts in the field, by the British Congenital Cardiac Association (BCCA), (that may be based within the UK, or elsewhere in the world (www.cardiacmorphology.com)) and by the inclusion and exploration of real patient journeys. International elements are embedded in the content of this learning material, with the long-term plan being to include more worldwide case studies. This online information will enable inter-professional students to learn with from, and about, each other (CAIPE, 1997), whilst broadening their knowledge and understanding, and incorporating an international component in their evidence-based practice. Online courses promote the use and practice of enhanced medical and surgical techniques that will ultimately benefit the care received by the child and young person.

However, despite the ease with which courses can be offered globally, certain limitations pose restrictions and potential hurdles for the module team to overcome if the venture is to be successful. Delivering lectures via web conference is an innovative way of ensuring synchronicity during live, face-to-face dialect.

Our experience of using web conferencing indicates that both speakers and learners require comprehensive inductions in order to increase their chances of participating in a rewarding web conference. This includes setting up their computers with the aid of a Learning Technologist and being aware of connectivity problems that may arise. Both speaker and learner are vulnerable to loss of Internet connectivity; it is

therefore essential that users have a broadband connection. The East-West Coast (USA) 'switch-on' also affects the speed of internet connections and, therefore, web conferences need to be scheduled to avoid busy hours.

Although collaboration tools, such as web conferencing, can provide media rich learning experiences other factors need to be considered before deciding to use this conferencing tool. As this course begins to recruit internationally, language fluency of all involved will need to be considered. Web-conferencing requires a greater degree of language fluency as opposed to when using discussion forums, which allow for more time to understand and compose messages. Also, audio quality in a web conference can increase the difficulty in understanding accents. Students can, however, interact during the web conference using a chat tool, where questions or messages are typed for others in the conference to see. A certain level and speed of typing skills are however required to take part in the spontaneous chat that may occur using the chat screen (Horton 2006).

Time zones may cause problems in terms of the ability for all students to log on at set times to attend web conferences, this could be seen to disadvantage some students but with the commencement of an international course there will be a review of working practices for the module delivery team taking the impact of time zones into consideration. E-learning is asynchronous (Salmon, 2004) to some extent, as students log on at different times and days of the week according to their personal and professional schedules. Including international students may increase the asynchronicity and the time span that postings to discussion forums are made to cover the 24-hour clock. E-facilitators will therefore, need to log on at varying times to capture the essence, and to facilitate the direction of discussions taking place.

The more difficult logistical aspects of including international students are compensated by the extremely positive aspects of learning from an international and inter-professional peer group, who will challenge the juxtaposition of discussions taking



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place to create a more questioning environment in which the students will learn.

Students will not only learn about different techniques and practices being implemented and employed around the world, but will glean an insight into the varying nature of health care practitioner (HCP) roles; enabling critical analysis of their own experience and challenging traditional views. It is therefore, imperative that the content of the module reflects the international focus, including patient journeys from countries other than the UK. Bringing together a group of like-minded professionals from around the globe will forge stronger bonds and may even encourage movement and greater employability of HCPs internationally.

Internationalisation using new technologies enables us to 'reach out to new markets' (Deepwell, 2007) to provide specialist educational opportunities to all health care practitioners, whilst having a highly constructive impact on forging stronger relationships. As technology improves, strategies for material delivery will become more innovative, resulting in greater accessibility for professionals, whilst reducing the distance barriers. Inter-professional learning on an international scale will assist in the implementation of evidence-based care, encourage open forum discussions with international colleagues and ultimately have a positive impact on the experience of the child and their family.

For further details about the course, please contact Kerry Cook, Course Director kerry.cook@coventry.ac.uk

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Noncompaction of the Ventricular Myocardium and Mitral Valve Regurgitation: a Unique Association

By Sulafa KM Ali, MD, FACC, FRCPCH

Introduction

Noncompaction of the ventricular myocardium (NCVM) is a cardiomyopathy characterized by excessive myocardial trabeculations and deep inter-trabecular recesses. It can either be isolated or associated with congenital heart defects[1]. In a previous report we described a unique association of NCVM with mitral valve pathology in the form of valve leaflet deformity and mitral regurgitation (MR) in four patients[2]. In this report, we describe the same abnormalities in three other patients.

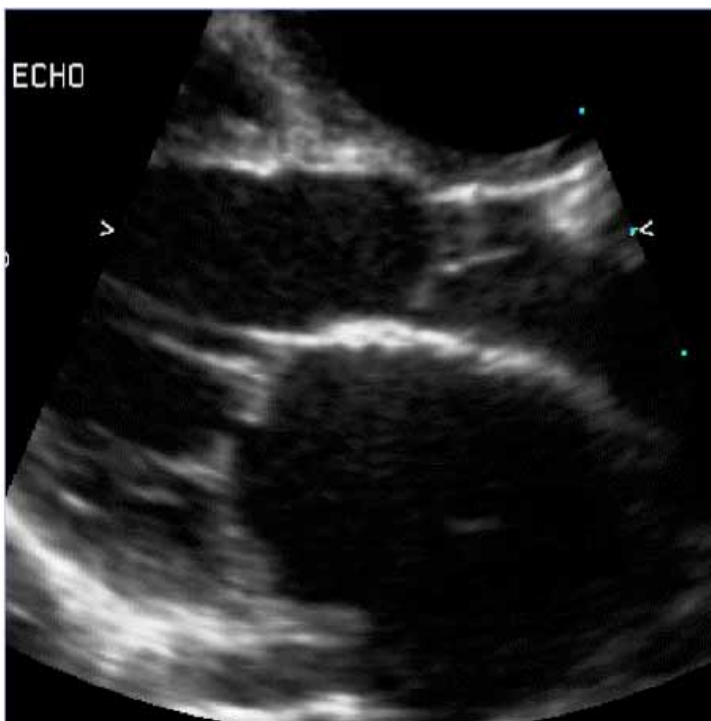


Figure 1. Parasternal long axis view showing anterior mitral valve leaflet coapting superior to the posterior leaflet with lack of complete coaptation.



Figure 2. Short axis view of the left ventricle distal to papillary muscles showing 2 layer appearance and noncompaction of the left ventricle myocardium.

“In conclusion, we think that there is a definite association between NCVM and mitral valve pathology that can lead to significant MR. This disease is more common in females.”

Patients and Methods

The patients were seen at the Sudan Heart Centre from July 2004-July 2007. Clinical and echocardiographic examinations

CURRENT TOPICS IN *Patent Ductus Arteriosus*
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Table 1: Patient Characteristics

No	Age	Sex	Clinical Features	Echocardiographic Features	Follow-up
1	18 month	Female	Heart failure (NYHA IV)	Mitral valve anterior leaflet coapts superior to the posterior leaflet (Figure 1). On the para sternal long axis view. On the 4 chamber view there is a zig-zag deformity of the anterior leaflet. There is Severe MR. Left Ventricle is dilated to 5.6 cm, NCVM seen apically (Figure 2). Ejection fraction is 62%.	F/U for 12 months. No change.
2	12 year	Female	Heart failure (NYHA II)	Mitral valve anterior leaflet coapts superior to the posterior leaflet. (Figure 3). Moderate degree of MR. NCVM seen at the left ventricle apex. Left ventricle is dilated to 5.8 cm. Ejection fraction is 65%.	F/U for 6 months. No change.
3	8 year	Female	Heart failure (NYHA II)	There is hypertrophic cardiomyopathy: interventricular septum is 2 cm and left ventricle posterior wall 1 cm. There is a gradient of 40 mmHg at the left ventricle outflow. Ejection fraction is 80%. Mitral valve anterior leaflet coapts superior to the posterior leaflet with moderate MR. NCVM is seen at the left ventricle apex. There is a vegetation measuring 10X10 mm tethered to the anterior mitral leaflet.	F/U for 6 weeks. No change.

were done. Noncompaction was diagnosed with the following criteria:

1. From the parasternal short axis view distal to papillary muscles the noncompacted layer thickness is measured at the end of systole and compared to the compacted layer thickness. A ratio of > 2:1 is considered significant.
2. A 2-layer appearance of the myocardium from different views.
3. Demonstration of the inter trabecular recesses using low scale color flow.
4. Follow-up was arranged for every 2-6 months.

Results

Patient's characteristics are shown in Table 1.

Discussion

NCVM is being increasingly recognized but its association with mitral valve deformity mimicking mitral valve prolapse is not well established. We first observed this association in four patients [2]. In the previous as well as current patients females predominated (female to male ratio 6:1). All patients showed the same mitral valve deformity in the form of abnormal coaptation in the long axis view, and a unique zigzag deformity in the apical Four chamber view. All patients showed a normal ejection fraction therefore MR cannot be secondary to myocardial dysfunction. The degree of MR is variable from

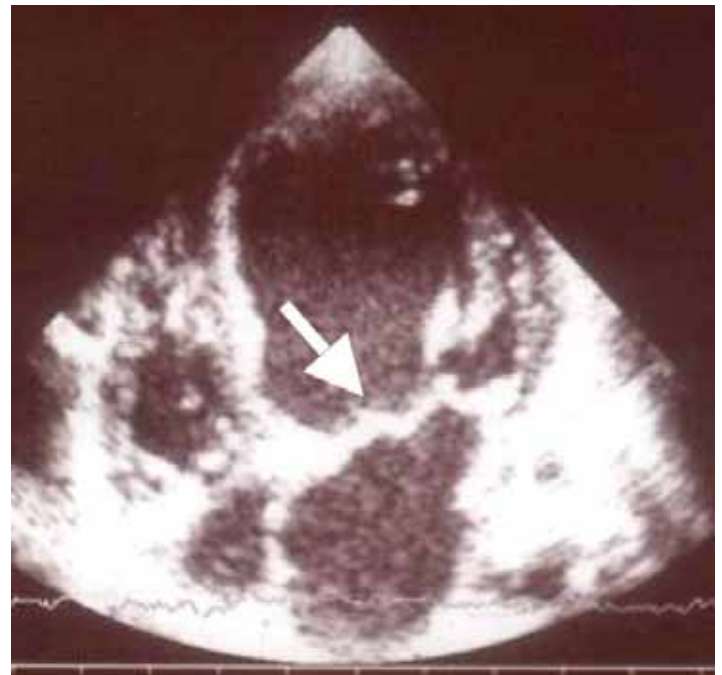


Figure 3. Four chamber view showing zigzag deformity of the anterior mitral leaflet (arrow).



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moderate to severe. In patient number 3, there were two important associations: hypertrophic obstructive cardiomyopathy (HOCM) and infective endocarditis. Hypertrophic cardiomyopathy had been reported to be associated with NCVM by us and also by others [1,3], but without obstruction. Endocarditis is a known complication of abnormal mitral valve. There are important implications of NCVM on the surgical management of patients with MR as NCVM can be associated with myocardial dysfunction, arrhythmias, embolic events and a poor prognosis in adults[4].

In conclusion, we think that there is a definite association between NCVM and mitral valve pathology that can lead to significant MR. This disease is more common in females.

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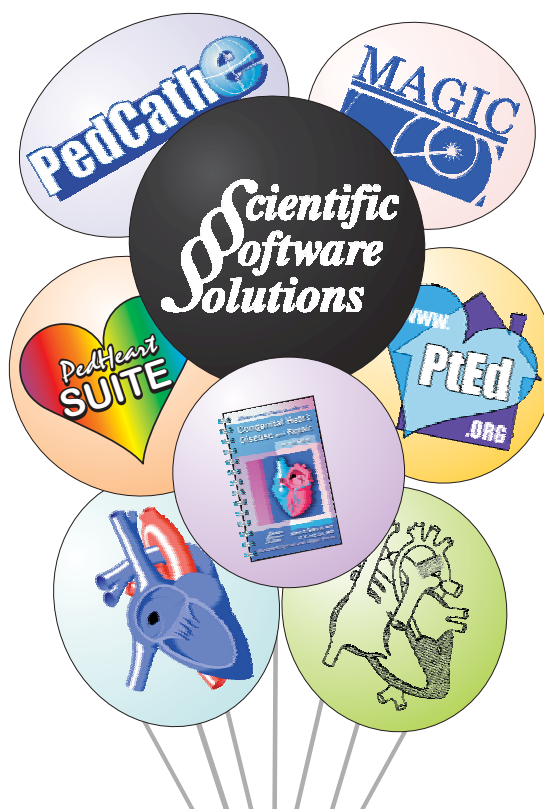
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Medical News, Products and Information

Call for Grant Proposals

The Children's Heart Foundation calls upon all investigators to submit clinical research proposals on congenital heart disease by June 6, 2008. The Medical Advisory Board of the Children's Heart Foundation will review these proposals in late Fall 2008. Those recommended will receive funding in December 2008. Last year the Children's Heart Foundation funded \$603,262 in grant support (9 separate grants). Investigators should contact the Children's Heart Foundation for an application or download an application from the website: www.childrensheartfoundation.org

"Congenital Heart Disease: Cardiac Morphology & Echocardiography – A Multimedia Presentation" by S. Yen Ho and William C.L. Yip

This newly produced DVD (ISBN 978-981-05-7231-0) encapsulates a multimedia book by combining movie clips of morphology demonstrations and echocardiograms, text slides, and diagrams. It begins with normal anatomy and the sequential segmental analysis of malformed hearts, followed by chapters on the more common forms of heart defects. Each chapter has a morphology review followed by echocardiograms of the lesions. Emphasis is given to delineation of anatomy by real-time cross-sectional imaging and color-flow mapping.

Why a DVD ? (1) Echocardiography is an imaging technique that is very widely used in diagnosing structural malformations of the heart. Still images of echocardiograms as presented in conventional textbooks often are inadequate for proper understanding. There are only a few DVD titles available that have echo movies, but there are none with morphological correlates presented in a systematic fashion to help understand the heart structures that are displayed on echocardiography. (2) For better understanding of congenital heart malformations, a 3D perspective is crucial, and (3) This DVD will be a very useful tool for self-learning by junior doctors wishing to specialize in congenital heart disease, and also for experienced doctors who may not see many patients with congenital heart disease, but wish to refresh their knowledge.

For more information, E-mail: Morphology@rbht.nhs.uk; distributed by CARDIOTEXT - www.cardiotext.com.



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HEART CENTER

ADULT CONGENITAL HEART DISEASE CARDIOLOGIST

The Cardiology Division of the Massachusetts General Hospital is recruiting a faculty member specializing in Adult Congenital Heart Disease. Candidates must be experienced in clinical evaluation of patients, both hospital consultative and office-based. Candidates must be Board-certified or eligible in Cardiovascular Disease and hold the rank of Assistant Professor of Medicine or higher. Significant previous clinical experience, demonstrated ability to collaborate with multiple other specialties, and prior active participation in clinical research endeavors are useful. The program in Adult Congenital Heart Disease is closely integrated with the MGH Pediatric Cardiology program and includes cardiac surgery, interventional cardiology, electrophysiology, heart failure, transplantation and pulmonary hypertension. The practice will involve inpatient and outpatient clinical care, teaching and participation in affiliated outreach clinics.

Interested Candidates should send an introductory letter and their curriculum vitae to:

Richard R. Liberthson, M.D.

Director, Adult Congenital Heart
Disease Program

Massachusetts General Hospital
8 Hawthorne Place, Suite 110
Boston, MA 02114

rliberthson@partners.org

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Medical Director of Cardiac Transplantation

THE UNIVERSITY OF CALIFORNIA, SAN DIEGO, DEPARTMENT OF PEDIATRICS AND CHILDREN'S SPECIALISTS OF SAN DIEGO are jointly recruiting a Medical Director of Cardiac Transplantation for the unified Division of Pediatric Cardiology at Rady Children's Hospital, San Diego. This 220-bed facility serves as the 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. 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. The Division provides a full range of Pediatric Cardiology services. It currently has six pediatric cardiologists, two 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. Applications received by July 1st or until the position is filled, will receive full consideration.

Please send Curriculum Vitae to: John Moore, M.D., email jmoore@rchsd.org or by mail to 3020 Children's Way, MC 5004; San Diego, CA 92123.

UCSD is an AA/EOE with a strong institutional commitment of excellence through diversity.



Medical Director of Electrophysiology and Pacing

THE UNIVERSITY OF CALIFORNIA, SAN DIEGO, DEPARTMENT OF PEDIATRICS AND CHILDREN'S SPECIALISTS OF SAN DIEGO are jointly recruiting a Medical Director of Electrophysiology and Pacing for the unified Division of Pediatric Cardiology at Rady Children's Hospital, San Diego. This 220-bed facility serves as the 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 lead and expand a large well established existing EP and Pacing Program. The successful candidate must have advanced training in pediatric electrophysiology and preferably several years of practice experience. The successful candidate should possess the qualifications for academic appointment at the rank of Assistant, Associate or Full 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. The Division provides a full range of Pediatric Cardiology services. It currently has six pediatric cardiologists, two 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. Applications received by July 1st or until the position is filled, will receive full consideration.

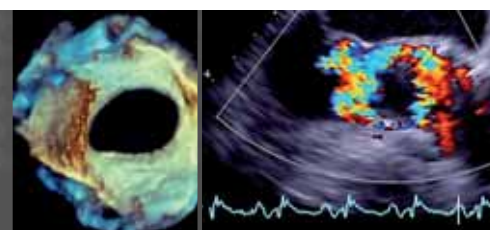
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Drs. E. Bacha, Z.M. Hijazi and D. Rowland,

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Hybrid Stage I Palliation for HLHS PA Bands and PDA Stent -

Drs. M. Galantowicz and J. P. Cheatham

Intraoperative Aortic Stent for CoA -

Drs. R. Burke and E. Zhan

Intraoperative LPA Stent Using Endoscopic Guidance -

Drs. A. Phillips, R.J. Holzer, and V. Olshove, CCP

Creation of ASD after PA Bands & PSA Stent for HLHS in a Premie

- Dr. J. P. Cheatham, S. L. Hill, ACNP

Perventricular Implant of Edwards Valve Stent

in the Pulmonary Position -

Drs. Z. M. Hijazi and J. Lin

Closure of Septal Defect Using Real Time 3D Echo Guidance -

Drs. N. V. Vasilyev and Qi-Ling Cao

High Frequency Ultrasound Creation of ASD -

Drs. N. V. Vasilyev and Qi-Ling Cao

PmVSD Closure -

Dr. M. Carminati

Transcatheter Implantation of Implantable Melody Valve-

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Percutaneous Closure of ASD(s) with TEE or ICE Guidance -

Percutaneous Valve Implantation -

Drs. Eric Horlick and Lee Benson

Perimembranous VSD Closure with Amplatzer

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For more information on the symposiums that produced these live cases, and how to attend, please visit:

- **ISHAC** (*International Symposium on the Hybrid Approach to Congenital Heart Disease*)
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- **PICS-AICS** (*Pediatric and Adult Interventional Cardiac Symposium*) www.picsymposium.com
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- **OKLAHOMA CITY, OK:** The University of Oklahoma Health Sciences Center

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The Congenital Heart Surgery program performs over 300 surgeries each year. Two thirds of the surgeries are pump cases. The program provides care to neonates (approximately 30%) and children under 2 years of age (approximately 70%).

Call or inquire by email today:

Kathleen Kyer,

Manager, Pediatric Subspecialty Recruitment

888-933-1433 or

Kathleen.Kyer@HCAHealthcare.com



Master Class in Congenital Cardiac Morphology July 15-16, 2008; Pittsburgh, Pennsylvania

Course Director: Professor Robert H. Anderson MD, FRCPATH

Contact: Lynda Cocco, Children's Hospital of Pittsburgh of UPMC, Heart Center, 3705 Fifth Avenue, Pittsburgh, PA 15213 Phone: 412-692-3216; Fax: 412-692-6870; e mail: Lynda.cocco@chp.edu



The Division of Pediatric Cardiology at the University of Utah School of Medicine and Primary Children's Medical Center is recruiting additional pediatric cardiologists with major interests in:

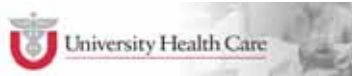
- **Noninvasive imaging**
- **Outpatient cardiology**
- **Transplant/heart failure**
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Candidates should be BC/BE in pediatric cardiology and should have a strong clinical background in pediatric cardiology with expertise and interest in at least one of the areas listed above. Candidates will join a 21-member Division of Pediatric Cardiology. The Division has a very active, growing clinical program. The Division also has a very active clinical research program and is one of the participating centers in the Pediatric Heart Disease Clinical Research Network funded by the NIH. Protected time and mentoring for clinical research will be available within the Division for clinical research studies.

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Interested individuals should send or email a cover letter and curriculum vitae to:

Lloyd Y. Tani, M.D.
 Chief, Division of Pediatric Cardiology
 University of Utah School of Medicine
 100 N. Mario Capecchi Drive
 Salt Lake City, UT 84113
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REVISED DATE

PICS-AICS 08 **July 20-23, 2008** Bellagio, Las Vegas

PEDIATRIC AND ADULT INTERVENTIONAL CARDIAC SYMPOSIUM



Course Directors: Dr. Ziyad M. Hijazi, Dr. William E. Hellenbrand, Dr. John P. Cheatham, & Dr. Carlos Pedra

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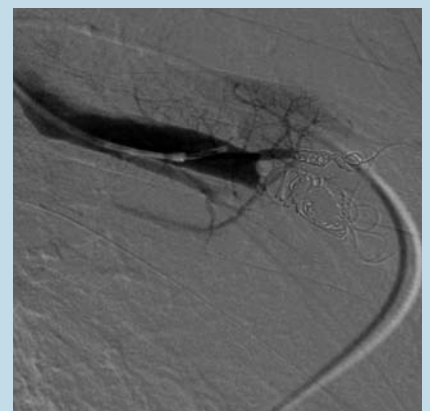
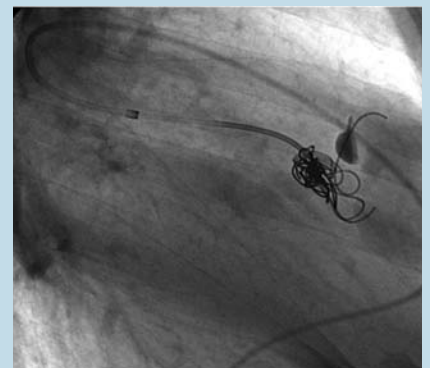
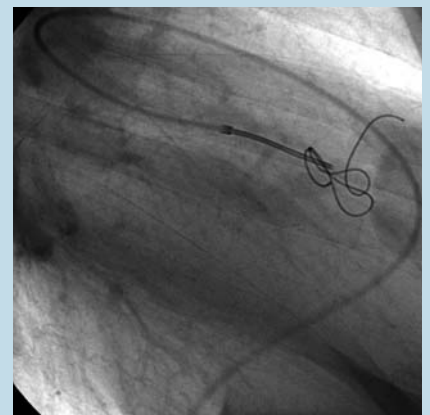
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Comprehensive Workshop: Embolization Therapy

Moderators: *John P. Cheatham, Seong-Ho Kim
and Shakeel Qureshi*

1. What Do You Need in the Cath Lab for Embolization Therapy?
- *Robert White*
2. Catheter Management of Pulmonary AVMs.
- *Robert White*
3. Aorto-Pulmonary Collaterals:
Anatomy and Indications for Closure.
- *Lee Benson*
4. Aorto-Pulmonary Collaterals:
Closure Techniques, Results.
- *Shakeel Qureshi*
5. Veno-Venous Collaterals Pre & Post Fontan:
When and How to Close Them.
- *Jeffrey Feinstein*
6. Coronary Arteriovenous Fistulas:
Anatomy, Closure and Results.
- *Jo de Giovanni*
7. Retrieval Techniques in the Cath Lab.
- *Omar Galal*

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of a large PAVM.



Radiographs provided by Dr. Robert I. White Jr., Yale University, Department of Vascular and Interventional Radiology, New Haven, CT.