CONGENITAL CARDIOLOGY TODAY

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

Volume 10 / Issue 12
December 2012
International Edition

IN THIS ISSUE

UPCOMING MEDICAL MEETINGS
See website for additional meetings

The 3rd Congress of Congenital Heart Disease; Ventricular Septal Defect from A to Z
Jan. 9-11, 2013; Ho Chi Minh City, Vietnam

PICS-AICS
Jan. 19-22, 2013; Miami, FL USA
www.picsymposium.com

Sudden Cardiac Arrest in Children and Adolescents
Jan. 25-26, 2012; Anaheim, CA USA
www.choc.org/events/index.cfm?id=P00473&eid=805

10th Gulf Heart Association Conference
Feb. 13-16, 2012; Riyadh, KSA
www.sha-conferences.com

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

© 2012 by Congenital Cardiology Today ISSN: 1544-7787 (print); 1544-0499 (online). Published monthly. All rights reserved.

Determining the Incidence of Sudden Cardiac Death in the Young: The Orange County Experience

By Anjan S. Batra, MD; Tiffany Cheng, MS3

Sudden Cardiac Death (SCD) among young athletes is a devastating tragedy that continues to occur. The sudden and unexpected death of such a young individual in apparently excellent physical fitness is a highly visible event that stimulates considerable concern among both the medical and lay communities. Though seemingly rare, media reports drawing attention to these events have raised the question of whether generalized screening of athletes should be implemented in the United States. This is because despite the best efforts by health care providers to identify the patients and families with cardiac conditions, pediatric sudden cardiac death still occurs.[1] However, due to the lack of a national registry, there exists no organized database for tracking these events. As a result, the actual incidence of SCD among the pediatric population in the United States remains unknown.

Epidemiology of SCD

So far there have been limited population based studies on SCD in children in the United States and Europe estimating the incidence between 1 and 5 per 100,000 person-years (Table 1). Note that this is per population and not per children in the population. The precise frequency with which SCD occurs in young athletes is not known. There are a number of practical obstacles to the collection of such data. Estimates that rely on reporting from individual schools and institutions, as well as on media accounts, probably underestimate the occurrence of these events. Most studies on the prevalence of SCD are retrospective and based upon death certificates. Such studies carry intrinsic bias and can be highly inaccurate. Also, the incidence of sudden cardiac arrest is clearly higher than that of SCD especially with the recent emphasis on CPR education and widespread availability of automatic external defibrillators.

The Orange County Experience

Here in Orange County, California, we have begun to address this issue by considering our unique location and population. Orange County has the largest number per capita of NCAA and Olympic athletes of any county in the United States. And with an estimated population of over

> ***"Though seemingly rare, media reports drawing attention to these events have raised the question of whether generalized screening of athletes should be implemented in the United States."***

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

Medtronic

A perfect melody of compassionate hearts, innovative minds and skilled hands.

Melody®

TRANSCATHETER PULMONARY VALVE (TPV) THERAPY

Worldwide, over 3,000 congenital heart disease patients have benefited from Melody TPV therapy. We remain committed to providing innovative options for your clinical management of these patients over their lifetime.

Visit www.Melody-TPV.com and restore hope for your patients.

Melody® Transcatheter Pulmonary Valve
Ensemble® Transcatheter Valve Delivery System

Indications

The Melody® Transcatheter Pulmonary Valve is indicated for use in patients with the following clinical conditions:

- Patients with regurgitant prosthetic Right Ventricular Outflow Tract (RVOT) conduits with a clinical indication for invasive or surgical intervention, OR
- Patients with stenotic prosthetic RVOT conduits where the risk of worsening regurgitation is a relative contraindication to balloon dilatation or stenting.
- Existence of a full (circumferential) RVOT conduit that was equal to or greater than 16 mm in diameter when originally implanted.
- The intended lifetime for the Melody® device is 2 years.

Contraindications

- Venous anatomy unable to accommodate a 22 Fr size introducer sheath; Implantation in left heart;
- Unfavorable right ventricular outflow tract for good stent anchorage;
- Severe right ventricular outflow obstruction, which cannot be dilated by balloon;
- Obstruction of the central veins;
- Clinical or biological signs of infection;
- Active endocarditis;
- Known allergy to aspirin or heparin;
- Pregnancy.

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

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

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

The Melody® Transcatheter Pulmonary Valve and Ensemble® Transcatheter Delivery System has received CE Mark approval and is available for distribution in Europe. Additionally, a Medical Device Licence has been granted and the system is available for distribution in Canada.

Melody and Ensemble are trademarks of Medtronic, Inc.

© Medtronic, Inc. 2012 UC201205149 EE

Table 1 - Epidemiology of SCD in The Young					
Report	**Publication Date**	**Dates Data Collected**	**Age Range**	**Event Rates**	**Method of Estimation**
Driscoll et al.[2]	1985	1950-1982	1 and 22 years	1.3 cases per 100,000 person years	Population-based study by review of death certificates
Chugh et al. [3]	2009	2002-2005	< 18 years	1.7 cases per 100,000 person years (90% <1 year)	Population-based study in Portland, Oregon by emergency room and medical examiner records
Maron et al.[4]	2009	1985-2007	High school and college athletes	0.93 deaths per 100,000 person-years	Registry and insurance records in Minnesota
Maron et al.[5]	2009	1980-2006	Athletes < 40 years	0.61/100 000 person-years	National registry for sudden deaths in US athletes
Corrado D et al. [6]	2006	1979-2004	12-35 years	Athletes: 1.9 deaths/100,000 person-years Non-Athletes: 0.79 deaths/100,000 person-years	Prospective cohort study in Veneto, Italy
Harmon et al. [7]	2011	2004-2008	NCAA Athletes	2.28 deaths per 100,000 person-years	NCAA Database, media reports, insurance claims

3 million, a quarter of which accounts for those under 18 years old, establishing the incidence of SCD in Orange County will be a step forward in determining the true scope of this problem.

To begin this process, we first determined how SCD events in Orange County can be tracked. Figure 1 shows a simplified layout of how the sequence of events can be captured following a SCD outside of the hospital. Before initiating the prospective data registry, we felt it was critical to evaluate the accuracy and ease of obtaining the data that was currently being collected by each of these entities. With this outline in mind, we requested currently existing databases from all 3 entities: the Emergency Medical Services (EMS) database, the Office of Statewide Health Planning & Development (OSHPD), and the Orange County Child Death Review Team (division of the Coroner's Office). From the EMS database, we should be able to examine all records related to "cardiac arrest," including paramedic's "on-scene" assessments. The OSHPD database includes Emergency Department and Inpatient hospital data for all hospitals in Orange County, which provides the details on all cases with principal diagnoses of "sudden cardiac arrest," "cardiac arrest," or "syncope & collapse" (ICD-9 codes of V12.53, 427.5, or 780.2). Finally, data from the coroner's office will give us a sense of how many sudden cardiac arrest events resulted in SCD. We requested data for the last 10 years from each entity for cases with individuals <35 years old.

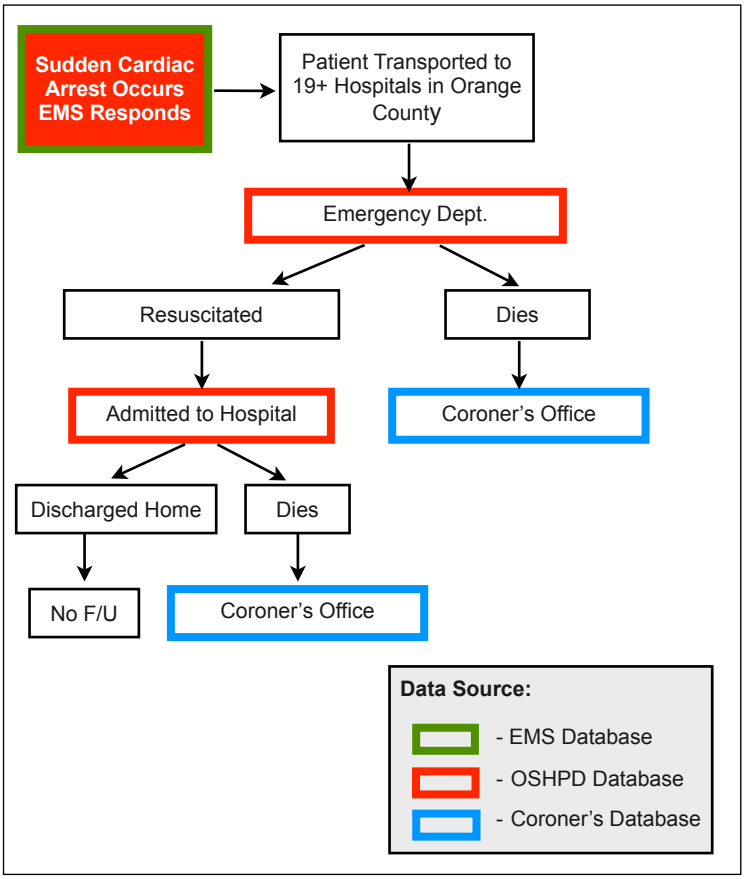


Figure 1. Diagram for tracking SCD events in Orange County.

Preliminary Data

Thus far, we have received preliminary data from the Orange County Coroner's office and OSHPD from 2001-2010 and are in the process of obtaining the data from the EMS. Data from the Orange County Coroner's office shows an incidence of 1.58 cases per 100,000 person-years, with pediatric cases of SCD accounting for 17.8% of all SCD events in those <35 years old. These cardiac-related deaths include cases of Sudden Infant Death Syndrome (SIDS), which was previously reported by the Oregon Sudden Unexpected Death study in 2009 to account for a large portion of the pediatric sudden deaths in their population.[3] Despite our population being about 4.5 times that of Multnomah County, Oregon, our preliminary results resemble the incidence rates previously published by the Oregon Study.

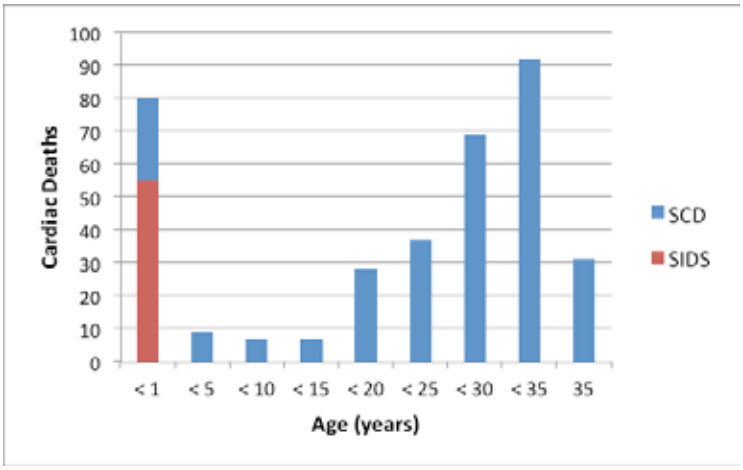


Figure 2. Age distribution of cardiac deaths in Orange County.

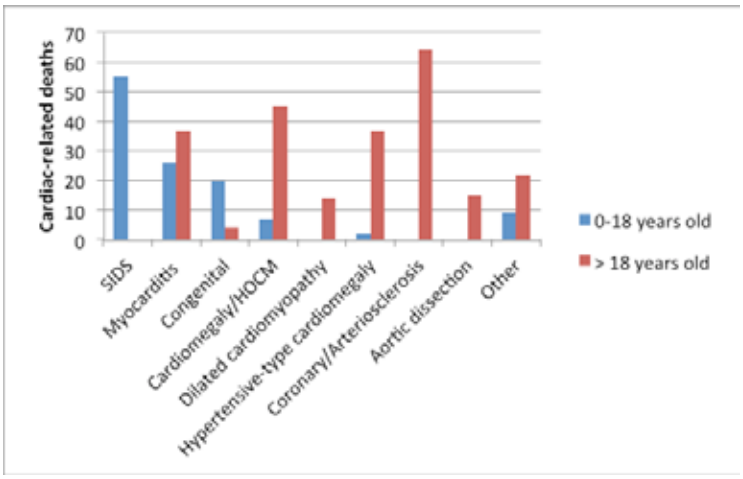


Figure 3. Causes of cardiac related deaths in Orange County.

Additionally, our preliminary data show that the age distribution of SCD events is bimodal (Figure 2). The large number of deaths occurring in children <1 years old is highly contributable to SIDS, while the gradual increase in events in the young adult age groups may be due to multiple causes. Since we could not identify whether these individuals were athletes or not, these SCD events could be related to increased athletic conditioning or advancing co-morbid conditions such as diabetes or atherosclerosis.

For the pediatric age group, the top three causes of cardiac death were SIDS, myocarditis, and congenital anomalies (Figure 3). Males were 2.5 times more affected than females, with white and Hispanic ethnic groups outweighing others.

Discussion

Our model for building a registry is similar to the one set forth by the Cardiac Arrest Registry to Enhance Survival (CARES)[8] first piloted in Atlanta, Georgia by the CDC. In that study, data was also captured from the three sources comprising the continuum of emergency cardiac care: 911 dispatch, EMS providers, and receiving hospitals. The goal of this registry was to provide communities with a means to identify cases of out-of-hospital cardiac arrest, measure how well emergency medical services (EMS) perform key elements of cardiac care, and determine outcomes through hospital discharge. Developed as a central repository of data about cardiac arrests from EMS systems throughout the United States, CARES collects data from separate sources and links them to a single record. The dataset is extensive, including 911 response time, bystander CPR efforts, application of automated external defibrillator (AED) and whether shocks were delivered, hospital admission/course/discharge or death, and discharge neurological and cardiovascular status. CARES generates standard reports that can be used to characterize the local epidemiology of cardiac arrest and help managers determine how well EMS is delivering out-of-hospital cardiac arrest care. After pilot implementation in Atlanta and subsequent expansion to 7 surrounding counties, CARES was implemented in over 40 communities in 23 states.

"Without a national registry to keep track of SCD events, we do not know exactly how many individuals are affected each year. Our hope is that by beginning in Orange County, we can start to establish a centralized repository for data on SCD and provide the medical community with a more concrete understanding of the incidence of these events."

We anticipate that the additional data we will analyze from EMS and OSHPD will allow us to further determine the true incidence of SCD in Orange County. Trying to form a link between each of these data sources is another one of our objectives. We hope to continue to learn from our current efforts in Orange County, to build a registry for SCD in the young, and ultimately to team up with other efforts such as the CARES registry to create one unified national registry.

Conclusion

The United States has 25 million competitive athletes involved in a network of sporting activities and 10 million high school and college athletes. Without a national registry to keep track of SCD events, we do not know exactly how many individuals are affected each year. Our hope is that by beginning in Orange County, we can start to establish a centralized repository for data on SCD and provide the medical community with a more concrete understanding of the incidence of these events. It will also build the foundation for future epidemiological studies on populations most at risk, common factors that predispose a child to SCD, and areas where prevention can be

CHDResources.org
Free downloadable
patient education materials
A service of
California Heart Connection
a nonprofit support network
caheartconnection.org
info@caheartconnection.org
877-824-3463

targeted. This will allow us to better serve the youth of communities nationwide and become the launching pad for a better understanding and prevention of SCD.

There is an upcoming symposium on the current controversies surrounding sudden cardiac arrest in children & adolescents to be held at Disney's Grand Californian Hotel & Spa on Friday & Saturday, January 25-26, 2013. Keynote speakers will include: Dr. Barry Maron, Minneapolis Heart Institute Foundation and Frank Marcos, University of Arizona Health Sciences Center. This two-day conference will present current controversies on topics related to the diagnosis, therapy and prevention of cardiac arrest in children and adolescents. Deadline for early bird registration is December 17th, 2012.

Online Registration: www.choc.org/scaconference.

References:

1. Campbell RM, Berger S, Ackerman MJ, Batra AS .Call for a Sudden Cardiac Death Registry: Should Reporting of Sudden Cardiac Death be Mandatory? PediatrCardiol. 2012; 33:471-473.
2. Driscoll DJ, Edwards WD. Sudden Unexpected Death in Children and Adolescents. J Am CollCardiol. 1985; 5:118B-121B.
3. Chugh SS, Reinier K, Balaji S, Uy-Evanado A, Vickers C, Mariani R, Gunson K, Jui J. Population-based analysis of sudden death in children: The Oregon Sudden Unexpected Death Study. Heart Rhythm. 2009;6:1618-1622.
4. Maron BJ, Haas TS, Doerer JJ, Thompson PD, Hodges JS (2009) Comparison of U.S. and Italian experiences with sudden cardiac deaths in young competitive athletes and implications for preparticipation screening strategies. Am J Cardiol 104:276-280.
5. Maron BJ, Doerer JJ, Haas TS, Tierney DM, Mueller FO. Sudden Deaths in Young Competitive Athletes: Analysis of 1866 Deaths in the United States, 1980-2006. Circulation. 2009;119:1085-1092.
6. Corrado D, Basso C, Pavei A, Michieli P, Schiavon M, Thiene G. Trends in Sudden Cardiovascular Death in Young Competitive Athletes After Implementation of a Preparticipation Screening Program. JAMA. 2006;296(13):1593-1601.
7. Harmon KG, Asif IM, Klossner D, Drezner JA (2011) Incidence of sudden cardiac death in national collegiate athletic association athletes. Circulation 123:1594-600.
8. McNally B, Stokes A, Crouch A, Kellermann AL. CARES: Cardiac Arrest Registry to Enhance Survival. Ann Emerg Med. 2009;54:674-683.

CCT

Corresponding Author:

Anjan S. Batra, MD, FHRS
Director of Electrophysiology
Children's Hospital of Orange County
Associate Professor of Clinical Pediatrics
University of California, Irvine
Irvine, CA USA
Phone: (714) 456-5338

abatra@uci.edu

Tiffany Cheng, MS3
University of California School of Medicine
Irvine, CA USA

chengt1@uci.edu

CONGENITAL CARDIOLOGY TODAY

CALL FOR CASES AND OTHER ORIGINAL ARTICLES

Do you have interesting research results, observations, human interest stories, reports of meetings, etc. to share?

Submit your manuscript to:
RichardK@CCT.bz

- Title page should contain a brief title and full names of all authors, their professional degrees, and their institutional affiliations. The principal author should be identified as the first author. Contact information for the principal author including phone number, fax number, email address, and mailing address should be included.
- Optionally, a picture of the author(s) may be submitted.
- No abstract should be submitted.
- The main text of the article should be written in informal style using correct English. The final manuscript may be between 400-4,000 words, and contain pictures, graphs, charts and tables. Accepted manuscripts will be published within 1-3 months of receipt. Abbreviations which are commonplace in pediatric cardiology or in the lay literature may be used.
- Comprehensive references are not required. We recommend that you provide only the most important and relevant references using the standard format.
- Figures should be submitted separately as individual separate electronic files. Numbered figure captions should be included in the main Word file after the references. Captions should be brief.
- Only articles that have not been published previously will be considered for publication.
- Published articles become the property of the Congenital Cardiology Today and may not be published, copied or reproduced elsewhere without permission from Congenital Cardiology Today.

Barth Syndrome Foundation

The Barth Syndrome Foundation

P.O. Box 974, Perry, FL 32348
Tel: 850.223.1128 info@barthsyndrome.org www.barthsyndrome.org
Symptoms: Cardiomyopathy, Neutropenia, Muscle Weakness, Exercise Intolerance, Growth Retardation

Image of the Month #3 - December 2012 - Presented by The Archiving Working Group

Contributors: Vera D. Aiello, MD; Diane E. Spicer, BS; Jeffrey P. Jacobs, MD; Jorge M. Giroud, MD; Robert Anderson, MD

This is a special column that is published bimonthly in *Congenital Cardiology Today* with contributors and images from the *Archiving Working Group* (AWG) of *the International Society for Nomenclature of Paediatric and Congenital Heart Disease.*

Please visit us at the AWG Web Portal at http://ipccc-awg.net and help in the efforts of the *Archiving Working Group* and the *International Society for Nomenclature of Paediatric and Congenital Heart Disease*.

The authors would like to acknowledge the Children's Heart Foundation (www.childrensheartfoundation.org) for financial support of the AWG Web Portal.

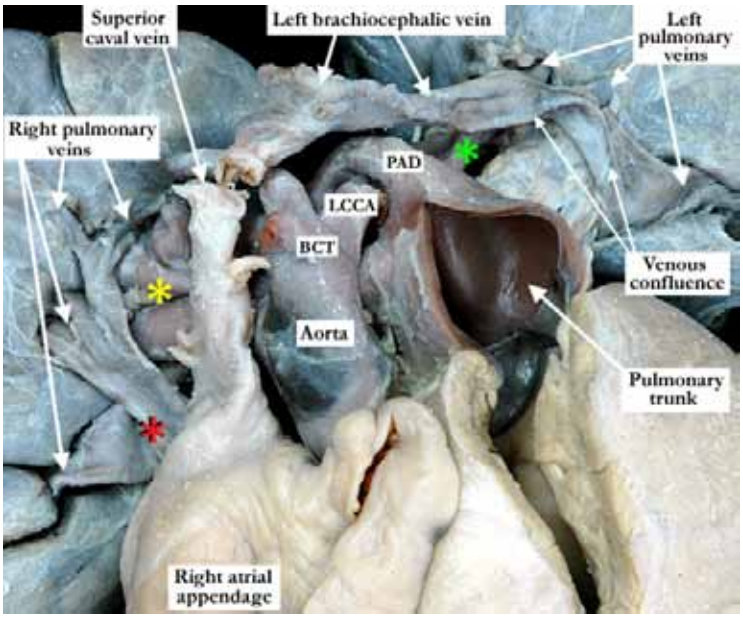


Figure 1. Description: The anterior anatomic view of this heart with concordant atrioventricular and ventriculo-arterial connections demonstrates normally related great arteries, and shows the left brachiocephalic vein draining to the superior caval vein. There is mixed totally anomalous pulmonary venous return, with the left pulmonary veins draining in supracardiac fashion to a venous confluence that then drains into the left brachiocephalic vein, while the right pulmonary veins (red asterisk) drain to the coronary sinus, and thence to the right atrium (see companion image) (yellow asterisk-right pulmonary artery, green asterisk-left pulmonary artery, BCT-brachiocephalic trunk, LCCA-left common carotid artery, PAD-patent arterial duct). Contributor: Diane E. Spicer, BS.

IPCCC: 4.08.30, 04.06.03, Q1.01.55, 04.06.12, Q1.01.52

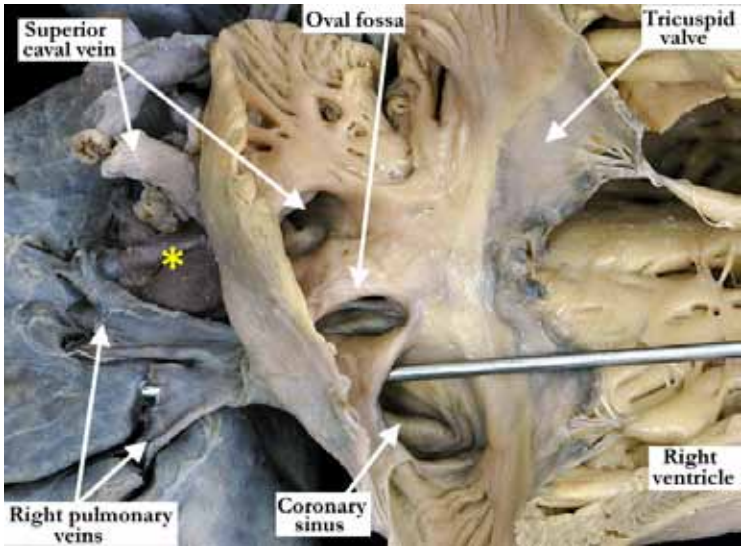


Figure 2. Description: The right atrium has been opened, and a probe inserted through the coronary sinus to reveal the anomalous drainage of the venous return from the right lung. The veins from the left lung drain in supracardiac fashion to the left brachiocephalic vein. As expected, the orifice of the coronary sinus is markedly dilated. There are concordant atrioventricular connections, with the tricuspid valve guarding the inlet to the right ventricle. The oval foramen is probe patent. The course of the left pulmonary veins can be viewed in the companion image. (yellow asterisk-right pulmonary artery). Contributor: Diane E. Spicer, BS.

AEPC Derived Term

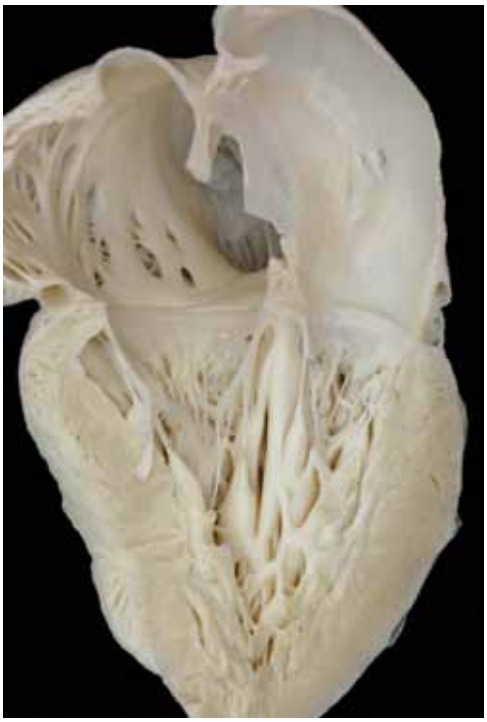
- Totally anomalous pulmonary venous connection: mixed (04.08.30).
- Supracardiac location of anomalous pulmonary venous connection(s) to left-sided vertical vein- left pulmonary vein(s) (04.06.03, Q1.01.55).
- Intracardiac location of anomalous pulmonary venous connection(s) to coronary sinus - right pulmonary vein(s) (04.06.12, Q1.01.52).

EACTS-STS Derived Term

- Total anomalous pulmonary venous connection (TAPVC), Type 4 (mixed) (04.08.30).
- Pulmonary venous connection anomalous, Supracardiac-modifier for site of drainage, Supracardiac location of APVC to left-sided vertical vein, Pulmonary veins-modifier for vein(s) involved, Left pulmonary veins (04.06.03, Q1.01.55).
- Pulmonary venous connection anomalous, Intracardiac-modifier for site of drainage, Intracardiac location of APVC to coronary sinus, Pulmonary veins-modifier for vein(s) involved, Right pulmonary veins (04.06.12, Q1.01.52).

ICD 10 Term: Total anomalous pulmonary venous connection (Q26.2).

AWG Web Portal link for this series of images:
http://ipccc-awg.net/TAPVC/TAPVC_Mixed_04_08_30/TAPVC_Mixed_04_08_30_SVC_CS.html



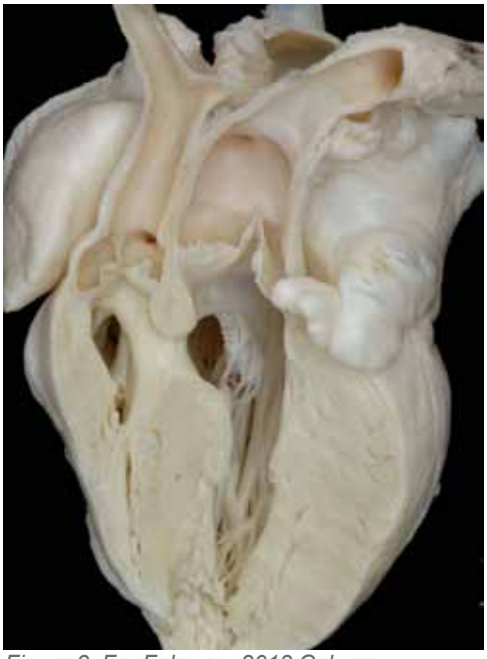


Figure 3. For February 2013 Column.

CCT

Vera D. Aiello, MD
Co-Chairman, Archiving Working Group
Heart Institute (InCor). São Paulo
University School of Medicine, Brazil

Diane E. Spicer, BS
Senior Archivist, Archiving Working Group
University of Florida, Department of
Pediatrics-Cardiology, Gainesville, Florida
Congenital Heart Institute of Florida
St. Petersburg & Tampa, FL USA

Jeffrey P. Jacobs, MD
Archiving Working Group
Congenital Heart Institute of Florida,
St. Petersburg & Tampa, FL USA

Corresponding Contributor

Jorge M. Giroud, MD
Co-Chairman, Archiving Working Group
Congenital Heart Institute of Florida &
Pediatrix Medical Group
St. Petersburg & Tampa, FL USA
jorgemgiroud@gmail.com

Robert H. Anderson, BSc, MD, FRCPath
Co-Chairman, Archiving Working Group
Institute of Medical Genetics
Newcastle University
Newcastle upon Tyne, UK

And the members of the Archiving Working Group
http://ipccc-awg.net/about_us.html

JANUARY MEETING FOCUS

Pediatric & Adult Interventional Cardiac Symposium (PICS & AICS 2013)
Jan. 19-22, 2013; Miami, FL USA
www.picsymposium.com

Course Directors: Ziyad M. Hijazi; John P. Cheatham; Carlos Pedra; Thomas Jones; William Hellenbrand (Director Emeritus)

Co-Directors: Damien Kenny; Giacomo Pongiglione; Clifford Kavinsky; Ralf Holzer

Overview:

- Focus on the latest Advances Interventional Therapies for Children and Adults
- Special Imaging Session - congenital and structural cardiovascular therapies
- Daily Breakout Sessions
- Daily Debates
- Live Case Demonstrations from International Centers
- The Popular "My Nightmare Case in the Cath Lab"
- Oral and Poster Abstract Presentations
- PICS/AICS Achievement Award

Invited Faculty: Teiji Akagi, Hakan Akpinar, Mansour Al-Jufan, BG Alekyan, Mazeni Alwi, Zahid Amin, Raul Arrieta, Emile Bacha, Steven Bailey, David Balzer, John Bass, Lee Benson, Lisa Bergersen, Darren Berman, Jacek Bialkowski, Werner Budts, Qi-Ling Cao, Massimo Caputo, Mario Carminati, John Carroll, Francisco Chamie, Jae Young Choi, Roberto Cubeddu, Bharat Dalvi, Jo De Giovanni, Michael de Moor, Karim Diab, Makram Ebeid, Howaida El-Said, Maiy El Sayed, Horacio Faella, Thomas Fagan, Ted Feldman, Craig Fleishman, Mark Fogel, Simone Fontes-Pedra, Thomas Forbes, Olaf Franzen, Yun Ching Fu, Mark Galantowicz, Wei Gao, Marc Gewillig, Matt Gillespie, Omar Goktekin, Miguel Granja, Daniel Gruenstein, Donald Hagler, James Hermiller, and others

cape town 2013

6th WORLD CONGRESS

Paediatric Cardiology & Cardiac Surgery

17 – 22 February 2013, Cape Town, South Africa



PROGRAMME TRACKS

- **Surgery, anaesthesia and intensive care**
- **Catheter interventions from fetus to adult**
- **Health systems and heart disease**
- **Adults with congenital and acquired heart disease**
- **Cardiology and the imaging revolution**

Congress Secretariat

Contact the congress secretariat or visit www.pccs2013.co.za

P.O Box 6761, Roggebaai, 8012, South Africa

Telephone: +27(0) 21 408 9796 Fax: +27(0) 21 408 9954

E-mail: info@pccs2013.co.za

Hosted by:

SA Heart

www.pccs2013.co.za

Pleural Fluid Triglyceride Cholesterol Ratio in Chylothorax

By Sameh Ibrahim Sersar, MD

Presented at the *7th Congress of Update in Cardiology and Cardiovascular Surgery* in association with TCT Mediterranean which will be held on 24-27 March 2011, in Antalya, Turkey. Oral Presentation number: 0554.

Abstract published in *International Journal of Cardiology*, Vol. 147 (March 2011), S44. doi:10.1016/S0167-5273(11)70136-X.

Key Words

Chylothorax, Triglyceride Cholesterol Ratio, steroids, octreotide, fat-free diet, Monogen

Abstract

Introduction

Very little, if any, is discussed in the recent cardiothoracic surgery publications about Triglyceride Cholesterol Ratio value either in the diagnosis or the prognosis of Chylothorax.

Patients and Methods

A retrospective analysis of 60 patients with chylothorax with a mean age of 21 months (range, 1 month-65 years) who developed chylothorax after heart surgery (January 2007 through December 2010). Data were collected regarding demographics, method of diagnosis, surgical procedures, characteristics of chylous drainage and its management. The patients were divided into 3 groups: Group 1 (ratio <1); Group 2 (ratio between 1-2) and Group 3 (ratio >2).

Results

Eighteen cases had a ratio <1, 14 had a ratio between 1-2 and 28 had a ratio >2. There were 2 hospital mortalities; both had a triglyceride/cholesterol ratio >2. All patients responded to the conservative treatment, except two cases who required further thoracic duct ligation.

Conclusions

Pleural Fluid Triglyceride Cholesterol Ratio in Chylothorax can be used in the diagnosis of chylothorax, and more importantly, as a prognostic detector in cases of post cardiac surgery chylothorax.

Introduction

Very little if any is discussed in the recent cardiothoracic surgery publications about Triglyceride Cholesterol Ratio either in the diagnosis or the prognosis of Chylothorax. The incidence of chylothorax post cardiac surgery has increased from 0.6–1.5% up to 6.6% over the past 15 years. Diagnosis of chylothorax relies on the presence of chylomicrons, a triglyceride level above 1.1 mmol/L, and an absolute white blood cell count above 1,000 cells/mm3, with a lymphocyte fraction above 80% in the pleural fluid.[1-2-3-4-5]

Kerpsack SJ et.al., 1994 used the determination of the pleural fluid triglyceride cholesterol ratio of > 1 in the pleural fluid as one of their two criteria to diagnose chylothorax in cats. The other one was presence of chylomicrons.[6]

Soto-Martinez M and Massie J 2009; consider the presence of chylomicrons in the pleural fluid as the key diagnosis. Chylomicrons can be seen after staining with Sudan III which requires special cytological preparation of the pleural fluid that may not be freely available in each laboratory. Triglyceride concentration of the fluid is a simpler method but only positive if the concentration is above 1.1 mmol/L (concentrations between 0.56 and 1.1 mmol/L are equivocal). Administration of a high fat meal by mouth or via a nasogastric tube will result in a dramatic change in the colour, triglyceride and chylomicron content of the pleural effusion, confirming the presence of chyle leak.[7]

We aimed to investigate the value of triglyceride cholesterol ratio as a diagnostic and prognostic tool in patients with chylothorax.

Patients and Methods

This is a retrospective study of the files of 60 cases of post cardiac surgery chylothorax in one centre in Jeddah, KSA (between January 2007 through December 2010 in KFSH&RC; Jeddah). Approval to use the medical records of the patient was obtained from the section head. The inclusion criteria of the patients were one or more of the following criteria:

1. Pleural fluid triglyceride level above 1.1 mmol/L.
2. Pleural fluid absolute white blood cell counts above 1,000 cells/mm3.
3. Pleural fluid lymphocytes above 80%.
4. Presence of chylomicrons in the pleural fluid.

Data were collected regarding demographics, method of diagnosis, surgical procedures, characteristics of chylous drainage and its management. We calculated the pleural fluid triglyceride/cholesterol ratio in the chylothorax cases. The patients were then divided into three groups: Group 1 (ratio <1); Group 2 (ratio between 1-2) and Group 3 (ratio >2).

We tried to determine the value of pleural fluid triglyceride/cholesterol ratio in both the diagnosis and prognosis of those patients. Chylothorax is clinically suspected once the pleural fluid drainage is profuse, milky, prolonged or the trend of drainage is going up. Data were presented as mean or median with ranges or percentages as appropriate. Differences in categorical variables were analyzed by means of the χ^2 analysis, and differences in continuous variables were analyzed by Student t-tests. The Fisher Exact Test was also used where appropriate. Differences were considered to be statistically significant when p value was less than 0.05.

Results

Sixty cases diagnosed as chylothorax post cardiac surgery were included in our retrospective study. Fifty-nine had a repair or palliation of congenital heart diseases and one case had CABG. Females were more than males (34/26). Chylothorax was suspected if the chest tube drainage is excessive with milky colour with one or more of the following criteria:

1. Pleural fluid triglyceride level above 1.1mmol/L.
2. Pleural fluid absolute white blood cell counts above 1,000 cells/mm3.
3. Pleural fluid lymphocytes above 80%.
4. Chylomicrons in the pleural fluid.

They were divided into 3 groups. Group 1 included 18 patients with TG/Cholesterol ratio <1. Group 2 included 14 cases with TG/Cholesterol ratio between 1-2, and Group 3 with a TG/Cholesterol ratio >2. Forty-one patients (68.3%) responded to lone fat-free diet. Nine cases (15%) responded to fat-free steroids. Six cases (10%) responded to fat-free octreotides and 4 cases (6.66%) responded to fat free steroids octreotides regimen. The mean CT duration, ICU, requiring thoracic duct ligations, hospital stay and mortalities were significantly higher in Group 3. The most common operative procedures complicated by chylothorax were Tetralogy of Fallot (18.33%) and Glenn (18.33%). Single ventricle pathway surgeries were responsible for 40% of chylothorax cases. Redo surgeries were responsible for 31.6%. Chest tubes are usually removed

when the chest x-ray shows full lung expansion with no air leak with acceptable drainage; 2-5ml/kgm/day. All patients were followed except three non-Saudi patients and the mortality case. Monogen was routinely prescribed for one month post discharge out of the hospital. The mean follow-up was 12 months (range between 2-42 months). See Tables 1 and 2.

Discussion

The prevalence of postoperative chylothorax in children is variable between 1% or less to 4.7%. The greater the complexity of the surgery, the higher the risks and earlier feeding postoperatively. Postoperative chylothorax is the most common cause of chylothorax in children. Chylothorax post-cardiac surgery is due to direct injury to the thoracic duct, central venous thrombosis and/or high central venous pressure.[4-5-7-8-9-10]

The incidence in our study was almost 5%. It was much more post pediatric cardiac surgery than adult cardiac surgery. Our practice is to send the fluid for chyle studies (pleural fluid triglyceride cholesterol levels, blood cell counts above 1,000 cells/mm3 with lymphocytes >80% and rarely chylomicrons) once there is clinical or intra-operative suspicion; a large amount of drainage, especially after the patient is fed. We usually depend upon the presence of triglycerides more than 1.1 mmol (48 cases - 80%), and absolute pleural fluid white blood cell counts above 1,000 cells/mm3 with lymphocytes >80% (20 cases - 33.3%), and the presence of chylomicrons (10 cases - 16.6%).

We found the Pleural fluid triglyceride/cholesterol ratio >1 in 42 cases (70%). Ratio >2 was parallel to the +ve diagnosis in 70% of cases. Ratio >2 may give false +ve results if the cholesterol level is very low. In such a case, we can use a combination of both ratio and triglyceride level. Although Buttiker et. al., 1999 believe that cholesterol level is not applicable in neonates and infants as dietary fat used in their formula consists mainly of triglycerides and almost no cholesterol, and the presence of cholesterol in the effusion is not expected.[1]

Table 1. The Operative Procedure Complicated by Chylothorax.

Operation	Ratio <1 18	Ratio ( ) 1-2 14	Ratio >2 28
CAVC	4 (22.2 %)	3 (21.35%)	3 (10.7%)
Rastelli	1 (5.55%)	0	1 (3.57%)
TOF	4 (22.2 %)	4 (28.56%)	3 (10.7%)
Glenn	2 (11.1%)	0	9 (30.21%)
Fontan	3 (16.6%)	3 (21.35%)	3 (10.7%)
BTS	1 (5.55%)	2 (14.28%)	2 (7.14%)
VSD	1 (5.55%)	1 (7.14%)	1 (3.57%)
Redo VSD	0	0	1 (3.57%)
TAPVD	1 (5.55%)	0	1 (3.57%)
Definitive ASO	1 (5.55%)	1 (7.14%)	3 (10.7%)
CABG	0	0	1 (3.57%)

Table 2. Demographics, Operative Data and Results of the Three Groups

Ratio No.	Ratio <1 0.7 18	( ) 1-2 1.7 14	>2 9.5 28
Mean Age in Months	31 (1-120)	27.5 (0.5-108)	19.7 (3-720)
M/F	10/8	6/8	10/18
Single	7	4	15
Bi-Ventricle	11	10	13
Redo Surgeries	4	2	13
Mean ICU	6.5	7.2	9 S.
Mean Hospital	16.5	17.5	22.5 S.
Mean CT Amount	20.5	19	19.5
Mean CT Duration	11.5	8	16.5 S.
Diet	16 (88%)	10 (71.4%)	15 (57.5%) S.
Steroids	1 (5.5%)	1 (7.14%)	7 (25%) S.
Octreotides	1 (5.5%)	1 (7.14%)	4 (14.25%) S.
Both	0	2 (14.28%)	2 (7.125%)
Duct Ligation	0	0	2 (7.125%) S.
Recurrence	0	0	0
Death	0	0	2 (7.125%) S.

We may disagree with this thought due to the eagerness of mothers nowadays to feed their children and our patients mean age was 21 months. Once the diagnosis is confirmed, fat-free diet and / or Monogen with diuretics, and ACEI are started and optimized. If the drainage trend is going up or refractory to diet modification only, we either give steroids or octreotides with no fixed policy or justification for which we use. The predictors of prolonged chest tube drainage >21 days were single ventricle physiology, redo surgeries, Fontan, Glenn and BT shunts. Nath et.al., 2009 found 25% of the chylothoraces to be post-Fontan and 20% to be post-Glenn shunts and 5% post-Norwood.[10-11]

Truncus arteriosus repair was the most common operative procedure complicated by chylothorax in the series of Biewer et.al., 2010, followed by TGA repair and then AVSD repair.[11-12]

We had 3 patients who did not respond to the conservative treatment; the first patient was a two-year-old boy with Double Outlet Right Ventricle with Hypoplastic Right Ventricle who had a redo sternotomy and a Bidirectional Glenn shunt status post-Blalock-Taussig shunt and thrombosis of the left femoral vein. His TG/Cholesterol ratio was 4.2. His mean CT drainage was 17 ml/kg/day. Monogen was started for 10 days, followed by steroids for 5 days. However, the chest tube drainage continued profusely. It was decided to give him nothing by mouth, and to start total parenteral nutrition. After two days the plan was changed because of the non-compliance of the mother who kept giving the patient milk formula. In the end, right thoracotomy and supra-diaphragmatic ligation of the thoracic duct on the twenty-third day postoperatively was performed. The chest tube was removed on the sixth day post-duct ligation.

The second patient was a 60-year-old man with diabetic hypertensive dyslipidaemic with 3 vessel coronary artery disease and chronic renal impairment. He had CABG. He had few sessions of renal dialysis and a smooth early postoperative course for 10 days, then he started to develop chylothorax with TG/cholesterol ratio: 3.8, sepsis, multi-organ failure and prolonged the ICU stay. He did not make it and died in the ICU on the 24th postoperative day.

The third case was an 18-month-old boy with Redo Sternotomy / Hypertensive Glenn shunt with forward pulmonary blood flow. Chylothorax was diagnosed. He continued to drain profusely for almost 6 weeks with failure of TPN, steroids, octreotides and even duct ligation. Trial of occlusion of the forward flow was aborted due to extreme desaturation. He died 7 weeks post Glenn shunt. Forty-one (68.3%) cases responded to a lone fat-free. The worst response to diet modification alone was noticed in Group 3. Nine patients responded to lone fat-free + steroids; 15%

with the best response noticed in Group 3. Six cases responded to a lone fat-free + Octreotides; 10% with the best response noticed with Group 3 also. Four cases responded to lone fat-free + both steroids and octreotides; 6.6% with the best response noticed in Group 2. Three cases were non-respondent - 5%; two of them were post-redo Glenn babies, and the third one was post-CABG old man. All the non-respondent patients were in Group 3 with a TG/cholesterol ratio more than 2. We had two patients who had thoracic duct ligations, but we never had pleuro-peritoneal shunt. We did not encounter any recurrence in our study. This may be due to the relatively short follow-up duration (median of 14 months).

Conclusions

Conservative therapy of chylothorax after cardiac surgery remains the standard approach in most cases. Triglyceride cholesterol ratio can be used as an acceptable diagnostic and an excellent prognostic tool in patients with post cardiac surgery chylothorax.

Limitations

This is a retrospective study with all inherited defects of the retrospective studies with a relatively good number of patients. The patients demographics, diagnoses and operations are heterogenous. Follow-up duration was relatively short. There was no standard fixed protocol for the management of each patient in this series as regards when to send for chyle study, which modality of treatment to start, size, number, positions and types of chest tubes and when to remove them. We did not study the pro and anti coagulation, total proteins or the immunoglobulins.

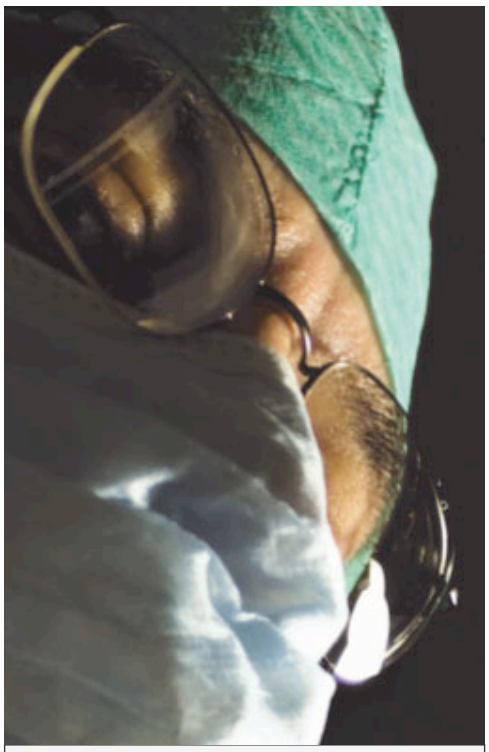
References

1. Buttiker V, Fanconi S and Burger R. Chylothorax in children: Guidelines for diagnosis and management. Chest 1999; 116: 682-687.
2. Bond S, Guzzetta P, Synder M and Randolph J. Management of pediatric postoperative chylothorax. Ann Thorac Surg 2001; 72:193-1960.
3. Bassiouni AM and Sersar SI. Chylothorax following pediatric cardiac surgery: a retrospective observational study. JESCTS 18(3–4):76–80;2010.
4. Sersar SI. Predictors of prolonged drainage of chylothorax after cardiac surgery: single centre study. Pediatr Surg Int. 2011;27(8):811-5.
5. Chan E, Russell J, Williams W, Van Arsdell G, Coles J and McCrindle B. Postoperative chylothorax after cardiothoracic surgery in children. Ann Thorac Surg 2005; 80: 1864–1870.
6. Kerpsack SJ, McLoughlin MA, Birchard SJ, Smeak DD, Biller DS. Evaluation of mesenteric lymphangiography and thoracic duct ligation in cats with chylothorax: 19 cases (1987-1992). J Am Vet Med Assoc. 1994 1;205(5):711-5.
7. Soto-Martinez M and Massie J. Chylothorax: Diagnosis and Management in Children. Paediatric Respiratory Reviews 10 (2009) 199–207.
8. Chan S, Lau W and Wong WHS, Cheng LC, Chau AKT and Cheung YF. Chylothorax in Children After Congenital Heart Surgery. Ann Thorac Surg 2006;82:1650-1656.
9. Beghetti M, La Scala G, Belli D, Bugmann P, Kalangos A and Le Coultre C. Etiology and management of pediatric chylothorax. J Pediatrics 2000;136:653–658.
10. Panthongviriyakul C and Bines JE. Post-operative chylothorax in children: An evidence-based management algorithm. Journal of Paediatrics and ChildHealth 44(12), ; 716–721, 2008.
11. Nath D, Savla J, Khemani R, Nussbaum D, Greene C and Wells W. Thoracic duct ligation for persistent chylothorax after pediatric cardiothoracic surgery. Ann Thorac Surg 2009; 88: 246-252.
12. Biewer ES, Zurn C, Arnold R, Glockler M, Schulte-Monting J, Schlensak C and Dittrich S. Chylothorax after surgery on congenital heart disease in newborns and infants -risk factors and efficacy of MCT-diet. J Cardiothorac Surg. 2010 Dec 13;5(1):127.

CCT

Corresponding Author

Sameh Ibrahim Sersar, MD
King Faisal Specialist Hospital and Research Center
Cardiothoracic Surgery Dept.
MBC J 16
P.O.Box 40047
Jeddah 21499
Saudi Arabia
Sameh001@yahoo.com



Need to Recruit a Pediatric Cardiologist?

Advertise in Congenital Cardiology Today, the only monthly newsletter dedicated to pediatric and congenital cardiologists.

Reach the most Board Certified or Board Eligible pediatric cardiologists worldwide.

Recruitment advertising includes full color in either the North American print edition, or the electronic PDF International edition.

Available in 1/3 and 1/2 page vertical Recruitment ad sizes. We can create the advertisement for you at no extra charge!

Contact:
Tony Carlson, Founder
Tel: +1.301.279.2005 or
TCarlsonmd@gmail.com

CONGENITAL CARDIOLOGY TODAY is pleased to announce its first Chinese language edition, printed and distributed in China and available worldwide in a PDF file. It will be published four times a year. You can read the August premier issue at:

www.congenitalcardiology.com/China-Aug12.pdf

If you would like to subscribe the the electronic PDF version, send an email to: CCT-China@CCT.bz being sure to include your name, titles, organization and its address.
If you would like to advertise in this special issue, send an email to: CCT-China-Adv@CCT.bz

CHOC Children's

Sudden Cardiac Arrest in Children and Adolescents – Current Controversies

Program Director

Anjan S. Batra, MD, FHRS
Medical Director of Electrophysiology,
CHOC Children's
Associate Professor, Clinical Pediatrics,
UCI School of Medicine

Keynote Speakers

Frank I. Marcus, MD
Professor of Medicine
Section of Cardiology
Department of Medicine
University of Arizona
Health Sciences Center

Barry J. Maron, MD
Director, Hypertrophic
Cardiomyopathy Center
Minneapolis Heart Institute
Foundation
Minneapolis, MN

Friday – Saturday, January 25 - 26, 2013

Disney's Grand Californian Hotel
1600 South Disneyland Drive
Sequoia Ballroom
Anaheim, CA 92808

Register online:
www.choc.org/scaconference

In affiliation with UCI School of Medicine

Conference Faculty

Anjan S. Batra, MD, FHRS – Chair, Program Director
Medical Director of Electrophysiology, CHOC Children's
Associate Professor, Clinical Pediatrics, UCI School of Medicine

Anthony Chang, MD, MBA, MPH
Director of Heart Institute, CHOC Children's Heart Institute

Leslie Anne Rabbitt, MPH
Administrative Director, CHOC Children's Heart Institute

Kevin M. Shannon, MD
Professor of Pediatric Electrophysiology
Mattel Children's Hospital at UCLA

Michael J Silka, MD
Professor and Chief, Division of Cardiology
Co-Director Heart Institute, CHLA
Keck School of Medicine, USC

Dianne L. Atkins, MD
Professor, Pediatrics, University of Iowa Children's Hospital and Carver College of Medicine, Iowa City, IA

Seshadri Balaji, MD
Professor, Pediatrics, Pediatric Cardiology
Director of Director, Pediatric Arrhythmias, Pacing & Electrophysiology
Oregon Health Science University

Yaniv Bar-Cohen, MD
Pediatric Electrophysiology
Children's Hospital Los Angeles

Stuart Berger, MD
Professor of Pediatrics, Pediatric Cardiology/Pediatric Critical Care
Medical Director, The Herma Heart Center
Director, Project A.D.A.M.
The Medical College of Wisconsin
The Children's Hospital of Wisconsin

Bryan C. Cannon, MD, FHRS
Director, Pediatric Arrhythmia and Pacing Service
Associate Professor of Pediatrics
Mayo Clinic, Rochester, Minnesota

Sumeet S. Chugh, MD, FACC, FHRS, FAHA
Pauline and Harold Price Professor Associate Director, Heart Institute Director, Cardiac Electrophysiology
Cedars-Sinai Heart Institute

Robert Hamilton , MD
The Hospital for Sick Children
Section Head, Electrophysiology
Cardiology, Senior Associate Scientist
Physiology & Experimental Medicine
Department of Peds, University of Toronto

Chris Koutures, MD, FAAP
Pediatric and Sports Medicine Specialist
Gladstien & Koutures, Anaheim Hills CA
Team Physician: USA Volleyball National Teams and CS Fullerton

Ian Law, MD
Clinical Professor of Pediatrics
Director of Clinical Cardiology, Division of Pediatric Cardiology
Director, Pediatric Electrophysiology
University of Iowa Children's Hospital
University of Iowa Carver College of Medicine

Marc A. Lerner, MD
Medical Officer
Orange County Department of Education

Ravi Mandapati MD, FACC
Professor of Medicine
Director, Specialized Program for Arrhythmias in Congenital Disease at UCLA
Director, Pediatric Cardiac Electrophysiology, Loma Linda University Medical Center
Director, Cardiac Electrophysiology, Pomona Valley Hospital Medical Center

Frank I. Marcus, MD - Key Note Speaker
Professor of Medicine
Section of Cardiology
Department of Medicine
University of Arizona Health Sciences Center

Barry J. Maron, MD - Key Note Speaker
Director, Hypertrophic Cardiomyopathy Center
Minneapolis Heart Institute Foundation
Minneapolis, MN

Jeremy Moore, MD
Pediatric Cardiology, Children's Hospital UCLA

Medical News, Products and Information

Less Experienced Physicians More Costly Than More Experienced Physicians

This study is the first to examine physician characteristics and medical costs. Physicians with the least experience spend significantly more money treating patients than physicians who have the most experience, according to a new RAND Corporation study.

The findings, published in the November edition of the journal *Health Affairs*, are from the first study to examine the link between physician characteristics and medical costs.

Researchers say the findings could have significant implications for less-experienced physicians, who might be excluded from contracting networks or face lower payments as both private insurers and government programs look to reward health care providers who deliver quality care at a lower cost.

"These findings are provocative, but they warrant further examination and need to be affirmed by additional studies," said lead author Dr. Ateev Mehrotra, an associate professor at the University of Pittsburgh School of Medicine and a researcher at RAND, a nonprofit research organization. "However, it is possible that one driver of health care costs is that newly trained physicians practice a more-costly style of medicine."

Commercial health plans and Medicare are using cost profiles to identify which physicians account for more health care spending than others, while devising strategies to reward those who provide quality care at a lower cost.

To identify which physician types might be costlier than others, researchers used commercial health plan claims for more than 1 million Massachusetts residents from 2004 and 2005 to construct cost profiles for more than 12,000 physicians in the state. Costs were evaluated across 600 types of "episodes of care" that included a patient's illness and the severity of their disease, including whether a procedure was performed.

Physicians who had less than 10 years of experience had 13.2% higher overall costs than physicians with 40 or more years of experience. Physicians with 10 to 19 years of experience had cost profiles that were 10% higher, those with 20 to 29 years of experience were 6.5% higher and those with 30 to 39 years of experience were 2.5 % higher.

No association was found between costs and other characteristics such as having had a malpractice claim or disciplinary action, whether a physician was board certified or the size of the medical practice where a physician worked. The study did not attempt to judge the quality of care provided.

Researchers say the cost difference noted by the study does not suggest that less-experienced physicians provide better medical care. Previous research has found only a weak relationship between quality and spending.
Because the use of cost profiles is relatively new and such tools are still being refined, researchers are cautious about the findings.

"Our findings cannot be considered final, but they do underscore the need to better understand physician practice patterns and what influences that behavior," Mehrotra said.

There are a number of factors that may explain the findings, researchers say. Recently trained physicians may be more familiar with and more likely to use new, expensive treatment modalities than older physicians. In addition, it is possible that newer physicians' lack of experience and uncertainty translates into more-aggressive medical care. Less-experienced physicians also may attract patients with problems that are harder to address and the current cost profiling methods may not adequately account for these differences.

As newer physicians gain more experience and have longer relationships with their patients, their practice patterns may change and become less costly. However, it also is possible that the cost differences remain throughout the careers of the newly trained physicians.

Researchers say the study's findings highlight the need for postgraduate training programs and specialty medical boards to educate physicians about their responsibility to be good stewards of health care resources.

Teens with Cardiovascular Risk Factors Face Accelerated Arterial Aging by Their Early '20s

A new study presented in November at the annual meeting of the American Heart Association in Los Angeles demonstrates that teenagers must control cardiovascular risk factors in adolescence or face "accelerated arterial aging" by their early '20s.

The study, which examined young people over a period of four years, shows that teens with risk factors such as high blood pressure, obesity and high levels of LDL cholesterol (the "bad" cholesterol) have abnormal thickness and stiffness (atherosclerosis) of their carotid arteries by the time they are 22 on average.

Carotid arteries supply blood to the brain. Atherosclerosis of carotid arteries is associated with a higher risk of stroke and heart attacks in adults.

"Young people must change their lifestyles to reduce risk factors and prevent a projected decline in life expectancy," says Elaine Urbina, MD, Director of Preventive Cardiology at Cincinnati Children's Hospital Medical Center and the study's lead author.

"Physicians should address cardiovascular risk factors early in life to prevent stroke and heart attacks in adulthood, and they should continue to screen for abnormalities in cardiovascular risk factors such as cholesterol and blood pressure, especially in children with an elevated body mass index or Type 2 diabetes."

Dr. Urbina and colleagues at Cincinnati Children's studied 124 people between the ages of 10 and 22. They found a significant increase in internal carotid wall thickness, particularly in people with obesity and Type 2 diabetes. Carotid stiffness also increased, particularly in people


International Children's Heart Foundation

VOLUNTEER YOUR TIME!
We bring the skills, technology and knowledge to build sustainable cardiac programmes in developing countries, serving children regardless of country of origin, race, religion or gender.
www.babyheart.org

who, at the beginning of the study, had high LDL cholesterol, a change in body mass index, and baseline carotid stiffness.

Dr. Urbina's study is one of the first to follow people over time (longitudinal study), and show the rate of progression of carotid wall thickness in this age group. In 2009, the AHA journal *Circulation* published a study by Dr. Urbina showing that obese children as young as 11 have atherosclerosis of their carotid arteries. The earlier study, however, measured risk factors and carotid thickness and stiffness at the same time (cross-sectional study), rather than over a period of time.

The new study was supported by a grant from the National Heart, Lung and Blood Institute (NHLBI R01 HL105591-01).

Additional information can be found at www.cincinnatichildrens.org.

Medtronic Gains FDA Clearance for New Pediatric Oxygenation System for Neonate, Infant & Pediatric Cardiopulmonary Bypass Surgery

Advanced System Serves as Child's Lungs During Lifesaving Open-Heart Surgery and Provides Perfusionists with Options for a Broader Range of Patients

In October, Medtronic, Inc. announced the US Food and Drug Administration (FDA) 510(k) clearance and the first US clinical use of its new Affinity Pixie® Oxygenation System. The system allows for broader use in children of various sizes and easy set-up and use by perfusionists during lifesaving open-heart (cardiopulmonary bypass) surgeries in neonates, infants and small children, including those with congenital heart defects.

The Affinity Pixie Oxygenation System serves as a child's lungs during open-heart surgery by removing carbon dioxide and adding oxygen to the child's blood before returning it to the body. It also cools or warms the blood to attain the desired body temperature. During open-heart surgery, blood is routed away from the child's heart and lungs through the cardiopulmonary bypass circuit that includes the oxygenation system, thereby creating a bloodless, motionless field, which is what allows surgeons to perform complex procedures on the heart intended to correct the defect or improve heart function.

The Affinity Pixie Oxygenation System was first used in the United States at the Advocate Christ Medical Center in Oak Lawn, Ill. The Affinity Pixie Oxygenation System with Balance® Biosurface gained CE (Conformité Européenne) Mark in May 2010, and is currently available for use in more than 50 countries worldwide.

A congenital heart defect is a condition, present at birth, in one or more structures of the heart or blood vessels. Approximately 25% of the 32,000 infants born each year in the United States with congenital heart defects require invasive treatment within the first year of life[1], and some children require additional procedures as they grow older.

"Medtronic is committed to investing its resources to provide successful therapies to underserved populations, including pediatric patients," said John Liddicoat, MD, Senior VP, Medtronic and President of the Structural Heart business. "The Affinity Pixie Oxygenation System is the latest innovation in Medtronic's expanding portfolio of products for pediatric cardiac patients, which includes transcatheter pulmonic valves, cannula products, arterial filters and temporary pacing leads."

For more information visit: www.medtronic.com.

Gore Reacts to RESPECT Trial Results - Data Calls for Further Research on Transcatheter Patent Foramen Ovale (PFO) Closure

(Business Wire) W. L. Gore & Associates responded to initial results reported in St. Jude Medical, Inc.'s RESPECT clinical trial. The RESPECT study investigated whether transcatheter closure of PFO using St. Jude's AMPLATZER® PFO Occluder device is safe and effective compared to best medical therapy in the prevention of recurrent cryptogenic stroke. Gore is concurrently conducting its Gore REDUCE Clinical Study using both the Gore HELEX® Septal Occluder and, as reported earlier this week, the new Gore® Septal Occluder in patients with PFO and a history of cryptogenic stroke or imaging-confirmed transient ischemic attack (TIA).

Stuart Broyles, PhD, Associate with the Gore Medical Division Stroke Business, commented, "Our commitment is to patients suffering from cryptogenic strokes and bringing them viable and beneficial treatment options. Our goal is to reduce recurrent stroke and improve the quality of life for patients. The RESPECT study data suggest closure therapy for PFO may be beneficial, but further research is required. Gore is committed to the pursuit of a PFO indication in the US for the GORE HELEX Septal Occluder and the GORE Septal Occluder. Worldwide, these Gore devices have a strong record of patient safety. We will continue to pursue the indication for our devices through the Gore REDUCE Clinical Study. Gore looks forward to further review of the RESPECT data in the coming weeks."

For more information visit: www.clinical.goremedical.com/REDUCE.

Request for Survey Participation: Cardiologists' Attitudes and Practices Regarding Genetic Testing For HCM

Are you a cardiologist who sees patients with Hypertrophic Cardiomyopathy (HCM)?

Please take this 10 minute online, anonymous survey - http://vovici.com/wsb.dll/s/ca61g5136d regarding genetic testing for HCM.

Upon completion, the respondent will obtain further resources refreshing them on the current practices and guidelines regarding genetic testing for HCM.

Thank you in advance for your participation. Your time and input are valuable and very much appreciated.

- Yi-Lee Ting, BS; Northwestern University; Genetic Counseling Program
- Lisa Dellefave-Castillo, MS; Certified Genetic Counselor; The University of Chicago, Section of Cardiology
- Elizabeth McNally, MD, PhD; Professor, Department of Medicine; Director, Institute for Cardiovascular Research; The University of Chicago

China California Heart Watch

www.chinacal.org

Robert Detrano MD, PhD, President
Cardiology and Professor of Radiological Science and Medicine
University of California at Irvine
19 Mistral Lane
Irvine, CA 92617
USA Phone: 949-737-1637; China Phone: 86-86096061
Email: robert@chinacal.org

Dedicated to understanding and relieving problems of heart disease and health care in rural China

Coping Skills, Marital Satisfaction Help Pregnant Moms Manage Stress When Fetus Has Heart Defect

--Early Detection of Heart Disease in Fetus Helps in Planning Care, but May Increase Maternal Anxiety, Depression--

Newswise — Expectant mothers who learn from prenatal diagnosis that they are carrying a fetus with a congenital heart defect (CHD) commonly suffer post-traumatic stress, depression and anxiety. However, a healthy relationship with one's partner and positive coping mechanisms can reduce this intense stress, according to new research from the Cardiac Center of The Children's Hospital of Philadelphia.

The study was published in the September 2012 issue of *The Journal of Pediatrics*.

"Receiving the news of carrying a fetus with a CHD is a stressful event which can potentially influence a mother's anxiety level," said study leader Jack Rychik, MD, Medical Director of the Fetal Heart Program in the Cardiac Center at The Children's Hospital of Philadelphia. "Prenatal diagnosis is helpful in that it gives parents time to learn about the defect, review treatment options, plan for necessary interventions and consider their options. While this is intrinsically a stressful time for parents, there has previously been little research on the details of this stress and ways to buffer it."

The researchers surveyed 59 pregnant mothers, ranging in gestational age from 17 to 31.5 weeks, who were recruited by nurse coordinators at either the initial visit to the Fetal Heart Program or a follow-up visit, then followed throughout the rest of their gestation. Participants intended to continue the pregnancy, and to plan for follow-up with the Fetal Heart Program. All were carrying fetuses with serious CHD requiring neonatal evaluation and postnatal surgical or catheter-based intervention within the first six months of life.

Using psychological evaluation tools and self-report instruments, the study team measured traumatic stress, depression and anxiety among the mothers. The researchers also measured partner satisfaction and collected demographic data.

More than 39% of the women experienced clinically important traumatic stress, 22% experienced depression, and 31% experienced state anxiety. Lower partner satisfaction and lower income were both associated with higher levels of depression, anxiety and traumatic stress. When the researchers controlled for partner satisfaction and income, they found denial to be most important factor contributing to depression.

"Prenatal diagnosis of CHD is a traumatic event for many pregnant women. In our study we found that a substantial proportion of mothers exhibited evidence for traumatic stress, with nearly 40% exceeding clinical cut-off points for post-traumatic stress disorder," said Guy S. Diamond, PhD, a psychologist at The Children's Hospital of Philadelphia who participated in this study.

"While individual coping skills are important, partner satisfaction may better predict a more resilient response to the stress of prenatal CHD," Diamond added. We have identified 'denial' as an important contributor to depression and that on-going counseling sessions should focus on this risk factor."

"This study is the beginning, and more research needs to be done to ensure we are giving mothers the very best multidisciplinary care. In one way, the families are fortunate to know in advance that their baby has a CHD and in another way given more stress with that knowledge. In the future, optimal management strategies to improve outcomes for both mom and fetus will include stress reduction techniques, which should accompany the diagnosis of CHD prior to birth," added Rychik.

Dr. Rychik's co-authors are: Denise D. Donaghue, RN, MSN; Suzanne Levy, PhD; Clara Fajardo, MS; Jill Combs, RN, MSN; Xuemei Zhang, MS; Anita Szwast, MD, and Guy S. Diamond, PhD, all from The Children's Hospital of Philadelphia.

Dr. Rychik is supported in part by the Robert and Dolores Harrington Endowed Chair in Pediatric Cardiology.

For more information, visit www.chop.edu.

Victoria L. Vetter et al, Preliminary Analysis of the National Child Death Review Database for Cardiovascular Deaths - Cardiac MRI Detects

Serious Blood Flow Reversal after Heart Surgery in Children-- Cardiac researchers demonstrate that a combination of imaging techniques can identify a serious reversal of blood flow that occurs in some children after reconstructive surgery for complex heart defects. Using Time Resolved Gadolinium Angiography (TWIST) and magnetic resonance phase contrast velocity mapping (PC-MRI), Kevin K. Whitehead, MD, PhD and colleagues describe their experience in identifying blood flow reversal in children who have undergone Superior Cavopulmonary Connections (SCPC) as part of the Fontan procedure for single ventricle heart defects. Identifying flow reversal in the Left Pulmonary Artery (LPA) and Right upper Lobe Branch (RUL) pulmonary artery is important, because these manifestations of systemic to pulmonary arterial collateral flow (CollF) may result in poor outcomes for these patients.

A failure to recognize LPA or RUL flow reversal may also cause clinicians to significantly underestimate CollF. The researchers reviewed 112 SCPC patients who had CollF quantified by MRI, and were able to readily identify LPA or RUL flow reversal in 7% of these patients. The CollF burden was much higher for patients with flow reversal than in those without flow reversal.

CONGENITAL CARDIOLOGY TODAY

© 2012 by Congenital Cardiology Today (ISSN 1554-7787-print; ISSN 1554-0499-online). Published monthly. All rights reserved.

Publication Headquarters:
8100 Leaward Way, Nehalem, OR 97131 USA
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, Medical Editor - *JMoore@RCHSD.org*
- Virginia Dematatis, Assistant Editor
- Caryl Cornell, Assistant Editor
- Loraine Watts, Assistant Editor
- Chris Carlson, Web Manager
- William Flanagan, Strategic Analyst
- Rob Hudgins, Designer/Special Projects

Editorial Board: Teiji Akagi, MD; Zohair Al Halees, MD; Mazeni Alwi, MD; Felix Berger, MD; Fadi Bitar, MD; Jacek Bialkowski, MD; Philipp Bonhoeffer, 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.

PICS-AICS

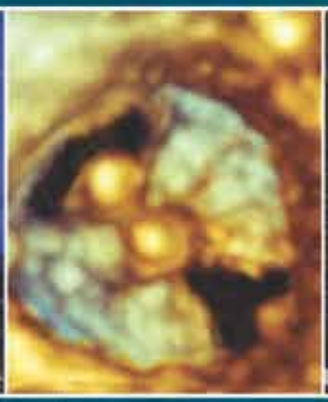
Pediatric and Adult Interventional Cardiac Symposium

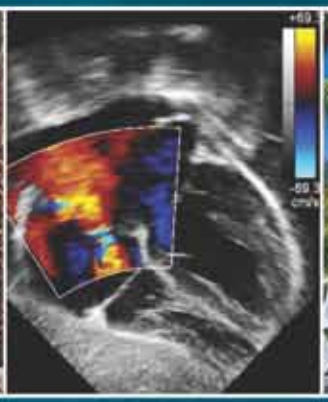
MIAMI

SAVE THE DATE JANUARY 19–22, 2013

REGISTRATION IS NOW OPEN

PRELIMINARY PROGRAM POSTED AT WWW.PICSYMPOSIUM.COM




LIVE CASE DEMONSTRATIONS WORKSHOPS HOT DEBATES ABSTRACT SESSIONS

"MY NIGHTMARE CASE IN THE CATH LAB" BREAKOUT SESSIONS DINNER EVENT

www.picsymposium.com

RUSH UNIVERSITY MEDICAL CENTER

Sponsored for CME credit by Rush University Medical Center

NuCLEUS-X™

Balloon Aortic & Pulmonic Valvuloplasty Catheter

Only U.S. Cleared Balloon for Balloon Aortic Valvuloplasty

B|BRAUN Interventional Systems

www.bisusa.org