Cardiology in the Young

Rare and Challenging Congenital Cardiac Lesions: an Interdisciplinary Approach

Highlights of:

10th Annual International Symposium on Congenital Heart Disease: Special Focus on Rare and Challenging Lesions, Vinoy Resort, Saint Petersburg, Florida, February 6–9. 2010

anc

Cardiology 2010, 13th Annual Update on Pediatric Cardiovascular Disease: Bringing Interdisciplinary Evidence-based Practice to the Patient, Disney's Contemporary Resort, Lake Buena Vista, Florida, February 10–14, 2010

Sponsored by



The Congenital Heart Institute of Florida



All Children's Hospital of St. Petersburg, Florida



The Children's Hospital of Philadelphia[®]
A pediatric healthcare network





Submit your paper online http://mc.manuscriptcentral.com/cty

CAMBRIDGE UNIVERSITY PRESS



ll Children's Hospital in St.
Petersburg, Florida has been dedicated to children's unique medical needs since 1926.
Our new 259-bed hospital provides the full spectrum of pediatric cardiac care, from the unborn child through adults with congenital heart disease. With nearly one-million square feet in our new hospital and adjoining Outpatient Care Center, we offer:

- 2 dedicated Cardiac Operating Suites
- 2 OR-capable Catheterization Labs
- Interventional Radiology Lab
- 22-bed Cardiovascular Intensive Care Unit
- Cardiac surgery & heart transplantation
- Cardiac MRI
- Perinatal cardiology & echocardiography
- Neonatal & pediatric cardiology
- Clinic for adults with congenital heart disease
- Outpatient Cardiology & Diagnostic Services
- Network of regional outpatient centers

Physician Access Line:

877-222-0404 (toll-free) or 727-767-8311





DEDICATED TO MAKING BETTER-BETTER.

We set out to make kids feel better. We ended up becoming one of the best.

One of the largest integrated medical campuses in the United States, Arnold Palmer Medical Center is home to Arnold Palmer Hospital for Children and Winnie Palmer Hospital for Women & Babies.

Arnold Palmer Hospital for Children

Featuring a Pediatric Intensive Care Unit, a Level One Trauma Center and 158 beds, Arnold Palmer Hospital is proud to recognize our Congenital Heart Institute and Pediatric Orthopedic Specialty Practice for helping us to achieve recent recognition as one of "American's Best Children's Hospitals," by *U.S.News & World Report*.

Specializing in Pediatric Cardiology and Cardiac Surgery, the Congenital Heart Institute features:

- Hybrid Catheterization/Surgical Laboratory
- 20-bed Cardiac Intensive Care Unit
- ICAEL Accredited Echocardiography Laboratory
- Fetal Cardiac Intervention Program
- Adult Congenital Heart Disease Program
- Cardiac Neurodevelopmental Clinic
- Advanced Cardiac Support Program
- Ultra-high-speed 128-Slice CT Scanner

- Cardiac MRI
- Cardiac Family Advisor Council
- Teaching and Research Affiliation with the University of Central Florida College of Medicine

Winnie Palmer Hospital for Women & Babies

Committed to the needs of women and babies, Winnie Palmer Hospital is a 285-bed facility complete with a Level III Neonatal Intensive Care Unit.

Dedicated. Focused. Strong.

Arnold Palmer Medical Center brings together the strength of dedicated physicians and focus of specialty care for newborns, children, teens and women. To learn more, visit arnoldpalmerhospital.com or

call 321.8HEALTH (321.843.2584).



Cardiology in the Young

journals.cambridge.org/CTY

Editor-in-Chief

Professor Edward J. Baker

Oxford Radcliffe Hospitals NHS Trust, John Radcliffe Hospital, Headington, Oxford, OX3 9DU, UK

Emeritus Founding Editor

Professor Robert H. Anderson

Cardiac Unit, Institute of Child Health, University College London, 30 Guilford Street, London WC1N 1EH, UK

Associate Editors

Allen D. Everett, Baltimore, MD Jeffrey P. Jacobs, St Petersburg, FL

International Editors

G. William Henry, Chapel Hill, NC

Hiromi Kurosawa, Tokyo

Supplements Editor Jeffrey P. Jacobs, St Petersburg, FL
Images Editor Roxane McKay, Memphis, TN

Founding Editors Anton E. Becker, Amsterdam; Giancarlo Crupi, Bergamo; Arthur Garson Jr,

Charlottesville, VA; Fernando Lucchese, Porto Alegre; Lucio Parenzan, Bergamo; the late Atsuyoshi Takao, Tokyo; Michael Tynan, London

International Editorial Board

Lindsey D. Allan (London) Luc Mertens (Leuven)

Maurice Beghetti (Geneva)

Lee N. Benson (Toronto)

Per G. Bjørnstad (Oslo)

Anthony C. Chang (Orange, CA)

Tjark Ebels (Groningen)

Timothy Feltes (Columbus, OH)

J. William Gaynor (Philadelphia, PA)

Cleonice de C. Mota (Belo Horizonte)

Jane Newburger (Boston, MA)

Edgardo E. Ortiz (Quezon City)

Daniel Penny (Melbourne)

Andrew N. Redington (Toronto)

Girish S. Shirali (Charleston, SC)

Norman H. Silverman (Palo Alto, CA)

Allan Goldman (London)

Willem A. Helbing (Rotterdam)

John Hess (Munich)

Giovanni Stellin (Padova)

András Szatmári (Budapest)

Hideki Uemura (London)

Eero Jokinen (Helsinki) Steven A. Webber (Pittsburgh, PA)
Tom Karl (Brisbane) James L. Wilkinson (Melbourne)

Doff B. McElhinney (Boston, MA) Shi-Joon Yoo (Toronto)

Cardiology in the Young is indexed and abstracted in Index Medicus/MEDLINE; Current Contents/Clinical Medicine; Research Alert; Sci Search; EMBASE/Excerpta Medica

Commissioning Editor: Dan Edwards Production Editor: Nicki Marshall Design and Production: MPS Limited, Bangalore Printed & Bound: Latimer Trend, Plymouth

Published by Cambridge University Press (Journals), Edinburgh Building, Shaftesbury Road, Cambridge CB2 8RU, UK Tel: +44 (0)1223 326491; Fax: +44 (0)1223 325802; E-mail: dedwards@cambridge.org

Cambridge Journals Online

For further information about this journal please go to the journal website at: **journals.cambridge.org/CTY**





RARE AND CHALLENGING CONGENITAL CARDIAC LESIONS: AN INTERDISCIPLINARY APPROACH

Highlights of Heart Week in Florida 2010

10th Annual International Symposium on Congenital Heart Disease: Special Focus on Rare and Challenging Lesions, Vinoy Resort, Saint Petersburg, Florida, February 6–9, 2010

and

Cardiology 2010, 13th Annual Update on Pediatric Cardiovascular Disease: Bringing Interdisciplinary Evidence-based Practice to the Patient, Disney's Contemporary Resort, Lake Buena Vista, Florida, February 10–14, 2010

Sponsored by:

The Congenital Heart Institute of Florida - All Children's Hospital



The Cardiac Center at The Children's Hospital of Philadelphia



The Children's Hospital of Philadelphia®

A pediatric healthcare network

and

Arnold Palmer Hospital for Children



Editors:

Jeffrey P. Jacobs, David S. Cooper, David Goldberg, Gil Wernovsky, William M. DeCampli, and Robert H. Anderson

Jacobs JP, Cooper DS, Goldberg D, Wernovsky G, DeCampli, WM, Anderson RH (Editors). **2010 Supplement to Cardiology in the Young: Annual Heart Week in Florida Supplement Number 3 – Rare and Challenging Congenital Cardiac Lesions: an Interdisciplinary Approach**. Cardiology in the Young, Volume 20, Supplement 3, pages 1–204, December, 2010.

Cardiology in the Young

COPYRIGHT © 2010 CAMBRIDGE UNIVERSITY PRESS ISSN 1047-9511

Table of Contents December 2010

RARE AND CHALLENGING CONGENITAL CARDIAC LESIONS: AN INTERDISCIPLINARY APPROACH

Editors:

Jeffrey P. Jacobs, David S. Cooper, David Goldberg, Gil Wernovsky, William M. DeCampli, and Robert H. Anderson

Introduction to the Supplement Jeffrey P. Jacobs	1
Anomalies of the coronary arteries: nomenclature and classification Marshall L. Jacobs, Constantine Mavroudis	15
Anomalous origin and course of the coronary arteries Anthony Hlavacek, Marios Loukas, Diane Spicer, Robert H. Anderson	20
Echocardiographic imaging of anomalous origin of the coronary arteries Meryl S. Cohen, René J. Herlong, Norman Silverman	26
Surgery and critical care for anomalous coronary artery from the pulmonary artery Timothy A. Febrenbacher, Michael E. Mitchell, Nancy S. Ghanayem, James S. Tweddell	35
Anomalous aortic origin of a coronary artery: a universally applicable surgical strategy Tom R. Karl, Sylvio C. J. Provenzano, Graham R. Nunn	44
The registry of anomalous aortic origin of the coronary artery of The Congenital Heart Surgeons' Society Julie A. Brothers, J. William Gaynor, Jeffrey P. Jacobs, Christopher Caldarone, Anusha Jegatheeswaran, Marshall L. Jacobs, The Anomalous Coronary Artery Working Group	50
The electrocardiogram as an adjunct in diagnosing congenital coronary arterial anomalies Mitchell Cohen, Stuart Berger	59
Surgical management of congenital coronary arterial anomalies in adults Sameh M. Said, Joseph A. Dearani, Harold M. Burkhart, Hartzell V. Schaff	68
Fistulous communications with the coronary arteries in the setting of hypoplastic ventricles Robert H. Anderson, Diane Spicer	86
Development of the outflow tracts with reference to aortopulmonary windows and aortoventricular tunnels Robert H. Anderson, Andrew Cook, Nigel A. Brown, Deborah J. Henderson, Bill Chaudhry, Timothy Mohun	92
Echocardiography of aortopulmonary window, aorto-ventricular tunnels, and aneurysm of the sinuses of Valsalva William T. Mahle, Joseph Kreeger, Norman H. Silverman	100
Unnatural history of the right ventricle in patients with congenitally malformed hearts Leo Lopez, Meryl S. Cohen, Robert H. Anderson, Andrew N. Redington, David G. Nykanen, Daniel J. Penny, John E. Deanfield, Benjamin W. Eidem	107

Table of Contents continued

Rare problems associated with the fontan circulation	113
David Goldberg, Jorge Giroud, Marshall Jacobs, Kathryn Dodds, Jack Rychik	
The current surgical perspective to repair of atrioventricular septal defect with common atrioventricular junction Tom R. Karl, Sylvio C. J. Provenzano, Graham R. Nunn, Robert H. Anderson	120
An institutional approach to, and results for, patient with tetralogy with pulmonary atresia and major systemic-to-pulmonary collateral arteries William M. DeCampli, I. Ricardo Argueta-Morales, Jennifer Zabinsky, Robert L. Hannan, Redmond P. Burke	128
Role of the cardiologist in the evaluation of dysautonomia Jeffrey R. Boris	135
Commentary on the adoption of the electronic health record Jeffrey R. Boris	140
Patient-reported outcomes in congenital cardiac disease: are they as good as you think they are? <i>Philip Moons</i>	143
Feeding, growth, and nutrition in children with congenitally malformed hearts Barbara Medoff-Cooper, Maryam Naim, Deborah Torowicz, Anthony Mott	149
9th Annual William J. Rashkind Memorial Lecture in Pediatric Cardiology: "The Reimbursement Tsunami: Preserving the Passion" Robert Campbell	154
Abstracts from Cardiology 2010 Edited by David Goldberg	160

This journal issue has been printed on FSC-certified paper and cover board. FSC is an independent, non-governmental, not-for-profit organization established to promote the responsible management of the world's forests. Please see www.fsc.org for information

Cardiology in the Young © 2010 Cambridge University Press, ISSN 1047-9511 is published bi-monthly

Subscription information: Volume 20 (6 issues) will appear in 2010. Correspondence concerning subscriptions should be addressed to: Journals Customer Services, Cambridge University Press, The Edinburgh Building, Cambridge CB2 SRU, UK. Tel: +44 (0)1223 325150; E-mail enquiries: journals_subscriptions@cambridge.org; Web: www.cambridge.org; Cambridge Journals Online: www.journals.cambridge.org. The subscription rate for 2010 Volume 20 (6 issues) is: Individual rate £338 or US\$582; Institutional rate £658 or US\$58138. All prices inclusive of postage. Cheques should be made payable to Cambridge University Press. Copyright: The submission of a manuscript implies the following: (a) that the work described has not been published before, except in the form of an abstract or as part of a published lecture, review, or thesis; (b) that it is not under consideration for publication elsewhere; (c) that all co-authors approve its publication; (d) that its publication is approved by the responsible authorities at the institute where the work has been carried out; (e) that when the manuscript is all tool publishers (f) that the automatic transfer of the copyright to the publisher; (f) that it is publication, the authors agree to the automatic transfer of the copyright to publisher. (f) that the manuscript will not be publisher (b) that the manuscript will not be publisher (b) that the manuscript will not be publisher. (b) that the authors for material used from other copyrighted sources. All articles published in this journal are protected by copyright, which covers the exclusive rights to reproduce and distribute the article (e.g., as offprints), as well as all translation rights. No material published in this journal are be reproduced photographically or stored on microfilm, in video disks, etc., without first obtaining written permission from the publishers. The use of general descriptive names, trade manuscription in this publication, even if not specifically identified, does not imply that these names are not protected by