Cardiology in the Young

A Lifelong Interdisciplinary Approach to Common Arterial Trunk, Transposition of the Great Arteries, and Other Evolving Challenges in Paediatric and Congenital Cardiac Disease

> 12th Annual International Symposium on Congenital Heart Disease: Special Focus on Common Arterial Trunk and Transposition of the Great Arteries, Vinoy Resort, Saint Petersburg, Florida, February 17 – 21, 2012 and Cardiology 2012, 16th Annual Update on Pediatric and Congenital Cardiovascular Disease: Developing a Lifelong Interdisciplinary Strategy for Your Patient with Congenital Heart Disease, Loews Portofino Bay Hotel at Universal Orlando®, Orlando, Florida, February 22 – 26, 2012



All Children's Hospital, Saint Petersburg, Florida



The Congenital Heart Institute of Florida



The Children's Hospital of Philadelphia®

🔀 CARDIAC CENTER

and



THE HEART CENTER

The Heart Center at Arnold Palmer Hospital for Children



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

CAMBRIDGE UNIVERSITY PRESS



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 Editors

Dr G. William Henry Chapel Hill, USA

Professor Robert H. Anderson University College, London, UK

Associate Editors

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

International Editor

Professor Hiromi Kurosawa, Tokyo Women's Medical University, Japan

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) Maurice Beghetti (Geneva) Lee N. Benson (Toronto) Per G. Bjørnstad (Oslo) Anthony C. Chang (Orange, CA) David Cooper (Cincinnati, OH) Tjark Ebels (Groningen) Timothy Feltes (Columbus, OH) J. William Gaynor (Philadelphia, PA) Allan Goldman (London) Willem A. Helbing (Rotterdam) John Hess (Munich) Eero Jokinen (Helsinki) Tom Karl (Brisbane) Doff B. McElhinney (Boston, MA) Luc Mertens (Toronto) 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) Giovanni Stellin (Padova) András Szatmári (Budapest) Hideki Uemura (London) Steven A. Webber (Pittsburgh, PA) James L. Wilkinson (Melbourne) 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





A LIFELONG INTERDISCIPLINARY APPROACH TO COMMON ARTERIAL TRUNK, TRANSPOSITION OF THE GREAT ARTERIES, AND OTHER EVOLVING CHALLENGES IN PAEDIATRIC AND CONGENITAL CARDIAC DISEASE

Highlights of HeartWeek 2012

12th Annual International Symposium on Congenital Heart Disease: Special Focus on Common Arterial Trunk and Transposition of the Great Arteries, Vinoy Resort, Saint Petersburg, Florida, February 17–21, 2012

and

Cardiology 2012, 16th Annual Update on Pediatric and Congenital Cardiovascular Disease: Developing a Lifelong Interdisciplinary Strategy for Your Patient with Congenital Heart Disease, Loews Portofino Bay Hotel at Universal Orlando[®], Orlando, Florida, February 22–26, 2012

All Children's Hospital, Saint Petersburg, Florida



The Congenital Heart Institute of Florida (CHIF)



The Cardiac Center at The Children's Hospital of Philadelphia



and The Heart Center at Arnold Palmer Hospital for Children





Editor:

Jeffrey P. Jacobs

EDITORIAL BOARD:

Jeffrey P. Jacobs, David S. Cooper, Gul Dadlani, Allan D. Everett, Gil Wernovsky, William M. DeCampli, and Robert H. Anderson

Jacobs JP, Cooper DS, Dadlani G, Everett AD, Wernovsky G, DeCampli WM, Anderson RH (Editors). December 2012 Issue of Cardiology in the Young: Annual Heart Week in Florida Issue Number 10 – A Lifelong Interdisciplinary Approach to Common Arterial Trunk, Transposition of the Great Arteries, and Other Evolving Challenges in Paediatric and Congenital Cardiac Disease. Cardiology in the Young, Volume 22, Issue 6, pages 619–830, December, 2012.

Pediatric Cardiac Care at All Children's Hospital

Il Children's Hospital in St. Petersburg, Florida provides expert pediatric care for children from across the state of Florida and beyond. We offer the full spectrum of pediatric cardiac care, from the unborn child through adults with congenital heart disease, in our state-of-the-art 259-bed hospital. All Children's is a fully integrated member of Johns Hopkins Medicine. Through Johns Hopkins Children's Heart Surgery at ACH, we are integrating treatment, research and education to provide world-class care and achieve the best outcomes.

Our Cardiac Services feature:

- 2 dedicated cardiac operating suites
- 2 OR-capable cath labs
- Interventional radiology lab
- 22-bed Cardiovascular Intensive Care Unit
- Neonatal & pediatric heart transplantation
- Clinic for adults with congenital heart disease
- Outpatient cardiology & diagnostic services
- Network of regional outpatient care centers
- Transport via ambulance, helicopter or fixed-wing aircraft

Physician Access Line: 1-877-222-0404

Learn more at **facebook.com/HRatACH** and **twitter.com/HRatACH**

www.allkids.org



Volume 22 • Number 6 • Pages 619–830

Cardiology in the Young

COPYRIGHT © 2012 CAMBRIDGE UNIVERSITY PRESS ISSN 1047-9511

Table of ContentsDecember 2012

A LIFELONG INTERDISCIPLINARY APPROACH TO COMMON ARTERIAL TRUNK, TRANSPOSITION OF THE GREAT ARTERIES, AND OTHER EVOLVING CHALLENGES IN PAEDIATRIC AND CONGENITAL CARDIAC DISEASE

Editor:

Jeffrey P. Jacobs

Part I. Introduction	
Introduction: a lifelong interdisciplinary approach to common arterial trunk, transposition of the great arteries, and other evolving challenges in paediatric and congenital cardiac disease <i>Jeffrey P. Jacobs</i>	619
The world congress of paediatric cardiology and cardiac surgery: "The Olympics of our Profession" <i>Christopher Hugo-Hamman, Jeffery Phillip Jacobs</i>	630
The world congress of paediatric cardiology and cardiac surgery: A short factual history by Jane Somerville Jane Somerville	633
Part II. A Holistic Approach to Common Arterial Trunk and Transposition of the Great Arteries	
Rationalising the nomenclature of common arterial trunk Marshall L. Jacobs, Robert H. Anderson	639
Understanding coronary arterial anatomy in the congenitally malformed heart Robert H. Anderson, Ing-Sh Chiu, Diane E. Spicer, Anthony J. Hlavacek	647
Echocardiography of common arterial trunk Thieu Nguyen, J. Blaine John, Kathryn Nardell, Javier H. Gonzalez, Stan Timofeev, Gerald Marx	655
Echocardiography of transposition of the great arteries William T. Mahle, Javier H. Gonzalez, Joseph Kreeger, Gerald Marx, Gul Duldani, Norman H. Silverman	664
Foetal echocardiography of transposition of the great arteries and common arterial trunk <i>Grace Freire, Michelle Miller, James Huhta</i>	671
Cardiac magnetic resonance of the common arterial trunk and transposition of the great arteries <i>Mark A. Fogel, Marguerite Crawford</i>	677
Cardiac catheterisation of patients with common arterial trunk and transposition of the great arteries Gary E. Stapleton, Ivan Wilmot, Elsa J. Sub	687
Surgery for common arterial trunk Paul J. Chai, Jeffrey P. Jacobs, James A. Quintessenza	691
Transcatheter pulmonary valve insertion: when, how, and why Jeremy M. Ringewald, Elsa J. Sub	696
Surgical pulmonary valve insertion – when, how, and why Cheul Lee, Jeffrey P. Jacobs, Chang-Ha Lee, Jae Gun Kwak, Paul J. Chai, James A. Quintessenza	702
Safe surgical strategy for extracardiac conduit replacement in common arterial trunk Tom R. Karl	708
Long-term follow-up after truncal valve repair Hyde M. Russell, Constantine D. Mavroudis, Carl L. Backer, Constantine Mavroudis	718

Table of Contents continued

Past, present, and future of the arterial switch operation: historical review Ali Dodge-Khatami, Constantine Mavroudis, Constantine D. Mavroudis, Jeffrey P. Jacobs	724
Truncus and transposition: the Chicago approach Carl L. Backer, Hyde M. Russell	732
Complexity stratification of the arterial switch operation: a second learning curve <i>Francois Lacour-Gayet</i>	739
"All is not lost": management of intra-operative coronary injury during the arterial switch operation Luca A. Vricella, Richard Redett, W. Reid Thompson, Kristen Nelson, Jeffrey P. Jacobs, Duke E. Cameron	745
Arrhythmia management in patients with a common arterial trunk and d-transposition of the great arteries Jamie A. Decker, J. McCormack, Mitchell I. Cohen	748
Intensive Care Management of Neonates with d-Transposition of the Great Arteries and Common Arterial Trunk Pirouz Shamszad, Ryan A. Moore, Nancy Ghanayem and David S. Cooper	755
Primary care management of patients with common arterial trunk and transposition of the great arteries <i>Jeffrey R. Boris</i>	761
Long-term management of adults with conotruncal lesions: the diagnostic approach at All Children's Hospital Gul H. Dadlani, Katherine Braley, Anthony Sochet, Kristen Marcet, Jennifer Leshko, Dima Turpin, Jeffrey P. Jacobs, Richard Martinez	768
Part III. Ethical Considerations	
Ethical considerations for post-cardiotomy extracorporeal membrane oxygenation Constantine Mavroudis, Constantine D. Mavroudis, Jeanette Green, Robert M. Sade, Jeffrey P. Jacobs, Eric Kodish	780
The role of research for sustainable paediatric cardiac programmes in developing countries Constantine D. Mavroudis, Constantine Mavroudis, Jeffrey P. Jacobs, Allison Siegel	787
Part IV. Featured Topics	
Centre variation in cost and outcomes for congenital heart surgery Sara K. Pasquali, Michael G. Gaies, Jeffrey P. Jacobs, J. William Gaynor, Marshall L. Jacobs	796
Computational fluid dynamics in congenital heart disease William M. DeCampli, I. Ricardo Argueta-Morales, Eduardo Divo, Alain J. Kassab	800
13th Annual Featured Lecture in Cardiovascular Nursing: T. Garrett Rauch Memorial Lecture – one parent's perspective: helping families deal with the non-medical challenges of congenital heart disease <i>Jean Chatzky</i>	809
11th Annual William J. Rashkind Memorial Lecture in paediatric cardiology – a short history of progress: Where we've been, where we are, where we're going Gil Wernovsky	813
13th Annual C. Walton Lillehei Memorial Lecture – Invisible problems in cardiovascular surgery: What we can learn from prospective observational studies? James S. Tweddell	823

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 © 2012 Cambridge University Press, ISSN 1047-9511 is published bi-monthly

Subscription information: Volume 22 (6 issues) will appear in 2012. Correspondence concerning subscriptions should be addressed to: Journals Customer Services, Cambridge University Press, The Edinburgh Building, Cambridge CB2 8RU, UK. Tel: +44 (0)1223 320100; Fax: +44 (0)1223 321100; E-mail enquiries: journals_subscriptions@cambridge.org; Web: www.cambridge.org; Cambridge Journals Online: www.journals.cambridge.org The subscription nart for 2012 Volume 22 (6 issues) is: Individual rate £375 or US\$645]. Institutional rate £774 or US\$130. 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 letture, 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 accepted for publication, the authors garee to the automatic transfer of the copyright to the publisher; (b) that it is not under consent of the copyright holders, and (g) that written permission of the copyright to headwords 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 believed to be true and accurate at the date of its going to press, neither the authors, the editors, nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, spersos or implied, with respect to the material contained herein. Cambridge University Press and the editors are not reponsible for claims made for it by advertiser to comply



Locally Trusted by Parents.

Nationally Recognized by Experts.



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.

In 2012, Arnold Palmer Hospital was ranked once again as one of the "Best Children's Hospitals" by *U.S. News* & *World Report* in Cardiology & Heart Surgery.

Specializing in Pediatric Cardiology and Cardiac Surgery, The Heart Center 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 256 slice, 128 dual Sampling CT Scanner
- Cardiac MRI
- Cardiac Family Advisor Council
- Teaching and Research Affiliation with the University of Central Florida College of Medicine

Dedicated. Focused. Strong.

Arnold Palmer Medical Center brings together the strength of dedicated physicians and focus of specialty care for children, women and babies.

To learn more, visit arnoldpalmerhospital.com or call 321.8HEALTH (321.843.2584).





6th WORLD CONGRESS Paediatric Cardiology & Cardiac Surgery

17 – 22 February 2013, Cape Town, South Africa



The 6th World Congress of Paediatric Cardiology and Cardiac Surgery will be held in Cape Town in February 2013, for the first time on the African continent.

This is the major international scientific event for our global community and an opportunity to highlight and review four years of research and technological developments in basic sciences, clinical research and therapeutic interventions.

Cape Town provides the meeting place for the global coalition of doctors, nurses and health scientists who use research and technological development to provide better care for babies, children and adults with heart disease.

<image>

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
- Nursing

Visit the full scientific programme at www.pccs2013.co.za.

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 9754 E-mail: info@pccs2013.co.za

https://doi.org/10.1017/51047951112002211 Published online by Amrid Windson Peccs 2013.co.za