

Division of Cardiothoracic Surgery

DIVISION PROFILE	
Number of Faculty	4
Number of Fellows	
Clinical Fellows	1
Research Fellows	1
Number of Graduate Students	
Number of Other Students (full and part-time)	10
Number of Support Personnel	13
Annual Total Grant Support (direct)	\$407,967
Number of Peer Reviewed Publications	12
Patient Encounters	
Outpatient	278
Inpatient	387

FACULTY LISTING

Peter B. Manning, MD, Professor of Surgery, Director, Cardiothoracic Surgery; Co-director, The Heart Center

Jodie Y Duffy, PhD, Research Assistant Professor

Pirooz Eghtesady, MD, Assistant Professor of Surgery

Jeffrey M. Pearl, MD, Associate Professor of Surgery, Surgical Director, Cardiac Transplantation

OVERVIEW

The Division of Cardiothoracic Surgery at Cincinnati Children's Hospital Medical Center is comprised of three surgical faculty, one research faculty, four clinical perfusionists, four nurse practitioners, one physician assistant, two research assistants and three administrative support staff dedicated to the surgical care of children with cardiac problems. Based completely at Cincinnati Children's Hospital Medical Center, the division has formed a strong collaborative relationship over recent years with the leadership in Cardiothoracic Surgery at University Hospital. As an integrated component of The Heart Center, a multi-disciplinary business unit within CCHMC, the division has enjoyed a continually higher profile nationally as a leader in the management of cardiac problems in children.



Left to Right: J. Duffy, P. Manning, P. Eghtesady, J. Pearl

The vision of the division is to be a national and international leader in pediatric cardiothoracic surgical care, surgical research and teaching. The clinical programs of the division continue to provide excellent care with morbidity and mortality rates rivaling any program nationwide.

Members of the Division of Cardiothoracic Surgery function as key faculty of the Pediatric Cardiology and Pediatric Critical Care fellowship training programs at CCHMC. Close interaction with these fellows occurs on a daily basis, primarily in the Cardiac Intensive Care Unit, in addition to a number of weekly teaching conferences in which the faculty participates. The division serves as one of the primary rotations of the

Cardiothoracic Surgery training program, based at UC, with a Fellow on the CCHMC service four to six months out of each year.

The research efforts within the division continue to grow with two basic science laboratories presently within the division, as well as the collaboration of Cardiothoracic Surgical faculty with Cardiology and other faculty on a number of clinical research projects.

HIGHLIGHTS

The clinical programs in the Division of Pediatric Cardiothoracic Surgery focus on surgical management of cardiac problems from birth through adolescence. We also have become more involved in the Fetal Cardiology program, participating in prenatal counseling of families with children with congenital heart defects. We focus on complete corrections of cardiac defects in the newborn period, management of complex single ventricle cardiac anomalies, and techniques to limit transfusion exposures. The program has the capability of performing all levels of open and closed heart surgeries, including cardiac transplantation and the ability to perform ECMO support.

Clinical case volume for FY 06 remained stable from the previous year. The annual review of state-wide data for pediatric cardiac programs under the auspices of BCMH revealed that Cincinnati Children's continues to perform the highest volume of newborn open heart procedures in Ohio. The planning for a hybrid catheterization suite was completed and construction was begun on this facility in the summer of 2006.

Research has continued to be active in the Division of Cardiothoracic Surgery. In FY 06 Dr. Pearl's research lab has continued to focus primarily on mechanisms underlying reperfusion and reoxygenation injury in the immature cardiopulmonary system. In FY 06 a NIH R03 exploratory grant from the National Institute of Child Health and Human Development supports investigation into the use of gene therapy to temporarily raise the level of protective proteins in the heart and lungs of neonates undergoing heart surgery. In addition, NIH R01 funding from the National Heart, Lung, and Blood Institute supports studies to determine the cellular and molecular mechanisms involved in the cardioprotection offered by inactivating calpain activity and augmenting the calpastatin pathway during ischemia and reperfusion. An additional area of research encompasses methods to reduce the detrimental effects of brain death on heart function to potentially increase the number of donor hearts available for transplantation.

Dr. Eghtesady's lab was also productive in FY 06. This lab worked to ramp-up and complete projects for all of the new grant funding received in 2005. Projects underway or completed are funded by the Thrasher Research Foundation Grant, the AHA Ohio-Valley Affiliate Grant, the AHA National Scientist Development Grant, the Translational Research Initiative grant and continuations of Children's Heart Association grants. In FY 2006 this lab also received additional funding from the Children's Heart Fund-Chicago and submitted a five-year RO1 proposal to NIH. A total of seven abstracts based on the past years projects have been submitted for presentation at upcoming national meetings. Students in Dr. Eghtesady's lab who were recognized for their research projects include Christopher Lam who won the "Coolest Co-op" award presented by the University of Cincinnati and gave an oral presentation at this year's Ohio Doctors Interested in Congenital Heart Disease Society conference in Cleveland, and Walter Lubbers who published his work as first author and begins medical school this fall.

Dr. Eghtesady's lab continues to pursue research into pathogenesis of congenital heart diseases and HLHS in particular, and developing protocols for translation of experimental fetal open-heart surgery into clinical practice. Specifically we have begun to develop an experimental model of fetal ASD creation we hope to translate to the clinic for fetuses with restrictive or intact atrial septum (in the setting of HLHS). In addition, the lab has begun epidemiology studies to examine the etiology of HLHS. These include an IRB-approved study to test a hypothesis that HLHS is a manifestation of rheumatic heart disease in the fetus. An additional study has been submitted for approval to determine whether there are firstly, gender differences in the manifestation of HLHS and secondly, a mini-epidemic pattern of occurrence of HLHS. To assist in these studies, we have set up collaboration with Dr. James Deddens, PhD, Professor of Mathematics at the University of Cincinnati, an expert in probability theory and other advanced statistical mathematics. We also created a website that introduces and promotes the research pursuits and focus of our lab, yet can also educate and inform the lay reader about congenital heart disease.

The division continues to collaborate on a number of clinical research projects with other members of The Heart Center, including cardiologists, intensivists, and anesthesiologists. These include studies to identify more sensitive markers of renal function following cardiac operations requiring cardiopulmonary bypass support, and participation in two NIH sponsored Pediatric Heart Network randomized trials focusing on the surgical and medical management of infants with complex single ventricle cardiac anomalies.

TRAINING

Jeffrey Garrett, MD

PGY -VIII University of Cincinnati

GRANTS, CONTRACTS AND INDUSTRY AGREEMENTS

Grant and Contract Awards Annual Direct/Project Period Direct

Eghtesady, P

Role of Nitric Oxide in the Increased Placental Vascular Resistance Following
Cardiopulmonary Bypass
American Heart Association – National

07/01/05 – 06/30/09 \$59,091/\$236,364

Role of Nitric Oxide in the Increased Placental Vascular Resistance Following
Cardiopulmonary Bypass
Children’s Heart Foundation

01/01/06– 12/31/07 \$36,479/\$72,958

Fetal Cardiac Interventions for Aortic Stenosis
Thrasher Research Fund

03/01/05 – 02/28/08 \$84,397/\$249,657

Pearl, J

Calpain and Calpastatin Regulation of Reperfusion Injury
National Institutes of Health
R01 HL 077653

04/01/05 – 03/31/009 \$225,000/\$900,000

Mecoli, G

Calpain-mediated Myocardial Injury: Understanding the Mechanism and Prevention
American Heart Association - Ohio

06/01/06– 08/31/06 \$3,000

Current Year Direct \$407,967

Industry Contracts

Current Year Direct Receipts \$0

TOTAL \$407,967

PUBLICATIONS

1. Kaiser RA, Lyons JM, Duffy JY, Wagner CJ, McLean KM, O'Neill TP, Pearl JM, Molkentin JD. Inhibition of p38 reduces myocardial infarction injury in the mouse but not pig after ischemia-reperfusion. Am J Physiol Heart Circ Physiol 2005;289(6):H2747-51.
1. Pandalai PK, Lyons JM, Duffy JY, McLean KM, Wagner CJ, Merrill WH, Pearl JM, Akhter SA. Role of the beta-adrenergic receptor kinase in myocardial dysfunction after brain death. J Thorac Cardiovasc Surg 2005;130(4):1183-9.

2. Eghtesady P. Hypoplastic left heart syndrome: Rheumatic heart disease of the fetus? *Med Hypotheses* 2006;66(3):554-65.
3. Eghtesady P, Nelson D, Schwartz SM, Wheeler D, Pearl JM, Cripe LH, Manning PB. Heparin-induced thrombocytopenia complicating support by the Berlin Heart. *Asaio J* 2005;51(6):820-5.
4. Eghtesady P, Sedgwick JA, Schenbeck JL, Lam C, Lombardi J, Ferguson R, Gardner A, McNamara J, Manning P. Maternal-fetal interactions in fetal cardiac surgery. *Ann Thorac Surg* 2006;81(1):249-55; discussion 255-6.
5. Lombardi J, Sedgwick J, Schenbeck J, Lubbers W, Ferguson RE, Gardner A, McNamara JL, Eghtesady P. Cardiopulmonary bypass in the immature fetus through novel use of a mini-centrifugal pump. *Perfusion* 2006;21(3):185-91.
6. Lubbers WC, Baker RS, Sedgwick JA, Lam CT, Schenbeck JL, McNamara JL, Ferguson RE, Lombardi J, Gardner A, Clark KE, Eghtesady P. Vacuum-assisted venous drainage during fetal cardiopulmonary bypass. *Asaio J* 2005;51(5):644-8.
7. Hinton RB, Jr., Lincoln J, Deutsch GH, Osinska H, Manning PB, Benson DW, Yutzey KE. Extracellular matrix remodeling and organization in developing and diseased aortic valves. *Circ Res* 2006;98(11):1431-8.
8. Dent CL, Spaeth JP, Jones BV, Schwartz SM, Glauser TA, Hallinan B, Pearl JM, Khoury PR, Kurth CD. Brain magnetic resonance imaging abnormalities after the Norwood procedure using regional cerebral perfusion. *J Thorac Cardiovasc Surg* 2006;131(1):190-7.
9. Hinton RB, Jr., Deutsch GH, Pearl JM, Hobart HH, Morris CA, Benson DW. Bilateral semilunar valve disease in a child with partial deletion of the Williams-Beuren syndrome region is associated with elastin haploinsufficiency. *J Heart Valve Dis* 2006;15(3):352-5.
10. Lyons JM, Pearl JM, McLean KM, Akhter SA, Wagner CJ, Pandalai PK, Duffy JY. Glucocorticoid administration reduces cardiac dysfunction after brain death in pigs. *J Heart Lung Transplant* 2005;24(12):2249-54.
11. McLean KM, Lorts A, Pearl JM. Current treatments for congenital aortic stenosis. *Curr Opin Cardiol* 2006;21(3):200-4.
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