

PART I. General Information

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Name: Audrey Chung Marshall

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Place of Birth: St. Louis, MO

Education:

1988 B.A. Yale University, New Haven, CT

1993 M.D. University of Pennsylvania, Philadelphia, PA

Postdoctoral Training:

1993-1994 Intern in Pediatrics, Children's Hospital, Boston, MA

1994-1996 Resident in Pediatrics, Children's Hospital, Boston, MA

1996-1998 Clinical Fellow in Pediatric Cardiology, Children's Hospital, Boston, MA

1998-2000 Research Fellow in Pediatric Cardiology, Children's Hospital, Boston, MA

2000-2001 Senior Fellow in Interventional Cardiology, Children's Hospital, Boston, MA

Licensure and Certification:

1994 Diplomate, National Board of Medical Examiners

1996 Diplomate, American Board of Pediatrics: Pediatrics, recertified 2004

1997 Board of Registration in Medicine, Commonwealth of Massachusetts

2000 Diplomate, American Board of Pediatrics: Pediatric Cardiology, recertified 2007

2007 Board of Registration in Medicine, State of Rhode Island

2008 Certified, Pediatric Advanced Life Support

Academic Appointments:

1993-2000 Clinical Fellow in Pediatrics, Harvard Medical School

2001-2004 Instructor in Pediatrics, Harvard Medical School

2004- Assistant Professor in Pediatrics, Harvard Medical School

Hospital or Affiliated Institution Appointments:

2001-2004 Assistant in Cardiology, Children's Hospital Boston

2001- Affiliate Consultant in Newborn Medicine, Brigham & Women's Hospital

2004- Associate in Cardiology, Children's Hospital Boston

2007- Staff Pediatric Cardiologist, Rhode Island Hospital

Hospital and Health Care Organization Service Responsibilities

2001- Attending, Cardiac Catheterization Laboratory
2001- Attending, Cardiology Outpatient Clinic
2006- Interviewer, Boston Combined Residency Program
2008 Speaker, Children's Hospital Trust Women in Medicine Luncheon, 270 attendees

Major Administrative Responsibilities:

2003 Course Director, Prenatal Cardiac Interventions
2005-2006 Member, Board of Directors, The Ali Fund
2006- Associate Director, Cardiac Catheterization Laboratory
2006-2007 Member, Board of Directors, Boston Children's Heart Foundation
2007 Medical Director, Joint Program in Interventional Cardiology at Children's Hospital Boston and Hasbro Children's Hospital

Major Committee Assignments:

Institutional

2006 Curriculum Committee, Fellows' Program in Cardiology, Member
2007- Children's Hospital Medical Peer Review Committee, Member
2007- Coarctation of the Aorta Clinical Practice Guideline Committee, Member
2007 Hybrid Cath Lab and OR C-arm fluoroscopy Committee, Member
2008- Children's Hospital Physicians' Leadership Committee, Member
2008 Implementation Committee for Cath Lab Extended Recovery Unit, Physician Leader
2008- Cath Lab New and Emerging Technologies Committee, Member

National

2006 ACC Special Program in Pediatric Cardiology Committee, Member
2007- ACC Women in Cardiology Committee, Member

International

2006 Siemens Pediatric Catheterization Advisory Board, Member

Professional Societies:

2000- American College of Cardiology, Member
2001- American Heart Association Council on Cardiovascular Disease in the Young, Member
2003- Society for Cardiac Angiography and Interventions, Fellow
2005- Society for Pediatric Research, Member

Editorial Boards:

2001- Ad hoc reviewer, *American Journal of Cardiology*
2001- Ad hoc reviewer, *Circulation*
2002- Ad hoc reviewer, *Journal of Thoracic and Cardiovascular Surgery*

2005-2006 Member, Editorial Advisory Board, *Pediatric Cardiology*
2007 Abstract grader, American College of Cardiology
2007- Ad hoc reviewer, *Catheterization and Cardiovascular Intervention*
2008 Ad hoc reviewer, *Cardiology in the Young*

Awards and Honors:

2007 Henry Crown Fellowship
2006 CIMIT Johnson & Johnson Young Clinician Research Award
1999 American Heart Association Women in Cardiology Travel Grant
1998 NIH National Research Scholarship Award, Children's Hospital
1993 American Medical Women's Association Scholarship Citation
1993 Dr. Spencer Morris Prize Nominee, University of Pennsylvania
1992 American Heart Association Young Investigator Travel Citation
1991 American Heart Association Student Research Fellowship, The Wistar Institute
1991 Alpha Omega Alpha Honor Society, University of Pennsylvania
1989 NIH Student Research Fellowship, University of Pennsylvania
1988 Distinction in the Major, History, Yale University
1986 Phi Beta Kappa Honor Society, Yale University

PART III

Original Articles:

1. Baldwin HS, Shen HM, Yan HC, DeLisser HM, **Chung A**, Trask T, Kirschbaum NE, Newman PJ, Albelda SM, Buck CA. Platelet endothelial cell adhesion molecule-1 (PECAM-1/CD31): alternatively spliced, functionally distinct isoforms expressed during mammalian cardiovascular development. *Development* 1994; 120: 2549-2553.
2. Park M, Lewis C, Turbay D, **Chung A**, Chen J, Evans S, Breitbart R, Fishman M, Izumo S, Bodmer R. Differential rescue of visceral and cardiac defects in *Drosophila* by vertebrate tinman-related genes [published erratum appears in *Proc Natl Acad Sci* 1998; 95: 13348b]. *Proc Natl Acad Sci* 1998; 95: 9366-9371.
3. **Marshall AC**, Perry SB, Keane JF, Lock JE. Early results and medium-term follow-up of stent implantation for mild residual or recurrent aortic coarctation. *American Heart Journal* 2000; 139: 1054-60.
4. **Marshall AC**, Lock JE. Structural and compliant anatomy of the patent foramen ovale in patients undergoing transcatheter closure. *American Heart Journal* 2000; 140:303-7.
5. Geva T, Greil GF, **Marshall AC**, Landzberg M, Powell AJ. Gadolinium-enhanced 3-dimensional magnetic resonance angiography of pulmonary blood supply in patients with complex pulmonary stenosis or atresia: comparison with x-ray angiography. *Circulation* 2002; 106: 473-8.

6. Huang T, Lock JE, **Marshall AC**, Basson C, Seidman JG, Seidman CE. Causes of clinical diversity in human TBX5 mutations. *Cold Spring Harbor Symposia on Quantitative Biology* 2002; 67: 115-20.
7. **Marshall AC**, Love BA, Lang P, Jonas RA, del Nido P, Mayer JE, Lock JE. Staged repair of tetralogy of Fallot and diminutive pulmonary arteries using a fenestrated ventricular septal defect patch. *J Thorac Cardiovasc Surg* 2003;126: 1427-33.
8. Knauth A, **Marshall AC**, Geva T, Jonas RA, Marx G. Respiratory symptoms secondary to aortopulmonary vessels in tetralogy of Fallot absent pulmonary valve syndrome. *Am J Cardiol* 2004; 93: 503-5.
9. **Marshall AC**, van der Velde ME, Tworetzky W, Gomez CA, Wilkins-Haug L, Benson CB, Jennings RW, Lock JE. Creation of an atrial septal defect in utero for fetuses with hypoplastic left heart syndrome and intact or highly restrictive atrial septum. *Circulation* 2004; 110: 529-33.
10. Tworetzky W, Wilkins-Haug L, van der Velde ME, **Marshall AC**, Colan SD, Benson CB, Lock JE, Perry SB. Balloon dilation of severe aortic stenosis in the fetus: Potential for prevention of hypoplastic left heart syndrome. Candidate selection, technique, and results of successful intervention. *Circulation* 2004; 110: 2125-2131.
11. Garg R, Powell AJ, Sena L, **Marshall AC**, Geva T. Effects of metallic implants on magnetic resonance imaging evaluation of Fontan palliation. *Am J Cardiol* 2005; 95: 688-91.
12. McElhinney DB, **Marshall AC**, Lang P, Lock JE, Mayer JE, Jr. Creation of a brachial arteriovenous fistula for treatment of pulmonary arteriovenous malformations after cavopulmonary anastomosis. *Annals of Thoracic Surgery* 2005; 80: 1604-9.
13. **Marshall AC**, Tworetzky W, Bergersen L, McElhinney DB, Benson CB, Jennings RW, Wilkins-Haug LE, Marx GR, Lock JE. Aortic valvuloplasty in the fetus: Technical characteristics of successful balloon dilation. *J Peds*, 2005; 147:535-539.
14. Tworetzky W, del Nido PJ, Powell AJ, **Marshall AC**, Lock JE, Geva T, MD. Usefulness of magnetic resonance imaging of left ventricular endocardial fibroelastosis in infants after fetal intervention for aortic valve stenosis. *Am J Cardiol* 2005; 96:1568-70.
15. Makikallio K, Levine JC, Marx GR, Colan SD, **Marshall AC**, Lock JE, Tworetzky W. Fetal aortic valve stenosis and the evolution of hypoplastic left

- heart syndrome: patient selection for fetal intervention. *Circulation*, 2006; 113: 1401-5.
16. Wilkins-Haug LE, Tworetzky W, Benson CB, **Marshall AC**, Jennings RW, Lock JE. Factors affecting technical success of fetal aortic valve dilation. *Ultrasound in Obstetrics and Gynecology*, 2006; 28: 47-52.
 17. Peng L, McElhinney DB, Nugent AW, Powell AJ, **Marshall AC**, Bacha EA, Lock JE. Endovascular stenting of obstructed right ventricle to pulmonary artery conduits: a fifteen-year experience. *Circulation* 2006; 113: 2598-2605.
 18. Qureshi AM, McElhinney DB, Lock JE, Landzberg M, Lang P, **Marshall AC**. Outcomes of stent implantation for native and recurrent coarctation of the aorta. *Cardiol Young*, 2007; 17: 307-18.
 19. Selamet Tierney ES, Wald RM, McElhinney DB, **Marshall AC**, Benson CB, MD, Marcus EN, Marx GR, Levine JC, Wilkins-Haug L, Lock JE, Tworetzky W. Changes in left heart hemodynamics after technically successful in utero aortic valvuloplasty. *Ultrasound Obstet Gynecol*, 2007; 30: 715-20.
 20. Meadows J, Pigula F, Lock JE, **Marshall AC**. Transcatheter creation and enlargement of ventricular septal defects for relief of ventricular hypertension. *J Thorac Cardiovasc Surg*, 2007; 133: 912-8.
 21. Tzifa A, **Marshall AC**, McElhinney DB, Lock JE, Geggel R. Endovascular treatment for superior vena cava occlusion or obstruction in a pediatric and young adult population: A 22-year experience, *JACC*, 2007; 49: 1003-9.
 22. Vida VL, Bacha EA, Thiagaragan R, Gauvreau K, Larrazabal LA, Fynn-Thompson F, Pigula FA, Mayer JE, del Nido PJ, Tworetzky W, Lock JE, **Marshall AC**. Hypoplastic left heart syndrome and intact or highly restrictive atrial septum: surgical experience from a single center, *Ann Thorac Surg*, 2007; 84: 581-5.
 23. Mizrahi-Arnaud A, Tworetzky W, Bulich LA, Wilkins-Haug LE, **Marshall AC**, Benson CB, Lock JE, McElhinney DB. Pathophysiology, management, and outcomes of fetal hemodynamic instability during prenatal cardiac intervention, *Pediatric Research*, 2007, 62: 325-330.
 24. Vida VL, Bacha EA, Larrazabal LA, Gauvreau K, Dorfman A, Marx G, Geva T, **Marshall AC**, Pigula FA, Mayer JE Jr, del Nido PJ, Fynn-Thompson F. Surgical outcome for patients with the aortic atresia-mitral stenosis variant of hypoplastic left heart syndrome, *Ann Thorac Surg*, 2008; 135: 339-346.

25. McElhinney DB, Bergersen L, **Marshall AC**. In situ fracture of stents implanted for branch pulmonary artery stenosis in patients with congenital heart disease, *Cardiol Young*, 2008; 18: 405-14.
26. Brown D, Chong E, Keane JF, Lock JE, **Marshall AC**. Aortic injury as a complication of neonatal aortic valvuloplasty: incidence and risk factors, *Circulation: Cardiovasc Intervent*, 2008; 1: 53-9.
27. **Marshall AC**, Levine J, Morash D, Silva V, Lock JE, Benson C, Wilkins-Haug L, McElhinney DB, Tworetzky W. Results of in utero atrial septoplasty in fetuses with hypoplastic left heart syndrome, *Prenatal Diagnosis*, *in press*.

Reviews, Chapters, and Editorials:

1. Buck CA, Baldwin HS, DeLisser H, Mickanin C, Shen HM, Kennedy G, **Chung A**, Edelman JM, Albelda SM. Cell adhesion receptors and early mammalian heart development: an overview. *C R Acad Sci Paris* 1993; 316: 849-59.
2. **Marshall AC** and Lang P. Closing Ventricular Septal Defects in the Cardiac Catheterization Laboratory. *Heart Disease* 2002; 4: 51-53.
3. **Marshall AC** and Lang P. Hemodynamic and interventional catheterization of the patient with single ventricle. *Progress in Pediatric Cardiology* 2002; 16: 39-46.
4. **Marshall AC** and Perry SB. "CardioSEAL/STARflex devices in transcatheter closure of ventricular septal defects" Chapter 27 in Catheter-based devices for the treatment of non-coronary cardiovascular disease in adults and children, Lippincott Williams & Wilkins, 2003.
5. Tworetzky W and **Marshall AC**. Balloon valvuloplasty for congenital heart disease in the fetus. *Clinics in Perinatology* 2003; 30: 541-550.
6. Tworetzky W and **Marshall AC**. Fetal Interventions for cardiac defects. *Pediatric Clinics* 2004; 51: 1503-14.
7. **Marshall AC** and Lang P. Cardiac Catheterization and Catheter-based interventions. In : Sellke FW, del Nido PJ, Swanson SJ (editors), Sabiston and Spencer Surgery of the Chest. Philadelphia, PA: Elsevier Saunders; 2004
8. Bulich LA, Tworetzky W, **Marshall AC**. Anesthesia for Fetal Cardiac Intervention. In: Myers LB and Bulich LA (editors), Anesthesia for Fetal Intervention and Surgery. Hamilton, Ontario: BC Decker Inc.; 2005

9. **Marshall AC** and Lock JE. Leaving Neverland: A randomized trial for coarctation shows pediatric interventional cardiology is growing up. *Circulation* 2005; 111: 3347-8.
10. Wilkins-Haug LE, Benson CB, Tworetzky W, **Marshall AC**, Lock JE. In utero intervention for hypoplastic left heart syndrome—a perinatologist’s perspective. *Ultrasound Obstet Gynecol* 2005; 26: 481-6.
11. Geva T and **Marshall AC**. Magnetic resonance imaging-guided catheter interventions in congenital heart disease. *Circulation* 2006; 113: 1051-2.
12. Bacha EA, **Marshall AC**, McElhinney DB, del Nido PJ. Expanding the hybrid concept in congenital heart surgery. *Semin Thorac Cardiovasc Surg Pediatr Card Surg Ann* 2007; 10:146-150.
13. Dibardino DJ, McElhinney DB, **Marshall AC**, Bacha EB. A review of ductal stenting in hypoplastic left heart syndrome: bridge to transplantation and hybrid stage I palliation. *Pediatric Cardiol* 2007;
14. Lock JE, **Marshall AC**, Invited Commentary. *Ann Thorac Surg* 2007 84: 1638-1639.

Books

Bergersen L, Foerster S, **Marshall AC**, Meadows J eds. *The Congenital Catheterization Manual*, Springer, *in press*.

Clinical Communications, Case Reports

1. Cua CL, Sanghavi D, Voss S, Laussen PC, del Nido P, **Marshall A**, Breitbart RE. Right ventricular pseudo-aneurysm after modified Norwood procedure. *Annals of Thoracic Surgery* 2004; 78: e72-e73.
2. Mizrahi-Arnaud A, Wilkins-Haug L, **Marshall A**, Silva V. Maternal Mirror Syndrome after in utero aortic valve dilation. *Fetal Diagnosis and Therapy* 2006; 21: 439-43.
3. Meadows J, **Marshall AC**, Lock JE, Scheurer M, Laussen PC, Bacha EA. A hybrid approach to stabilization and repair of obstructed total anomalous pulmonary venous connection in a critically ill newborn. *J Thorac Vasc Surg* 2006; 131: e1-e2.

Educational Material

Contributor “Stenting of Coarctation” *The Fellows’ Cardiac Catheterization Manual*, 2nd edition, 1999

Editor, The Fellows' Cardiac Catheterization Manual, 3rd edition, 2003
Editor, The Fellows' Cardiac Catheterization Manual, 4th edition, 2006

Patents

Marshall AC, Lock JE, Kierce P, inventors; Introducer cannula and cannula straightener
US Patent number D533270. 2006 December 5.

Abstracts

1. Hasan BS, Keane JF, Tworetzky W, Lock JE, **Marshall AC**. Is myocardium the culprit in patients with fetal aortic valvuloplasty (FAV)? Accepted to American Academy of Pediatrics National Conference, 2008.
2. McElhinney DB, **Marshall AC**, Wilkins-Haug LE, Brown DW, Benson CB, Silva V, Marx GR, Mizrahi-Arnaud A, Lock JE, Tworetzky W. Anatomic predictors of technical success and postnatal biventricular outcome after in utero aortic valvuloplasty for aortic stenosis with evolving hypoplastic left heart syndrome, accepted to the American Heart Association Scientific Sessions, 2008.