

Abstract Submitted  
for the DFD13 Meeting of  
The American Physical Society

**Hemodynamic consequences of LPA stenosis in single ventricle stage 2 LPN circulation with automatic registration** DANIELE E. SCHIAVAZZI, ETHAN O. KUNG, University of California at San Diego, ADAM L. DORFMAN, University of Michigan - C.S. Mott Children's Hospital, TAIN-YEN HSIA, Great Ormond Street Hospital for Children, ALESSIA BARETTA, Politecnico di Milano, GREGORY ARBIA, INRIA Paris, ALISON L. MARSDEN, University of California at San Diego — Congenital heart diseases such as hypoplastic left heart syndrome annually affect about 3% of births in the US alone. Surgical palliation of single ventricle patients is performed in stages. Consequently to the stage 2 surgical procedure or other previous conditions, a stenosis of the left pulmonary artery (LPA) is often observed, raising the clinical question of whether or not it should be treated. The severity of stenoses are commonly assessed through geometric inspection or catheter in-vivo pressure measurements with limited quantitative information about patient-specific physiology. The present study uses a multiscale CFD approach to provide an assessment of the severity of LPA stenoses. A lumped parameter 0D model is used to simulate stage 2 circulation, and parameters are automatically identified accounting for uncertainty in the clinical data available for a cohort of patients. The importance of the latter parameters, whether alone or in groups, is also ranked using forward uncertainty propagation methods. Various stenosis levels are applied to the three-dimensional SVC-PA junction model using a dual mesh-morphing approach. Traditional assessments methodologies are compared to the results of our findings and critically discussed.

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Date submitted: 02 Aug 2013

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