Abstract Submitted
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Patient-specific modeling of the Assisted Bidirectional Glenn (ABG)[1] JESSICA SHANG, University of Rochester, MAHDI ESMAILY-MOGHADAM, Stanford University, RICHARD FIGLIOLA, Clemson University, TAIN-YEN HSIA, Great Ormond Street Hospital, ALISON MARSDEN, Stanford University — The Assisted Bidirectional Glenn (ABG) is proposed as an early-stage palliative procedure for single ventricle neonates. The ABG augments the pulmonary flow of the Bidirectional Glenn (BDG) with a secondary high-velocity flow through a nozzle-like shunt between the innominate artery and the superior vena cava (SVC). The ABG would provide a superior cavopulmonary connection than the systemic-pulmonary shunt that is typically employed as a stage-I procedure (e.g., a modified Blalock-Taussig shunt) and would address the low pulmonary flow associated with the BDG. Following simulations in vitro and in silico that show the ABG successfully increased pulmonary flows in idealized models, we implemented the ABG in several patient-specific models coupled to a lumped parameter network tuned to clinical values for each patient. The ABG performed similarly across different patients; compared to the BDG, the pulmonary flow increased $\sim$20% with a similar increase in the SVC pressure. The performance of the ABG was the most sensitive to nozzle outlet area, compared to nozzle inlet area and location of the shunt anastomosis. The study verified that the ABG benefits a range of patients and identified key parameters for further optimization of the ABG.

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