

Abstract Submitted  
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**Flow Behavior in the Left Heart Ventricle Following Apico-Aortic Bypass Surgery** SHAHROKH SHAHRIARI, University of Montreal Hospital Research Center (CRCHUM), MORTEZA JEYHANI, Concordia University, MICHEL LABROSSE, University of Ottawa, LYES KADEM, Concordia University — Apico-aortic bypass (AAB) surgery is an alternative for transcatheter aortic valve implantation (TAVI) to reduce left ventricle (LV) overload in patients with severe aortic stenosis (AS). It consists in connecting the apex of the LV to the descending thoracic aorta with a valved conduit. Postoperative flow assessments show that two thirds of the outflow is conducted from the LV apex to the conduit, while only one third crosses the native aortic valve. In this study, we performed high speed particle image velocimetry (PIV) measurements of flow pattern within an in vitro elastic model of LV in the presence of a very severe AS, before and after AAB. Results indicate that AAB effectively relieves the LV outflow obstruction; however, it also leads to abnormal ventricular flow patterns. Normal LV flow dynamics is characterized by an emerging mitral jet flow followed by the development of a vortical flow with velocities directed towards the aortic valve, while measurements in the presence of AAB show systolic flow bifurcating to the apical conduit and to the aortic valve outflow tract. This study provides the first insight into the LV flow structure after AAB including outflow jets and disturbed stagnation regions.

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