Transcatheter Aorta Pulmonary Shunt

Overview
McGill is looking for a partner to commercialize a prosthetic device which is a catheter based approach to creating a communication between the pulmonary artery and aorta in the case of pulmonary arterial hypertension (PAH). PAH is a life threatening disease characterized by progressive elevations in pulmonary artery pressures and pulmonary vascular resistance leading to right ventricular failure and death. Drugs can modestly reduce pulmonary pressures, but do not improve life expectancy. A communication between the pulmonary artery and aorta has been shown as a way of relieving supra-systemic pulmonary arterial hypertension and bridge patient to transplantation.

Applications
The high surgical mortality associated with severe PAH patients makes this communication between pulmonary artery and aorta impractical. The transcatheter aorto-pulmonary shunt (TAPS) makes use of the close proximity of the pulmonary artery and aorta in most patients.

Technology
A novel device was designed to allow the percutaneous creation of a Potts shunt, namely a transcatheter aorta-pulmonary shunt (TAPS) in patients with supra-systemic pulmonary arterial hypertension. This device can effectively offload the right ventricle and because it is placed through a catheter, it will eliminate the high surgical mortality associated with operating on patients with severe pulmonary hypertension. The researchers are interested to test and further develop their existing prototype using in vitro models of the pulmonary artery and aorta geometries. They will also use in silico modeling to design and test new design iterations. Finally, they seek to produce preliminary designs of some of their embodiments that include different material choices, hybrid structures and the potential of adding a valve to the device.
Dr Judith Therrien is an Assistant Professor at McGill University. She is a congenital cardiologist at the Sir Mortimer B. Davis Jewish Hospital and the McGill University Health Centre. She is presently Director of Fellowship Training for the McGill Adult Unit for Congenital Heart Disease (MAUDE Unit) and President of the Canadian Adult Congenital Heart (CACH) Network. Her research focuses on the study of abnormal heart function of the right ventricle.

Dr Richard Leask is an Associate Professor - Department of Chemical Engineering at McGill University. He is an Associate Researcher at the Montreal Heart Institute. His general goal is to use engineering principles and analyses to answer basic questions in biology and medicine especially the biomechanics and pathobiology of cardiovascular disease. His laboratory is also actively involved in the design and testing of biomedical devices and biomaterials.

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Reference code: ROI 11008
Opportunity: Exclusive license or research collaboration