ANATOMICAL CONSIDERATIONS FOR THE DEVELOPMENT OF A NEW TRANSCATHETER AORTO-PULMONARY SHUNT (TAPS) DEVICE IN PATIENTS WITH SEVERE PULMONARY ARTERIAL HYPERTENSION

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Background: Morbidity from pulmonary arterial hypertension (PAH) ensues when the pulmonary pressure reaches supra-systemic levels. A transcatheter alternative to the Pott’s shunt would allow decompression of the right heart without the surgical risks. To aid development of a transcatheter aorto-pulmonary shunt (TAPS) device, we described the anatomic relationship between the left pulmonary artery (LPA) and the descending aorta (dAO) in adults with severe pulmonary hypertension.

Method: Adults with severe PAH (types including idiopathic, drug-induced and associated PAH, with peak systolic pulmonary arterial pressure ≥ 80 mmHg) who had a computed tomography of the chest were enrolled. Measurements were taken on the axial plane at the level of the pulmonary artery bifurcation.

Results: Forty patients (male: 9/40; median age of 59 ± 15 years; peak systolic pulmonary artery pressure of 93 ± 12 mmHg) were identified. The mean distance between the LPA and dAO was 2.3 ± 3.1 mm. The mean luminal dAO and LPA diameters were 23.4 ± 3.8 mm and 25.5 ± 5.1 mm respectively. The LPA and dAO approximated in 93% of patients with 38% having aortic calcification at the contact site. The mean contact width and height (defining an area with distance < 4mm between the outer borders) of the two arteries were 15.7 ± 3.4 mm and 20.6 ± 4.4 mm respectively at a mean distance of 28.0 ± 7.6 mm from the MPA bifurcation.

Conclusion: This study shows that a TAPS device would be anatomically feasible in the majority of patients with severe PAH.