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# P123 Beyond Diameters, Flow Hemodynamics Quantified by Magnetic Resonance Imaging to Help Characterizing Aneurysmal Aorta

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## ABSTRACT

**Purpose:** Referral to surgery in thoracic aortic aneurysms (TAA) is based on maximal diameter (Dmax) measured from imaging, which is known to have a high diagnosis failure rate. In addition to geometry, 4D flow MRI provides a comprehensive time-resolved flow imaging. Thus, our aim was to evaluate the ability of 4D flow MRI-derived quantitative flow indices to characterize TAA.

**Methods:** We studied 20 patients with TAA and tricuspid valve (TAVd, Dmax = 43 ± 5 mm, Age = 66 ± 14 years) and 56 healthy controls (YC: 30 subjects, Age = 36 ± 9 years ≤50 years, OC: 26 subjects, Age = 65 ± 9 years > 50 years). All underwent 4D flow MRI. After aortic segmentation, ascending aorta (AA) backward flow volume (VBF) was calculated in addition to maximal velocity jet angle and eccentricity (Ecc). Receiver operating characteristic analysis was performed to assess the ability of flow indices to characterize AA = dilation.

**Results:** While AA Dmax was 1.4-fold higher in TAVd than OC, VBF increased by 6.5 folds and Ecc and Angle varied by 1.3 to 1.7 folds between the two groups. Moreover, VBF changed by 12.7 folds between the aneurysmal AA as compared to TAVd descending aorta. Finally, VBF increased consistently with age in all controls and was able to detect AA dilation with a 0.98 accuracy.

**Conclusion:** AA backward flow quantified from 4D flow MRI outperformed the previously described indices such as flow eccentricity and angle in the characterization of thoracic aortic aneurysms.



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