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Abstract 18: Association Of Dynamic Aortic Annulus Area With Paravalvular Regurgitation After TAVR

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Introduction: TAVR is considered treatment of choice for severe symptomatic aortic stenosis patients with high or intermediate surgical risk. Significant paravalvular regurgitation (PVR) post TAVR is still one of the complications that increases mortality and morbidity. Multidetector computed tomography (MDCT) is the primary imaging modality for assessment of aortic annulus for TAVR valve sizing. We hypothesize that a large dynamic change of aortic annular size may allow better fitting of TAVR to the annulus and thus, will affect degree and rate of PVR post TAVR. This study aimed to determine relationship between dynamic differences in aortic annular measurements during various phases of cardiac cycle and PVR.

Methods: Baseline demographic, echocardiographic and MDCT data were collected in 152 patients with severe symptomatic aortic stenosis being evaluated for TAVR at our institution in 2017. Cardiac MDCT were performed with GE 256-slice CT using a standard protocol (0.625 mm slice thickness, 120 kV with 60-75 ml Isovue-370) and reconstructed at 5-10% intervals. Aortic annular areas were measured in mid systole (20-25%), end-systole (30-40%), mid-diastole (75%) and end-diastole (0%). Leaflet calcification and LVOT calcification was also evaluated. Multivariate logistic regression analysis was performed.

Results: Out of 152 patients, 72 (47.3%) patients had PVR and 80 (52.7%) had no PVR. Among those with PVR, 46 (30.3%) had trace, 18 (11.8%) had mild, 8 (5.2%) patients had moderate PVR and no patient had severe PVR. Patients with difference in aortic annular areas between end-systole and end-diastole of less than 30 mm^2were more likely to have greater than or equal to mild PVR (OR 2.1, 95% CI 1.12 - 5.48) and those with greater than 30 mm^2 were less likely to have greater than or equal to mild PVR. Greater than moderate LVOT calcification was also associated with greater than or equal to mild PVR.

Conclusions: Significant variation of aortic annular area (> 30 mm2 or > 12% change) was observed in almost half of patients who underwent TAVR. A larger dynamic difference between minimal and maximal aortic annular area during cardiac cycle appears to favor less paravalvular leak. This greater dynamic nature of aortic annulus provides more elasticity to allow a better fitting between TAVR valve prosthesis and aortic annulus. Larger prospective studies are needed for further confirmation.

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