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LOW STROKE VOLUME IN PATIENTS WITH SEVERE AORTIC STENOSIS IS ASSOCIATED WITH ADVERSE LEFT VENTRICULAR REMODELING

ACC Moderated Poster Contributions

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Authors: *Praveen Mehrotra, Katrijn Jansen, Timothy Tan, Aidan Flynn, Michael Picard, Judy Hung, Massachusetts General Hospital, Boston, MA, USA*

Background: The degree of left ventricular (LV) remodeling due to pressure overload varies significantly in patients with severe aortic stenosis (AS). Worsening compensatory adaptation of the left ventricle to pressure load may be manifested by differences in LV remodeling which results in decreased stroke volume index (SVi) in patients with severe AS. We hypothesized that patients with severe AS and low flow but with similar transaortic gradients to those with normal flow have a greater degree of adverse LV remodeling.

Methods: We searched our echo database for patients with severe AS (aortic valve area <1.0 cm², mean gradient ≥ 30 mmHg, and peak velocity ≥ 4 m/s) and EF $> 55\%$ over a 1 year period. Patients were divided into those with a SVi [measured by volumetric method end-diastolic volume index (EDVi) - end-systolic volume index (ESVi)] < 35 mL/m² (Group 1, n=43) and ≥ 35 mL/m² (Group 2, n=105). LV geometry was assessed by indexed end-diastolic and end-systolic volumes, LV mass (LVM) index, LVM to EDV ratio, and relative wall thickness (RWT = $2 \times$ posterior wall thickness/end-diastolic dimension).

Results: In patients with severe AS, 29% (43/148) had a SVi < 35 mL/m² despite an average peak velocity of 4.5 m/s (vs. 4.7 m/s in Group 2, p=0.18) and mean gradient of 50 mmHg (vs. 53 mmHg in group 2, p=0.31). Aortic valve area was similar between the groups (0.68 vs. 0.72 cm², p=0.07). There was a higher proportion of females in group 1 (53% vs. 38%, p=0.1). Patients in group 1 had a higher RWT (58.1% vs. 52.0%, p<0.001) and significantly lower EDVi (45.6 vs. 59.0 mL/m², p<0.001) and ESVi (14.0 vs. 17.5 mL/m², p<0.001). Group 1 patients had a significantly lower LVM index (104.2 vs. 112.5 gm/m², p=0.05) but a higher LVM to EDV ratio (2.3 vs. 1.9 gm/mL, p<0.001). Overall survival was not different between the groups during an average follow-up period of 1.6 years.

Conclusion: Patients with severe AS by standard echocardiographic criteria can be more specifically categorized by stroke volume index. Severe AS patients with low flow are characterized by distinct LV remodeling features and may represent worsening adaptation to pressure load despite similar aortic valve areas and transaortic gradients to normal flow, severe AS patients.