

LVOT Area by CT is Smaller in Women and Correlates Better with Height than with Body Surface Area

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Background: Left ventricular outflow tract area (LVOTa) is closely related to aortic annulus area, which determines prosthetic valve size selection and has important implications for patient-prosthesis mismatch (PPM). The aim of this study was to determine the determinants of LVOTa using cardiac CT and 3D echocardiography (3DE).

Methods: We prospectively studied 43 patients (age 68 ± 12 y, 22 females, 22 with aortic stenosis (AS) and 21 without AS). LVOTa was determined by cardiac CT and correlated with gender, body size indices (height, weight and body surface area (BSA)) and left ventricular end diastolic volume (LVEDV) using 3DE.

Results: LVOTa was smaller in women than in men (3.7 ± 0.6 cm² vs. 5.1 ± 1.4 cm², $p=0.0003$). Similarly, both LVOT diameters were smaller in women (D1: 2.0 ± 0.2 vs. 2.4 ± 0.3 cm, $p=0.0003$, and D2: 2.5 ± 0.2 vs. 2.9 ± 0.3 , $p<0.0001$). LVOTa best correlated with height ($r=0.57$, $p=0.0001$), and less so with BSA ($r=0.48$, $p=0.001$) or weight ($r=0.39$, $p=0.01$). After adjustment for height, the association between gender and LVOTa was borderline ($p=0.05$). There was a better correlation between 3DE determined LVEDV and CT determined LVOTa ($r=0.69$, $p<0.0001$). There was no significant difference in LVOTa in patients with and without AS ($p=0.7$), and no correlation between LVOTa and age ($p=0.2$). There was also no correlation between LVOT eccentricity index (D2/D1) and gender, height, or LVEDV.

Conclusions: LVOTa is smaller in women than in men, and correlates better with height than with BSA or weight. These findings have important implications for PPM, especially in women and short obese patients. Such patients may do better with TAVI, since small balloon expandable or self-expanding aortic stent valves have lower resistance compared with small surgically implanted prosthetic valves.