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Prognostic value of diastolic wall strain in patients with asymptomatic severe aortic stenosis

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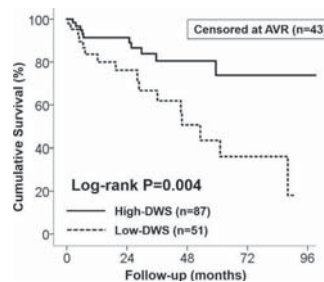
Background: Diastolic wall strain (DWS) has been reported to be associated with left ventricular (LV) stiffness and worse clinical outcomes. We sought to assess the utility of this new index for prediction of prognosis in asymptomatic patients with severe aortic stenosis (AS).

Methods: Asymptomatic severe AS patients [peak flow velocity (PFV) ≥ 4.0 m/s, mean pressure gradient (mPG) ≥ 40 mmHg, aortic valve area (AVA) ≤ 1.0 cm², or indexed AVA ≤ 0.6 cm²/m²] diagnosed between July 2007 and April 2016 were included in this study. Patients with significant mitral valve disease, posterior wall motion abnormality, prior cardiac surgery, hypertrophic cardiomyopathy, and LV ejection fraction $< 50\%$ were excluded. DWS was calculated with a validated formula [DWS = (posterior wall thickness at end-systole – posterior wall thickness at end-diastole)/posterior wall thickness at end-systole]. All study patients were prospectively followed up to last visit or death until November 2017, and predictive value of all-cause death was assessed using Cox-proportional

hazards modeling. Patients who underwent aortic valve replacement (AVR) during the study period were censored on the date of surgery.

Results: A total of 184 asymptomatic severe AS, 138 (age 76 \pm 9 year-old, men 41%, PFV 3.9 \pm 1.0 m/s, mPG 38 \pm 19 mmHg, AVA 0.83 \pm 0.18 cm², indexed AVA 0.56 \pm 0.13 cm²/m²) met all study criteria. Of whom, 43 (31%) underwent AVR and 28 (20%) died during a mean follow-up of 25 \pm 28 months. In a multivariable model after adjusting for clinical and echocardiographic variables, advancing age (per 10 yrs; HR=2.19, 95% CI=1.19–4.03, $P < 0.05$), history of hemodialysis (HR=4.31, 95% CI=1.30–14.35, $P < 0.05$), and low-DWS (DWS < 0.30) (HR=2.83, 95% CI=1.25–6.40, $P < 0.05$) were independent predictors of all-cause death. In the Kaplan-Meier estimates of cumulative survival stratified by DWS status were shown (Figure).

Conclusion: Low-DWS provides prognostic information in patients with asymptomatic severe AS.



The Kaplan-Meier estimates of survival