

Left ventricular, left atrial dysfunction and BNP progression in asymptomatic moderate and severe aortic stenosis

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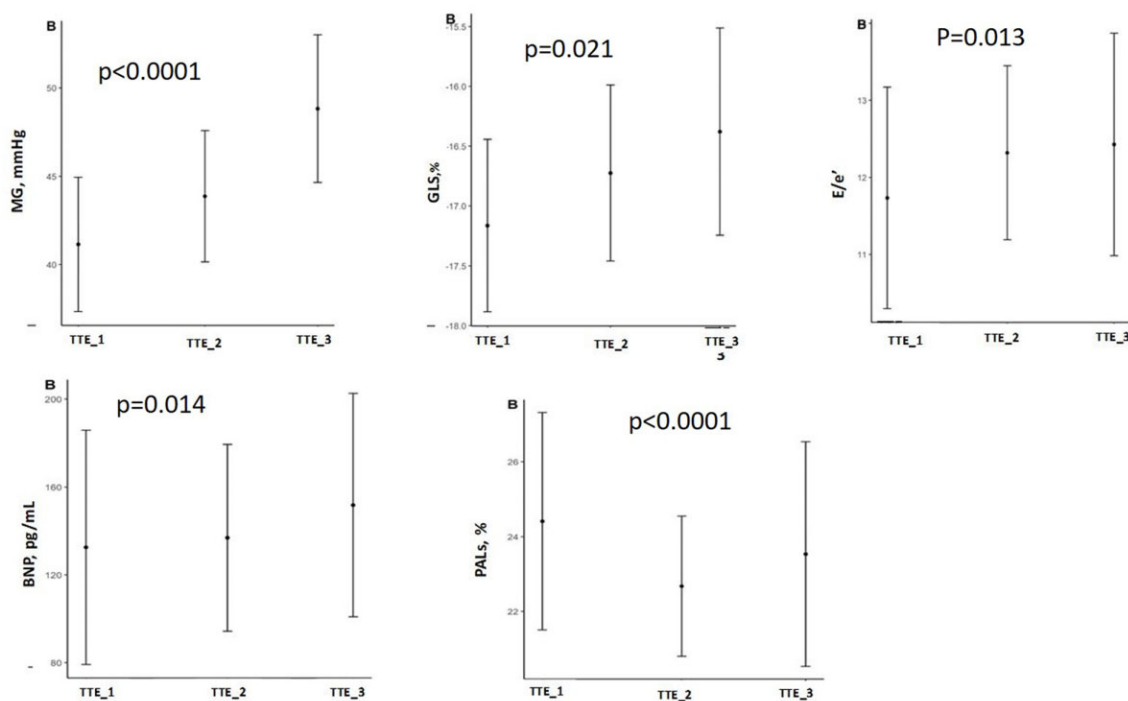
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Introduction and aim: Aortic stenosis (AS) is the most common valve disease in industrialized countries. Its prevalence is set to increase considerably in the coming years as the population ages (1). Data regarding the natural evolution in patients with moderate and severe AS are derived from cohorts of patients from 30 years ago (2, 3). We have thought to analyze the evolution of clinical, echocardiographic parameters and blood brain natriuretic peptide (BNP) in a recent cohort of truly asymptomatic patients with moderate to severe AS followed in the Valve Clinic. We also wanted to determine which is the echocardiographic parameter who's annualized change will influence all-cause mortality in these patients.

Methods: We have enrolled 63 patients with moderate or severe truly asymptomatic AS (negative exercise test in each patient) followed up in our Valve Clinic from 2010 to 2023 who had at least 2 or 3 transthoracic echocardiographic examination (TTE) of excellent quality while still asymptomatic. All patients had a complete TTE with images suitable for left ventricular (LV) and left atrial (LA) deformation analysis by 2D speckle tracking. All conventional TTE parameters were analyzed as well as BNP measurements at the time of the TTE. Patients were followed up (mean follow up of 401 days) and all-cause mortality was assessed.

Results: Our results show progression of AS severity, a decrease in LV systolic function (GLS decreased significantly but LVEF and SV index remained changed), progression of LV diastolic dysfunction (progressive increase in E /e' ratio, in LA index volume with a significant decrease in LA reservoir function (PALs)). A progressive increase in estimated systolic pulmonary arterial pressure (PAPs) and a higher probability of pulmonary hypertension during follow-up was observed, while RV function parameters, TAPSE and S' remained unchanged. BNP levels increased significantly over time. No patient was lost to follow-up and 23 (36.5%) patients died, 3 of cardiovascular cause. After adjustment for sex, age, presence of type 2 diabetes and coronary artery disease, all-cause mortality seemed to be significantly higher in patients with a decrease in LA reservoir function during follow-up (OR 0.77, CI 0.59-0.99, p=0.046).

Conclusion: To our knowledge, this is the first longitudinal contemporary study to describe the progression of AS and of all parameters of LV, LA, RV function and PHT in moderate to severe truly asymptomatic AS patients followed in a Valve Clinic. A higher risk of all-cause mortality was seen in patients with a poorer LA reservoir function. Annualized changed in LV and LA functional parameters may become a tool to improve risk stratification and therapeutic decision-making in asymptomatic severe AS if larger studies were to confirm our findings.



Variable	OR (95% CI)	P-value
Aortic valve		
Δ MG, mmHg	1,00 (0,96-1,03)	0,85
Δ V-max, m/s	0,58 (0,19-1,79)	0,34
Δ AVA, cm ²	0,57 (0,06-5,42)	0,63
Δ AVA indexed, cm ² /m ²	0,27 (0,00-17,22)	0,54
Left ventricle		
Δ LV mass index, g/m ²	0,99 (0,98-1,00)	0,26
Δ E/e'	1,00 (0,95-1,06)	0,87
Δ LVEF, %	1,03 (0,97-1,09)	0,35
Δ GLS, %	0,91 (0,72-1,14)	0,42
Δ SV index, ml/m ²	0,98 (0,94-1,02)	0,24
Δ LVEF/GLS	0,52 (0,09-2,92)	0,46
Left atria and Mitral Valve		
Δ LAVindexed, ml/m ²	1,06 (0,99-1,13)	0,071
Δ PACs, %	1,26 (0,98-1,62)	0,074
Δ PALs, %	0,77 (0,59-0,99)	0,046
Pulmonary artery pressure		
Δ PAPs, mmHg	1,04 (0,99-1,08)	0,14
Right ventricle		
Δ TAPSE, mm	0,96 (0,88-1,04)	0,33
Δ S', cm/s	1,09 (0,91-1,29)	0,36
Biomarkers		
Δ BNP, pg/mL	1,00 (0,99-1,01)	0,92
Δ BNP/GLS	1,01 (0,91-1,13)	0,81
Δ BNP/SVindex	1,07 (0,83-1,40)	0,59