Abstract

Title of the abstract: The role of extended Vs conventional echocardiographic parameters to quantify severity of aortic stenosis.

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Aims: The objective of the study was to evaluate left ventricular (LV) strain by speckle tracking imaging and plasma NT-ProBNP in patients with moderate to severe aortic valve stenosis (AS).

Methods: Thirty-three patients with isolated AS with preserved ejection fraction (EF) and ten controls underwent assessment of symptoms, transthoracic echocardiography and measurement of plasma levels of NT-ProBNP. LV Strain and plasma NT-ProBNP were analysed to find differences and correlation with conventional echocardiographic parameters and clinical variables. These parameters were also studied for their strength to predict symptomatic status in these patients.

Results: Global longitudinal (GLS), global area (GAS) and global radial (GRS) strains were lower in patients with aortic stenosis (n=33; Median -13.0,-26.0 and 40.0 , respectively) compared to controls (n=10; Median -20.4 , -31.5 and 49.5, respectively;p <0.001 ,0.02 and 0.01 respectively).GLS,GAS and GRS were also
lower in severe AS patients (n=27; Median -12.6,-25.0 and – 38.0, respectively) compared to moderate AS patients (n=6; Median -19.8,-32.5 and 52.5 respectively; p=0.02,0.01 and 0.03 respectively). GLS, GAS and GCS were lower in symptomatic (n=21; Median -11.6,-25.0 and 38.0) compared to asymptomatic (n=12; Median -16.45,-29.5 and 47.0 respectively; p=0.001,0.005 and 0.018 respectively) patients. Global circumferential strain (GCS) did not differ significantly between controls and AS patients or between subgroups of AS. There was a regional difference in strain with longitudinal strain in basal segments being decreased with preserved apical segmental longitudinal strain. Plasma NT-ProBNP was higher in AS patients (Median 628.00 pg/ml) compared to controls (80.82 pg/ml; p<0.001). NT-ProBNP was higher in severe AS (Median 614.0 pg/ml) patients compared to moderate AS patients (Median 118.9 pg/ml) and symptomatic (Median 1191.0 pg/ml) compared to asymptomatic (Median 118.9 pg/ml) patients. Absolute value of GLS correlated strongly with LV mass index (r= -0.70; p<0.001) and NT-ProBNP correlated strongly with LA volume index (r= 0.74; p<0.001). Log-transformed NT-ProBNP correlated well with GLS (r= -0.63; p<0.001). Of all the variables NT-ProBNP was the best predictor of symptomatic status; cut-off of 190.95 pg/ml has sensitivity of 90.5% and specificity of 91.7%. NT-ProBNP cut-off for predicting severe AS was 141.50 pg/ml with a sensitivity of 88.9% and specificity of 83.3%.

**Conclusions:** LV strain, especially GLS and plasma NT-ProBNP are affected early in patients with AS before the onset of symptoms and deterioration of LV function. Measurement of these variables to assess aortic stenosis patients may complement clinical and echocardiographic evaluation of these patients.

Key words: Aortic stenosis, Strain, NT-ProBNP