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Echocardiographic Assessment of Left Ventricular Function in Patients with Aortic Stenosis and the short-term effects after intervention

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Introduction: Aortic stenosis (AS) is the most prevalent form of acquired valvular heart disease, it affects ~2% of people aged over 75. Series of compensatory mechanisms occur, in order for LV to adapt to high pressure overload. Aortic valve replacement has been the mainstay AS treatment either surgically or percutaneously. The evaluation of myocardial strains after Transcatheter Aortic Valve Implantation (TAVI) and Surgical Aortic Valve Replacement (SAVR) is still underexplored and there is no single study to date scouting the difference between TAVI and SAVR.

Aim: To assess the impact of unloading LV after TAVI and SAVR on LV remodelling.

Methods: In this prospective study, we have recruited 111 patients (75±11 years, 63% were females) with varying degrees of aortic stenosis. Of the 111 patients, 43 patients and 11 patients underwent TAVI and SAVR respectively between November 2017 and May 2018. Demographics, clinical and echocardiographic measurements along with speckle tracking parameters were recorded for all participants and again 4±2 weeks after intervention.

Results: Pre-TAVI LV-GLS mean was –10.8±3.5% and after implantation of aortic prosthesis immediate improvement of the myocardial deformation to –13.98±2.9% was observed after one month of the intervention, mean difference of –3.16% following procedure. There was an evidence of significant improvement in LV-GRS after TAVI (44.86±12.9% to 49.77±10.8%, P value= 0.047). Per contra, when comparing pre and post TAVI LV-GCS, no statistical evidence was noted. However, a difference of –2.4% in GCS following the intervention might be clinically important, but no previous evidence can support this. This is attributed to the poor reproducibility and yet not available standardisation.

Conclusion: Significant improvement was evident in myocardial deformation parameters – in particular GLS – after weeks of the intervention demonstrating a strong evidence of reversed remodelling following SAVR and TAVI.

Table 1

Variables	TAVI (n=43)			SAVR (n=11)			P value†
	Pre	Post	P* value	Pre	Post	P* value	
GLS (%)	–10.82±3.5	–13.98±2.9	<0.001	–12.75±4.3	–16.1±2	0.021	0.152
GCS (%)	–30.1±8.1	–32.49±9.2	0.134	–27±9.8	–33.9±4.69	0.063	0.062
GRS (%)	44.86±12.9	49.77±10.8	0.047	36.6±13.3	44.97±4.9	0.074	0.058

Data are expressed as mean ± SD. Comparisons were performed using paired Student's t tests. *Pre and post intervention. †Post TAVI vs. post SAVR. Comparison done using unpaired t test of the differences.