Left ventricular myocardial work in patients with secondary mitral regurgitation

I. Yedidya, R.P. Lustosa, F. Fortuni, P. Van Der Bijl, F. Namazi, N.M. Vo, N. Ajmone Marsan, V. Delgado, J. Bax

Leiden University Medical Center, Leiden, Netherlands (The)

Funding Acknowledgement: Type of funding source: None

Background: Assessment of left ventricular (LV) function in patients with secondary mitral regurgitation (SMR) remains challenging because LV ejection fraction (LVEF) reflects changes in LV volume without taking into account the direction of the blood flow. LV global longitudinal strain better reflects active LV myocardial deformation but does not incorporate afterload. LV myocardial work derived from pressure-strain loops integrates speckle tracking echocardiography with non-invasive blood pressure measurement.

Purpose: To evaluate LV myocardial work components to better characterize LV function in patients with SMR.

Methods: 378 patients (72% men, median age 68 [range 60 to 74 years]) with various grades of SMR were retrospectively analysed. LV myocardial constructive work, wasted work and work efficiency were measured with speckle tracking echocardiography.

Results: 145 patients had mild SMR, 130 moderate SMR and 103 severe SMR. Patients with severe SMR had larger LV volumes, lower LVEF and more impaired LV GLS (Table 1). While LV constructive work was more impaired in patients with severe SMR, wasted work was lower as compared to mild SMR (Table 1). Consequently, patients with severe SMR had better myocardial work efficiency than patients with mild MR. This could reflect, the regurgitant volume which is pumped into a low pressure chamber (the left atrium) resulting in less myocardial wasted work and preservation of myocardial efficiency.

Conclusion: In patients with severe SMR, LVEF, LV GLS and myocardial constructive work are more impaired when compared to mild SMR. However, myocardial wasted work is lower, resulting in higher better LV myocardial work efficiency.

Echocardiographic parameters

	Mild MR (N=145)	Moderate MR (N=130)	Severe MR (N=103)	P-value
LVEF (%)	30±8[a]	27±10	28±9	0.041
LVEDV (ml)	171 [133–226][a,b]	196 [157–255]	195 [156–262]	0.001
LVESV (ml)	121 [90–160][a,b]	147 [109–190]	148 [107–196]	<0.001
GLS (%)	–8±3.4[a,b]	–6.8±3	–6.5±2.9	<0.001
GCW (mmHg%)	845 [635-1114][a,b]	739 [479–1083]	678 [467–972]	0.001
GWW (mmHg%)	258 [161–344][a,b]	182 [101–285][b]	130 [87–223]	<0.001
GWE (%)	77 [67–84][b]	81 [70–87]	81 [76–88]	0.001

LVEF, Left ventricular ejection fraction; LVEDV, Left ventricular end-diastolic volume; LVESV, Left ventricular end-systolic volume; GLS, global longitudinal strain; GCW, Global constrictive work; GWW, Global wasted work; GWE, Global work efficiency. Data are presented as mean ± SD or median (25th–75th percentile) as appropriate. [a]P<0.05 vs moderate MR; [b]P<0.05 vs severe MR.