Tissue Doppler, Speckle Tracking and Strain Imaging

Prognostic implications of myocardial work in patients with reduced left ventricular ejection fraction: a preliminary study

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Funding Acknowledgements: Type of funding sources: None.

Background. Myocardial work (MW) is a new imaging technique to assess left ventricular (LV) systolic function. It incorporates both deformation parameters (global longitudinal strain -GLS-) and loading conditions and gives information on global constructive work (GCW), global wasted work (GWW), global LV myocardial work index (GWI) and global LV myocardial work efficiency (GWE).

Purpose. The aim of this study was to describe the prognostic role of MW in predicting major adverse cardiovascular events (MACE) in patients with reduced LV ejection fraction (LVEF), and to compare it with GLS and LVEF.

Methods. We retrospectively included consecutive patients from 2012 to 2019 with dilated LV and LVEF < 50% of any aetiology. Clinical variables were collected and LVEF, GLS and MW were evaluated from baseline echocardiogram. MACE was defined as heart failure (HF) and/or ventricular arrhythmia (VA) and/or cardiac arrest and/or all cause death.

Results. 99 patients were included, 26 were women (26.3%), mean age at diagnosis was 57 years (SD 23). Mean LVEF was 32.5% (SD 10.3). Baseline patients characteristics are described in Table 1. During a median follow-up of 25 months (IQR 12), 24 MACE were recorded (24.4%). Patients with MACE had worse MW parameters: significantly lower MWI (805 ± 360 % vs 638 ± 277 %, p = 0.04) and lower GCW (1116 ± 535 mmHg vs 874 ± 458 mmHg, p = 0.05), and a tendency to lower GWE (83 ± 11 % vs 77 ± 16 %, p = 0.084). Of note, both LVEF (33 ± 10% vs 29 ± 9%, p = 0.123) and GLS (-9.99 ± 3.7% vs -8.8 ± 3.0, p = 0.170) showed a trend but were not significantly associated with outcomes. This might suggest that MW variables are stronger prognostic predictors than traditional imaging parameters.

Conclusions. In patients with reduced LVEF, MW parameters including global MWI and GCW were associated with major adverse cardiovascular events. Of note, both EF and GLS seem to have less prognostic implications in this cohort when compared with MW. Our results are preliminary and larger studies are needed in order to fully understand the clinical utility of MW beyond traditional parameters.

Baseline patient characteristics

	GLOBAL	EVENTS	NO EVENTS	p
Hypertension, %	41	67	29	0.014
Ischaemic etiology, %	14	20	12	0.448
Creatinine, mean (SD) - mg/dL	0.96 (0.04)	1.11 (0.09)	0.90 (0.04)	0.021
Bblockers, %	98	100	97	0.514
Nitrates, %	4	13	0	0.025
Diuretics, %	65	93	53	0.006

SD: standard deviation

Abstract Figure. Results