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Myocardial work analysis in hypertrophic cardiomyopathy: low work or high work?

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Topic(s):
Tissue Doppler, Speckle Tracking and Strain Imaging

Citation:
Background: Myocardial Work (MW) is an interesting novel non-invasive parameter to evaluate cardiac performance by left ventricle (LV) pressure-strain loops.

Purpose: The present study sought to investigate MW in patients with both non-obstructive (NOHCM) and obstructive hypertrophic cardiomyopathy (OHCM).

Methods: Forty-four patients with hypertrophic cardiomyopathy (HCM) and twenty controls (mean age 53 ± 20 years vs 52 ± 17 years, respectively, p = 0.8) underwent standard two-dimensional and speckle-tracking echocardiography. Global Work Index (GWI), global constructive work (GCW), global work waste (GWW) and global work efficiency (GWE) were estimated by LV pressure-strain loops. In OHCM group, MW was evaluated by adding LVOT peak gradient to SBP. Analysis of multilayer LV longitudinal strain (LS) and left atrial (LA) LS was performed.

Results: Global LS (GLS), endocardial LS, epicardial LS and LA LS were significantly reduced in patients compared to controls (p < 0.001 for all). All patient population had significantly lower GWI, GCW and GWE and higher GWW respect to controls. Regional GLS, endocardial LS, epicardial LS and regional WI were significantly reduced in hypertrophic area compared to no-hypertrophic area in the patient population (p < 0.001 for all). OHCM group ( n = 14) had higher values of GWI and GCW compared to NOHCM ( n = 30) (2160 (1877-2250) vs 1547 (1148-1767)mmHg% and 2285 ± 411 vs 1755 ± 584 mmHg% respectively, p < 0.05 for both, Figure).

Conclusions: GWI and GCW are reduced in patients with NOHCM. Patients with OHCM, have higher GWI and GCW compared to non-obstructive ones, as expression of work at higher level of energy necessary to counteract high afterload. Our proposed method to estimate MW in OHCM needs to be validated in invasive studies.
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