Non-invasive myocardial work reference ranges in healthy children

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Background: Myocardial work (MW) estimation by pressure-strain loops (PSL) allows a non-invasive assessment of myocardial performance, as recently demonstrated in adult patients.

Aim: Aim of this study is to provide the reference values for global myocardial work index (MWI), constructive work (MCW), wasted work (MWW), and work efficiency (MWE) in a group of healthy children.

Methods: Assessment of MW was performed using a commercially available software package. MW was measured from PSLs areas, derived from non-invasive LVP curves combined with strain acquired speckle tracking echocardiography (STE).

After calculating GLS, values of brachial blood pressure were inserted and the time of valvular events by echocardiography were indicated, then the software was able to measure non-invasive PSLs.

Results: Two-dimensional (2D) standard and speckle-tracking echocardiography were performed in 90 healthy children (mean age 9.9±4.9 [1–17] years, females: 57%) together with the assessment of MW by means of PSLs.

Mean ± standard deviation, 5° and 95° percentile values for global MWI, MCW, MWW, and MWE in the whole population were 1769±254 mm Hg, (1354–2193); 2201±290 mm Hg, (1657–2658); 78±47 (29–163) mm Hg%; 96±1.8 (92–99)%, respectively.

Conclusions: The assessment of MW is feasible in healthy children. This study provides useful 2-dimensional echocardiographic reference ranges for novel indices of non-invasive MW.