

A Novel Non-invasive Quantification of Myocardial Work of the Left Ventricle in Patients after Repairing Tetralogy of Fallot

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We investigated an efficacy of regional myocardial work index (MWI) of the left ventricle (LV) in children after repairing tetralogy of Fallot (TOF) by using a novel non-invasive quantification echocardiographic imaging. MWI at 18 segments of LV was calculated by pre-installed program of E95 and EchoPac (GE HMS) from regional LV pressure(LVP)-strain loop areas which was constructed from assumed LVP curve in combination with strain by speckle tracking from apical three images of LV as previously described (Eur H J 2012;33:724-733). The sixteen patients of TOF (14.9y) and 16 normal control (N) (13.6y) were enrolled.

Results: The global strain and MWI were significantly higher in N (-19, 2064 %/s) than in TOF(-17.3, 1682) as same as Myocardial work waste (MWW) in N (92%/s) and in TOF(74.9%/s). This results suggested MW-efficiency (MWE), defined as $\{(MWI-MWW)/MWI\}$ was reserved in TOF as Fig.1. In TOF, MWW tended to demonstrate weak positive correlation with the ratio of RVp/LVp and negative one with the ratio of RVEDV/LVEDV, however, MWE was reserved in patients not related to LV ejection fraction if not with heart failure. This means the regional myocardial energetic efficiency remains reserved until LV collapsed.

In conclusion, this non-invasive quantification of MWI could provide a new insight of regional myocardial energetics beyond deformation.

Fig.1

