

Parameters of biventricular deformation in patients with repaired and unrepaired Ebstein's anomaly – assessment by tissue tracking cardiovascular magnetic resonance

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INTRODUCTION

In Ebstein anomaly (EA) other factors than the tricuspid valve (TV) malformation, including left myocardial non-compaction (LVNC) and right ventricle (RV) atrialization may influence myocardial function even after TV repair.

We assessed biventricular myocardial deformation in repaired and unrepaired EA by using feature tracking (FT) CMR and tested features potentially influencing myocardial deformation.

METHODS

Biventricular function was prospectively assessed by cine CMR using the SSFP sequence in 20 patients with EA. Global circumferential (GCS) and longitudinal strain (GLS) of both ventricles were analysed by FT (Medis Version 3.3). Image temporal resolution was < 25 msec.

Patients median age was 44.5 (17-64). Six patients underwent TV repair and twelve (60%) had LVNC. Correlation with LVNC, degree of TV displacement, ventricular volumes and EF % was tested.

RESULTS

Mean RVEDV was 137±34 ml/m²; RVESV 86±33 ml/m², RV EF% 39±10. RV dilatation (> 110ml/m²) was measured in 18/20 patients, independently from valve repair. Mean LVEDV was 87±26 ml/m²; LVESV 42±16 ml/m²; LVEF% 53±10.

LV GCS was normal (-26.3±8%). GLS was decreased in the LV and RV compared to normal subjects (LV GLS -16.6±4% vs 21.3±4.8; p<0.01 and RV GLS -12±6% vs 18.9±4.6; p<0.001). GLS of RV septum was inferior to GLS of RV free wall (12.2±6% vs 22.8±7.3; p 0.0002). LVNC, previous TV repair, degree of TV displacement did not influence EF%, nor global strain values of both ventricles. LV GCS correlated with LV GLS (r 0.749, p<0.001), LV ESV and LV EF% (r 0.7128; p<0.001). A weak correlation was found between LV GCS and RV GLS (r 0.55; p 0.01). LV GLS correlated with LVESV (r-0.52; p 0.01), LV EF% (r 0.7128; p<0.001), RV GLS (r 0.49; p 0.029), but not with RV EF%. RV GLS significantly correlated with RV ESV (r -0.5;p 0.02) and RV EF % (r 0.54;p 0.01). No correlation was found between LV and RV EF%.

CONCLUSIONS

Patients with EA have a dilated RV with decreased RVGLS and EF% independently from the severity of TV displacement or RV repair. RV septum deformation is more affected than free wall. LV GCS is normal, while GLS decreased.