

## MP3-2

### Parameters of myocardial deformation in single ventricle patients after Fontan palliation – assessment by feature tracking cardiovascular magnetic resonance

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**Introduction:** Reliable quantification of cardiac function in single ventricle (SV) patients after Fontan palliation is challenged by complex cardiac anatomy and restricted acoustic windows. Feature-tracking (FT) cardiac magnetic resonance (CMR) is increasingly used in congenital heart disease. We sought to test the correlation between FT and conventional CMR-parameters, clinical parameters and biomarkers.

**Methods:** Myocardial deformation was retrospectively analyzed on cine-SSFP images in 40 consecutive patients (25 males) with SV physiology, 11±6 years after Fontan completion. Endocardial mid circumferential strain (mid-CS) and global longitudinal strain (GLS) were measured by FT (Qstrain, Medis Version 3.3) in short-axis and horizontal-long-axis, respectively. Image temporal resolution was <25msec.

**Results:** A dominant right ventricle (RV) was present in 16 (40%) patients, Fontan completion was performed at 3.2±1.5 years with a total cavopulmonary connection in 37 (93%) (18 fenestrated). Hospitalization length was 23±10 days, 16 patients experienced complications. Age at CMR was 15±7 years, weight 51±22 kg. Mean EDV was 89±33 ml/m<sup>2</sup>, ESV 41±18 ml/m<sup>2</sup>, EF 53±8%. At time of CMR, echocardiography showed a decreased ventricular function in 6 (15%) patients and significant atrioventricular valve regurgitation in 3 (7%). NYHA Class was I in 17 (43%), 11 (2.5%) received cardiac medication, and 8 (2%) had an arrhythmia. Median NT-proBNP was 206 (123-660) ng/ml, VO<sub>2</sub>max 28±10 ml/kg.

Left ventricle (LV)-mid-CS was higher than RV-mid-CS (-24.9±4.1% vs. -20.7±3.7%; p=0.004). LV-GLS was lower than RV-GLS (-15.6±4% vs. -19.9±6.8%; p=0.05). Total Mid-GCS correlated positively with larger EDV (p=0.006), smaller ESV (p=0.001) and EF (p=0.01). Total GLS correlated positively with EF (p=0.003) but not with ventricular volumes. Patients with echocardiographically decreased ventricular function had lower mid-GCS (p=0.03). No correlation was found between strain values and presence of fenestration, postoperative complications, atrioventricular regurgitation, NYHA class, arrhythmia, age at Fontan, hospitalization length, age, body size, interval since Fontan, NT-proBNP, and VO<sub>2</sub>max.

**Conclusions:** Myocardial deformation can be assessed with CMR-FT in patients after Fontan palliation. Systemic RV and LV have significantly different strain patterns. Mid-GCS shows a relevant correlation with ventricular volumes and ejection fraction, while GLS correlates only with ejection fraction. No correlation was observed between myocardial deformation and clinical parameters or biomarkers.