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### Prognosis of the systemic right ventricle further refined: a role for myocardial strain analysis

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**Background:** Predicting heart failure in patients with systemic right ventricle (sRV) due to transposition of the great arteries (TGA) is difficult. Strain parameters are easily available and detect early myocardial damage.

**Purpose:** To determine the value of strain parameters compared to cardiovascular magnetic resonance (CMR) derived parameters as predictors for heart failure-free survival in patients with an sRV.

**Methods:** In participants of a multicenter prospective trial, global longitudinal strain (GLS) was assessed on echocardiography using speckle tracking. Cox regression was used to determine the association of sRV GLS and postsystolic shortening, defined as >20% of myocardial contraction appearing after aortic valve closure, with the combined endpoint of progression of heart failure and death, compared to CMR derived parameters.

**Results:** Echocardiograms of 61/88 participants could be analyzed (age 34±11 years, 66% male, 34% congenitally corrected TGA). Mean GLS was -13.5±2.9% and 13 (21%) patients had postsystolic shortening. During 8 [7–9] years, 15 (23%) patients met the composite endpoint. sRV ejection

fraction (mean 39±9%, HR=0.93/% [95% CI 0.87–0.99]), sRV end systolic volume (mean 80±31 ml/m<sup>2</sup>, HR=1.19 per 10ml/m<sup>2</sup> [95% CI 1.01–1.40]), GLS (HR=1.25/% [95% CI 1.01–1.54]) and postsystolic shortening (HR=4.10 [95% CI 1.48–11.37]) were all associated with heart failure-free survival in univariable analysis. Optimal cut-offs for sRV ejection fraction and GLS were 30% and -10.5%, respectively, with comparable predictive value for heart failure-free survival (iAUC=0.66 and iAUC=0.68). Patients with both decreased strain (>-10.5%) and decreased RVEF (<30%) were at highest risk for heart failure and death (HR=19.83 [95% CI 4.92–80.01], iAUC=0.73).

**Conclusion:** The predictive value of global longitudinal strain is comparable to CMR derived ejection fraction. Patients with both low ejection fraction and low myocardial strain are at highest risk of heart failure and death. These easily available parameters should be integrated in future risk prediction scores and can be used in the clinic to guide follow-up intensity.

