

**Global and regional myocardial function in patients after arterial switch operation - speckle tracking study.**

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Introduction: Arterial switch operation/ASO/ for transposition of the great arteries /TGA/ was designed to restore the morphological left ventricle as the systemic ventricle, and thereby to improve cardiac function and longevity. Perfusion defects and ventricular wall motion abnormalities are late complications which affect the myocardial function and heart mechanics. Myocardial deformation imaging by 2D strain echocardiography is a novel method for assessing the ventricular myocardial function. This study aims to investigate the global myocardial function by standard and 2D strain echocardiography in children after ASO.

Methods: Medical files of patients divided in two groups were analyzed, first group - 58 children after neonatal ASO and second group - 17 healthy controls. Echocardiographic measurements by standard and Speckle Tracking Imaging /2DSE/ in these groups, were compared. Apical two, three and four-chamber images (frame rate  $74 \pm 6$  frames/s) were analyzed. Global and regional peak systolic strain (PPS) on the left ventricle (LV) was derived. The strain curves ( $\epsilon_{LL}$ ,  $\epsilon_{CC}$ ,  $\epsilon_{RR}$ ) were extracted and derived using a commercial software built on a 18-segment left ventricle. Data were presented as medians with range or means  $\pm$  standard deviation. A parametric paired samples T-test integrated in the statistical software SPSS was used. A value of  $p \leq 0,05$  was considered significant.

Results: Mean age was  $5.7 \pm 4$  years in the ASO group and  $7.6 \pm 4$  years in the control group, with no statistical difference. Global strain measures of the LV were significantly different between the groups (PSSLV  $-16,42 \pm 3,08$  vs.  $-19,29 \pm 2,17$ ,  $p=0,0001$ ). In the measurements of LV function, there was a clear tendency toward a decrease in the ejection fraction ( $63,6 \pm 4,1$  vs.  $71,1 \pm 3,2$ ) with a concomitant increase in LV diastolic diameter (LVDD) ( z-score  $0.7 \pm 1,0$  vs.  $-0,3 \pm 0,8$  ). The systolic velocities were reduced significantly, especially of the medial LV segment, as well as the global longitudinal systolic strain and SR.

Conclusions: The reduced global peak systolic LVS/SR after ASO are associated with an unfavourable trend toward reduced pump function of LV. Reduced segmental LVS and SR values are a sign of regional hyperkinesia with a possible local segmental coronary ischemia during surgery.