

**Patients after Arterial Switch Operation Have Impaired Global and Regional Systolic Right Ventricular Function: A Speckle Tracking Echocardiography Study**

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**Introduction:** Current standard treatment of D-Transposition of the great arteries is the neonatal arterial switch operation (ASO). Functional assessment of the right ventricle (RV) after this procedure remains problematic due to its complex ventricular geometry. Myocardial deformation imaging by 2D strain echocardiography is a novel method representing a diagnostic possibility for assessing the RV function. This study aims to investigate the global and regional systolic function of the RV.

**Methods:** We compared echocardiographic measurements – from standard and tissue Doppler imaging (TDI), between 58 patients (mean age 5.7±4 years) after neonatal ASO and 13 healthy controls (mean age 7.6±4 years). Additionally apical four-chamber images (frame rate 74±6 frames/s) were analyzed offline and the global and regional peak systolic strain (PSS) of the RV was derived. These data were compared between both groups with the Student`s t-test. A p-value of less than 0.05 was considered significant.

**Results.** Age and body surface area were comparable between patients after ASO and those from the control group. Compared to the control group, the ASO group had greater RV wall thickness (3.67±0.67mm vs. 2.9±0.29mm, p<0.0001) and greater RV diameter (15.1±4.3mm vs. 12.9±2.17mm, p=0.01). The peak systolic TDI velocity of the anterior RV wall was lower in the ASO group than in the control group (7.0±1.1cm/s vs. 11.54±1.4cm/s; p<0.001). The ASO patients had lower TAPSE (13.7±2.5mm vs. 20.5±4.5mm; p<0.001). Right ventricular global PSS was diminished in the ASO patients compared to the control group (-10.03±4.5 vs. -15.5±2.3; p<0.01). Regarding the regional RV function: PSS was lower in the ASO group than in the control group in the middle (-16.38±5.47% vs. -22.07±5.22%; p<0.001) and in the apical (-11.83±5.31% vs. -24.24±6.15%; p<0.001) RV free wall segments. There were no significant differences in the basal PSS between both groups (-20.16±7.34% vs. -21.13±7.03%, p=0.68).

**Conclusion:** Patients after ASO have diminished global systolic RV function. There is regional systolic dysfunction in the middle and apical segments of the RV which can be demonstrated by speckle tracking echocardiography.