Tissue Doppler Imaging - an important adjunct in Predicting the Outcome of Arterial Switch Surgery in Transposition of Great Arteries

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Background
Predicting the feasibility of ASO in patients with TGA is a contentious issue, especially in infants presenting beyond 3 weeks of age. We studied the usefulness of various echocardiographic parameters including tissue velocities, strain and strain rate imaging in predicting the outcome following arterial switch operation (ASO) for transposition of great arteries (TGA).

Methods
A total of 42 infants (aged 3 - 123 days) with dTGA and intact ventricular septum or a small ventricular septal defect (VSD) were included in the study. Standard echocardiography including Doppler studies was performed with 5 or 10 MHz probe (GE Vivid 7 Machine) prior to surgery. Intra and inter-observer variability of each parameter was assessed to be within acceptable limits. These echocardiographic variables were correlated with surgical outcomes. A composite end point of death, use of ECMO, and prolonged ICU stay (>10 days) was considered to indicate a complicated postoperative course.

Results: Out of the 42 patients with IVS, 12 patients had a regressed LV by conventional assessment. Left ventricular dimension in systole and posterior wall thickness were the only parameters that were significantly different in patients with a preserved left ventricle.

In this cohort, 10 patients had a complicated postoperative course. On logistic regression analysis, LV mass index (OR 6.0; p value 0.04) and anteroseptal basal strain (OR 9.2; P value 0.03) were significant independent predictors of poor outcome. Age alone was not an independent predictor of poor outcome (OR 0.37; p value – 0.44). A cut off of LV mass index of 35 gm/m2 and -18.5% peak systolic strain were good predictors of poor outcome. The area under the curve of ROC for peak systolic strain at -18.5% for differentiating good and poor outcome was 0.89.

Conclusions:
Functional assessment of LV with tissue strain in addition to structural assessment with LV mass index are useful in predicting a complicated outcome in patients of TGA undergoing arterial switch operation (ASO). The utility of these measures have to be confirmed in larger studies.