Assessment of myocardial deformation with 2-dimensional speckle tracking echocardiography in children with isolated subaortic stenosis after surgery

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Introduction: Here, we aimed to investigate whether strain and strain rate could detect subtle left ventricular dysfunction and impairment in regional myocardial functions in children with repaired isolated subaortic stenosis after mid-term follow up.

Methods: We studied 20 patient (%40 female, mean age was 15.2±6.86 years) and 31 healthy subjects (%40 female). Electrocardiography was performed in all subjects. NT-pro BNP levels were determined in patient group after exercise ECG. By using two dimensional speckle tracking echocardiography, strain and strain rate were measured in all subjects. Multiple linear regression analysis was used to determine independent variables on longitudinal and radial strain.

Results: Operation age was between 2 and 24 years (mean 8.05±5.57 years), and mean postoperative follow-up time was between 2 and 14 years (mean 7.15±3.26). In the patient group, preoperative left ventricular outflow tract gradient was 73.35±23.70 mmHg, and postoperative left ventricular outflow gradient was 22.80±19.31 mmHg. In the patient group, mean NT-pro BNP level was 193.89±611.13 pg/mL. Relative to the healthy subjects, interventricular septal wall thickness in diastole (IVSd) was significantly higher in the patient group (p=0.001). EF, FS and VCFc were found to be significantly lower in patients than in controls (p=0.001). In the patient group, mitral E’ (p=0.03) and septum E’/A’ (p=0.03) were significantly lower than in controls. Septum MPI, mitral MPI and aortic strain (using M mode) were found to be significantly higher in patients than in controls (p=0.03, p=0.02, p=0.001, respectively). Aortic distensibility was significantly lower in patient than in controls (p=0.034). Longitudinal strain of LV was found to be significantly lower in patient than in controls (β=0.138, p=0.034; 95% CI: 0.010-0.265).

Conclusions: Longitudinal strain of left ventricle is significantly impaired in children with subaortic stenosis after surgery. Longitudinal strain shows correlation with aortic strain. Longitudinal strain seemed to be superior to radial and circumferential strain of left ventricle in the follow-up of children with subaortic stenosis.