

Cardiac Function Abnormalities in Volume and Pressure Overload Congenital Heart Disease

Fatma Alzahraa

Professor & Head of the Echocardiography department, Cairo University

Aim:

To Compare left ventricular myocardial tissue velocities between cases of congenital heart disease with volume and pressure overload and to detect discrepant myocardial responses to pressure and volume overload.

Methods:

This study was carried out on 60 children 39 of them were diagnosed to have congenital heart diseases. 19 of them suffer from VSD and 20 suffer from CoA. Also, another 21 normal children were taken as a control group. All the patients had Full history taking, clinical examination, Tissue Doppler and 2D speckle tracking Echocardiographic assessment for calculation of the Left Ventricular E/E' (Left Ventricular ratio of early diastolic mitral inflow velocity to average of early diastolic velocities of the mitral annulus and basal septum) as a potential measure of LV diastolic function and LV global longitudinal strain (LV GLS).

Results:

Systolic tissue velocities (Septal S) are significantly higher in the group of VSD in comparison to coarctation and control group (mean \pm SD) 9.3 ± 2.6 for VSD, 5.9 ± 1.1 for coarctation and 7.2 ± 0.8 for control (p value < 0.001). For Mitral S velocity it was 9.2 ± 3.7 for VSD, 5.7 ± 1.5 for coarctation and 7.8 ± 1.1 for control with p value < 0.001. The LV E/E' ratio was significantly elevated in CoA group 9.4 ± 2.0 compared with VSD 7.4 ± 1.3 and control 5.9 ± 1.1 groups, p value < 0.001, denoting more affection of LV E' (tissue Doppler in mitral annulus) in CoA group. Mean LVSD (LV end diastolic septum thickness) is significantly increased in CoA group. Mean LV GLS is

reduced in both VSD 15.0 ± 1.0 and CoA 11.5 ± 1.7 groups compared with 19.6 ± 1.7 for controls p value < 0.001, but significantly affected in CoA group rather than VSD group.

There was a strong positive correlation between Septal S and VSD size, r (0.841), and strong negative correlation between LV E/E' and VSD size r (-0.722). There was strong positive correlation between LV E/E' and Pressure gradient across CoA r (0.867) and strong negative correlation between Mitral annular S and Pressure gradient across CoA r (-0.609).

Conclusion:

Systolic LV velocities were markedly impaired in coarctation group compared to VSD group, which had even higher systolic velocities than control group. Diastolic functions were highly impaired in cases of coarctation compared to patients with VSD.

Keywords:

pressure overload, volume overload, tissue Doppler, speckle tracking