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Congenital Cardiology Solutions

STRESS ECHOCARDIOGRAPHY: A USEFUL TOOL IN CHILDREN WITH AORTIC STENOSIS

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Background: Left ventricular subendocardial ischemia may occur in patients with valvar aortic stenosis and unobstructed coronary arteries, owing to an imbalance in oxygen supply/demand precipitated by exercise. While there is limited sensitivity and specificity of traditional exercise ECG markers for myocardial ischemia, the development of echocardiographic ventricular wall motion abnormalities with exercise may enhance detection.

Methods: The objective of the study was to assess the relationship between exercise wall motion index (WMIe) and ST segment depression (ST d) in pediatric patients with isolated aortic valve stenosis. The secondary aim was to evaluate exercise functionality in this group. It was a retrospective study (01/04 to 06/09). Patients with isolated aortic stenosis, with no prior surgical intervention, were included. Imaging was performed before and immediately post-maximal treadmill exercise. The stress echocardiogram and ECG were independently read by 2 pediatric cardiologists. Logistic regression and analysis of covariance (ANCOVA) were performed.

Results: 98 children met inclusion criteria. Mean age: 12.8 yrs; Male/female ratio: 4/1; There was 10% interobserver variability in assessment of WMI. 70/98 had mild (Group I), while 28/98 had moderate to severe (Group II), stenosis. An abnormal WMIe was seen in 8 patients (5 Group I, 3 Group II); 13 had significant STd (3 Group I, 10 Group II); 4/8 (50%) with abnormal WMIe also had significant STd. The severity of stenosis correlated with STd [Odd's ratio 12 (3, 49)]; a significant correlation also existed between abnormal WMIe and STd [OR 9.0 (1.9, 42)]. Mean exercise duration was 13 ± 2(2.64) min in Group I versus 12 ± 2(2.26) min. in Group II, (p=0.02).

Conclusion: Presence of STd and decreased exercise time was observed in patients with moderate to severe aortic stenosis. Thus, stress echocardiographic markers of myocardial ischemia were effective in identifying functionally important, and more severe, degrees of aortic valve stenosis in children. Stress echocardiography may be a useful adjunct to traditional exercise testing, in risk-stratifying pediatric patients with aortic valve disease.