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Strain and Strain Rate Echocardiography Findings in Children With Congenital Left Ventricular Outflow Tract Obstruction

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INTRODUCTION

Obstruction to left ventricular outflow impose increased afterload, and if severe and untreated, result in hypertrophy and eventual dilatation and failure of the left ventricle. However, various studies have reported that subclinic alterations occur in systolic and diastolic myocardial functions in patients with aortic stenosis and preserved ejection fraction. The aim of our study was to evaluate the myocardial functions with strain/strain rate echocardiography in LVOTO patients with normal cardiac functions determined by conventional echocardiographic techniques and comparing them with healthy controls.

MATERIALS AND METHODS

A total of 58 patients with various degrees of isolated congenital left ventricular outflow tract obstruction and 73 healthy controls were enrolled in this study. Two-dimensional cine-loop recordings of apical 4-chamber and basal short-axis views were digitally stored for off-line analysis. Conventional echocardiography parameters, longitudinal, circumferential and radial peak systolic strain and strain rate values were determined.

RESULTS

According to the peak systolic pressure gradient patients were divided into two groups; mild (68.9%) and moderate-severe aortic stenosis (31.9%). Global longitudinal strain (LS)(-23.12±3.6 and -24.2±3.4), and strain rate (LSR) (-1.49±0.32 and -1.6±0.32) were lower whereas circumferential strain (CS) (-25.9±4.7 and -22.4±6) and strain rate (CSR) (-1.82±0.46 and -1.66±0.51) were higher in the patient group than in control subjects. Difference was significant for global LSR and CS (<0.05). Regional analysis revealed lower LS values in the basal part of the left ventricular free wall and lower LSR in the basal parts of both of the septum and free wall in the patient group than in control group (p<0.05). Regional CSR, radial strain (RS) and strain rate (RSR) values were not statistically different between patient and control groups.

CONCLUSION

In conclusion: compatible with the previous studies, impairment of the left ventricular long axis function occurred earlier and was more prominent in basal parts of the interventricular septum and free wall of left ventricle. According to these findings, S/SR echocardiography in addition to conventional methods in evaluation of the left ventricular functions and determining the subtle alterations in LVOTO patients, will be helpful in management and timing of the treatment.