

Echocardiographic Assessment of Mitral Regurgitation in Children and Relation to Pro-BNP Levels

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Introduction

We studied children with chronic mitral regurgitation (MR) due to rheumatic fever (RMR) or mitral valve prolapse (MVP) using echocardiographic parameters and their relation to serum NT-ProBNP levels and QTc dispersion as markers of volume overload and impaired repolarization.

Methods

The study included 39 patients (mean age=11.8±3.3; range: 4-19) with chronic mitral regurgitation due to either mitral valve prolapsus (MVP)(27) or rheumatic valve disease(RMR)(12) and 23 healthy children (mean age=10.9±2.81; range: 7-16) as control group. Serum NT-ProBNP levels were obtained, QTc dispersion was calculated using 12-lead ECG; 2D, M-mode, Doppler, Tissue Doppler and Strain echocardiography were performed using Philips IE33 Ecocardiography machine equipped with 5MHz transducer. LV sytolic and diastolic diameters, volumes, ejection fraction, vena contracta, regurgitant volume, effective regurgitant orifis area; global circumferential and longitudinal strain of left ventricle were calculated. The patients were divided into two subgroup as mild or moderate/severe subgroups according to the criteria of European Association of Echocardiography and divided two another subgroups as MVP or rheumatic mitral regurgitation (RMR).

Results

Plasma NT-ProBNP levels have increased in severe MR comparing to mild MR subgroup (170±225 pg/ml in severe MR, 53±30 pg/ml in mild MR p=0.019) significantly. Plasma NT-ProBNP levels of MR group correlated to mGLS (mean global longitudinal strain) (p=0.017 r:-0.414). mGCS (mean global circumpherential strain) correlated to QTc dispersion (p=0.007 r:0.44) and vena contracta (p=0.018 r:0.39) in MR group. mGLS correlated to QTc dispersion in RMR subgroup (p=0.032 r:0.040). In MVP subgroup QTc dispersion correlated to LVESV/m²(p=0.01 r:0.48). MPI (myocardial performance index) correlated to Regurgitant volume (p=0.011, r:-0.41) in MR group.

Conclusion

NT-ProBNP levels increased with severity of MR. We found a relation between NT-ProBNP and mGLS which may provide more powerful assesment of global ventricular function when used together. MPI is another echocardiographic parameter indicating global ventricular function and its relation to mGLS is in accordance with this knowledge. Increased QTc dispersion also accompanies left ventricular dysfunction and reflects impaired repolarisation. This study emphasises NT-ProBNP levels, mGLS, mGCS and MPI together provides a powerful assesment of global LV function in chronic MR in children.