

P-wave dispersion in children with rheumatic heart disease

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Introduction: Rheumatic heart disease (RHD) is a common cause of morbidity and mortality in poor and developing countries. Mitral regurgitation results in volume overload, then causes left ventricular and left atrial remodeling and eventually left ventricular systolic impairment can be seen. Arrhythmia may be seen in patients with mitral regurgitation. P-wave dispersion is an electrocardiographic marker that reflects left atrial enlargement and also has been reported to be associated with inhomogenous and discontinuous propagation of sinus impulse and paroxysmal atrial fibrillation. The purpose of this study was to assess any atrial arrhythmia risk in children with chronic mitral regurgitation caused by rheumatic fever in respect to P-wave dispersion.

Methods: A total of 43 children with rheumatic mitral regurgitation, with a mean age of 12.22 ± 2.28 years, and 25 healthy children, with a mean age of 11.21 ± 1.79 years underwent 12-lead surface electrocardiography and transthoracic echocardiography. Children with acquired and congenital heart disease other than chronic rheumatic mitral regurgitation were excluded from the study. P-wave dispersion was calculated as the difference between the maximum and the minimum P-wave duration. An SPSS 17.0 program was used for statistical analysis.

Results: Children with RHD had significantly larger left atrium and ventricle than control group. All patients and control subjects had similar ($p > 0.05$) and normal systolic functions (ejectional fraction and fractional shortening). Patients had significantly longer P-wave dispersion compared to control group (41.07 ± 7.16 vs 27.76 ± 3.28 , $p < 0.001$). In patient group, maximum mean P-wave duration was significantly longer (86.46 ± 8.61 vs 77.36 ± 6.36 , $p < 0.001$) and minimum mean P-wave duration was significantly shorter (45.48 ± 5.67 vs 49.60 ± 5.71 , $p < 0.01$) than control subjects. In all subjects ($n=68$), P-wave dispersion was found significantly correlated to maximum P-wave duration ($r=0.768$, $p < 0.001$), left ventricular end diastolic diameter ($r=0.306$, $p < 0.05$) and left atrial width ($r=0.252$, $p < 0.05$).

Conclusion: Inhomogeneity of atrial conduction and prolonged atrial conduction time may be related to left atrial dilation in children with rheumatic mitral regurgitation. These children should be closely followed up for the risk of clinically important arrhythmias.

Key Words: P-wave dispersion, rheumatic heart disease, children.