Prospective School-based Electrocardiographic Screening Program* in Children: The Widest Experience in Europe


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Introduction: This project aims to demonstrate the normal electrocardiographic (ECG) data and percentiles of children aged 6-18 via 12-channel ECG recordings and to determine cardiac conduction problems and incidence of congenital heart diseases.

Methods: The project “ECG screening of school-aged children” was started in January, 2013 following approval by the Public Hospitals Association of Çekmece-Istanbul, Ministry of Health, Republic of Turkey. Informed consents were received from families; 12-channel ECGs of children recorded school were transferred to the ECG storage system MUSE® at our hospital. The children with pathologies in the report were re-evaluated at our hospital; tests and treatments were performed.

Results: 120,164 children, whose ECGs were recorded over 2 years, were included in the study. 7209 children(6%) reported as probably pathologic were evaluated. Electrical and structural abnormalities were determined in 596 children(0.49%) whose necessary tests(ECHO in 2822, Holter in 505 and exercise testing in 304) were completed. The electrical abnormalities were: first degree atrio-ventricular block(AVB) in 47(0.039%), second degree AVB in 12(0.099%), complete AVB in 2(0.0016%), WPW syndrome in 13(0.0191%), borderline long QT + long QT syndrome in 56(0.046%), early repolarization in 13 (0.011%), premature ventricular complexes (PVC) in 55(0.045%) and premature atrial complex(PAC) in 43(0.035%) patients. The structural pathologies were: atrial septal defects in 36(0.029%), ventricular septal defects in 6(0.0049%), aortic valve pathology in 50(0.0412%), mitral valve pathology in 107(0.089%), patent ductus arteriosus in 8(0.0066%), hypertrophic cardiomyopathy in 8(0.0066%), patent foramen ovale in 60(0.05%) patients. 15 patients with congenital heart diseases were treated with surgical or trans-catheter procedures and dual chamber pacemakers were inserted in 2 patients. EPS and/or ablation were performed in 18 patients with different arrhythmia substrates. Clinical follow-up was planned for the other patients on medical therapy.

Conclusion: The normal ECG data of healthy school-age children were demonstrated in this study, which includes the largest group of children in Turkey and Europe. As a result, we think that structural-electrical pathologies that may cause morbidity and sometimes sudden cardiac death can be detected earlier and treatment can be provided.