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Certain ECHO and advanced ECG indexes are associated with family history for major adverse events in children and adolescents with HCM, and can be distinguished from athlete's heart

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INTRODUCTION: Hypertrophic cardiomyopathy (HCM) remains a common cause of significant morbidity and mortality in the young. Sudden cardiac death (SCD) may sometimes occur in spite of lack of significant hypertrophy, making thus the early diagnosis HCM of utmost importance. Furthermore to distinguish HCM from "athlete's heart" is still an important clinical problem.

METHODS: The study population, part of a cohort from an ongoing prospective study, consisted of children and adolescents (age range 0,1-30 years, median 14,7 years) with HCM heredity, either without (HCM-risk; n=17) or with LV hypertrophy (Z-score for IVS and/or PW >2,5; n=21), healthy controls (n=81) and athletes (n=13, endurance physical exercise >10 hours/week, Z score for IVS and/or LPW >2). Left atrial (LA) and ventricular (LV) size, mass (both adjusted for BSA), and LV thickness and function were assessed by echocardiography with Tissue Doppler (TD). Spatial mean QRS-T angle by Kors was measured via advanced 12-lead ECG analysis using Cardiax® (IMED Co Ltd, Budapest, Hungary and Houston, USA).

RESULTS: Compared to controls, septal E/Ea ratio by TD and LA volume were significantly increased in both the HCM (p<0,001) and HCM-risk (p=0,01) groups, while QRS-T angle was significant increased in HCM group (p<0,001) versus controls and HCM-risk. Athletes had increased LV mass (p<0,01) versus controls and HCM-risk, comparable to HCM group (p=0,2), but similar septal E/Ea ratio and QRS-T angle as controls (Figure 1, p>0.5). Family history of major adverse events (SCD, cardiac arrest, ICD, heart transplantation) was associated with further increase of LA volume among HCM-risk individuals (Figure 2, p<0,001), and with further increase of QRS-T angle among HCM patients (p<0.01, Figure 3).

CONCLUSION: In addition to TD, advanced ECG provides a valuable diagnostic tool to distinguish HCM from athlete's heart. In HCM patients, family history for major adverse cardiac events appears to be associated with more profound electrical abnormalities, as suggested by its association with increased QRS-T angle. This finding might explain in part the earlier suggested further increase in SCD risk in HCM patients with family history for major cardiac events.