

## **Near Normal ECG in Hypertrophic Cardiomyopathy**

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Normal ECG is rare in hypertrophic cardiomyopathy (HCM) and is associated with favorable prognosis. However a substantial minority of HCM patients have only minor ECG abnormalities such as P-mitrale or non-specific ST-T changes. These patients do not have typical pathological ECG changes such as LVH, Q waves, T-wave inversion or conduction defects. We studied the clinical associations of a near normal ECG (nnECG) in a well characterized cohort of HCM patients from our cardiomyopathy clinic. Results were evaluated in comparison to other subgroups and the entire cohort by chi-test and ANOVA.

Our database comprised 210 patients diagnosed according to the established criteria; 14 were excluded from the analysis because of paced rhythm. nnECG was found in 39 (19%) patients. This subgroup was characterized by an older age on disease onset ( $45\pm 14$  compared to  $37\pm 18$  yr, in the entire cohort,  $p=0.02$ ), 62% male sex, 51% family history of HCM and a higher prevalence (36% vs 26%,  $p=0.03$ ) of family history of sudden death. The left maximal left ventricular wall thickness was lower in nnECG,  $18\pm 3$  vs  $20\pm 5$ . Concentric hypertrophy was present in 52% of patients with nnECG compared to 31% prevalence in the entire cohort ( $p<0.001$ ). The mean LVEF was  $62\pm 8$ , 51% had outflow obstruction, and 16% had severe diastolic dysfunction,  $p=NS$ ) but the prevalence of hypokinetic transformation was lower in this subgroup (3 vs 8%,  $p=0.003$ ).

There were no significant differences compared to general HCM population in the prevalence of atrial or ventricular arrhythmia, angina, NYHA functional class, stroke, device implantations or invasive procedures. We conclude that a nnECG pattern is more common in late onset disease with concentric LVH but otherwise these patients have similar characteristics and complications compared to a typical HCM population.