

A new phenotypic marker of hypertrophic cardiomyopathy

“Life is a great bundle of little things.”

Oliver Wendell Holmes (1809–94)

Hypertrophic cardiomyopathy (HCM) is a common cardiac disorder associated with sudden cardiac death, characterised by an unexplained increase in left ventricular wall thickness or mass.^{1–3} The prevalence is about one in 500 of the general population, affecting men and women of all ages and ethnic backgrounds^{2,3} who present with ventricular hypertrophy, left-ventricular outflow tract obstruction, heart failure, and potentially lethal arrhythmias.⁴

More than 1000 mutations in at least nine genes cause HCM.⁴ The majority are missense alleles, encoding so-called poison peptides—dominant-negative, mutant peptides—which adversely affect cardiac sarcomere function.⁴ Some mutations might also result in insufficient protein for normal function. The advent of cardiac imaging and genetic testing identified two distinct phenotypes, hypertrophic and non-hypertrophic HCM.⁵ However, non-hypertrophic HCM is not equivalent to phenotype-negative HCM, as various non-hypertrophic stigmata of classic HCM are often present in genotype-positive, phenotype-negative patients.⁵ These stigmata include redundant mitral valve leaflets, myocardial crypts, and anomalous papillary muscle insertions into the anterior mitral valve leaflet.⁵ Individuals can express the hypertrophic phenotype as late as their sixth or seventh decade,⁵ and thus by identifying these stigmata HCM can be diagnosed before the development of classic ventricular hypertrophy, and appropriate management planned. Sudden cardiac death is a major concern in these patients, especially the young,¹ and identifying the phenotype can thus lead to recommendations on participation in competitive sports and interventions ranging from β blockers to implantable cardioverter defibrillators.

Recently, Christiane Gruner and colleagues⁶ described distinctive apical-basal muscle bundles in the hearts of HCM patients, as well as in genotype-positive, phenotype-negative relatives. The study cohort consisted of 230 genetically and phenotypically confirmed HCM patients who underwent cardiovascular magnetic resonance imaging at three tertiary centres,

with 30 genotype-positive, phenotype-negative family members and 126 control individuals also studied. An accessory left-ventricular muscle bundle was defined as a single band of muscle extending through the left-ventricular cavity from the apex to the basal septum or the anterior wall of the left ventricle.⁶ Such apical-basal muscle bundles were present in 145 (63%) of 230 HCM patients, with similar proportions in patients younger than 20 years and in those older than 60 years. Bundles were also seen in 18 (60%) of 30 genotype-positive, phenotype-negative family members, and in 12 (10%) of 126 controls. Although no association could be found between the presence of muscle bundles and left-ventricular outflow tract obstruction, removal was deemed necessary in 22 patients who required surgery for relief of obstruction.

Gruner and colleagues' study⁶ adds another useful morphological marker to aid in the clinical diagnosis of a common inherited cardiac disease. Although MRI provides a comprehensive assessment of intracardiac anatomy in HCM patients, no single anatomical observation can be deemed completely specific for the disease. However, adding accessory apical-basal left-ventricular muscle bundles to established anatomical signs of HCM, such as redundant mitral valve leaflets, myocardial crypts, and anomalous papillary muscle insertions, will add to clinicians' confidence in identification of HCM.

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I declare no competing interests.

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