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MYOCARDIAL CONTRAST ECHOCARDIOGRAPHY DISTINGUISHES PHYSIOLOGICAL FROM PATHOLOGICAL GREY-ZONE LEFT VENTRICULAR HYPERTROPHY

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Background It remains difficult to distinguish an athlete's heart (physiological left ventricular hypertrophy (LVH) from hypertrophic cardiomyopathy (HCM) (pathological LVH) especially when subjects fall into Maron's grey zone ventricular wall thickness of 12–15 mm. Pathological LVH is one of the common causes of sudden death in young athletes. We hypothesised that pathological LVH due to HCM will have more fibrosis and reduced myocardial blood flow reserve (MBFR) compared to athletes. Capillary blood volume (CBV) which is reduced in fibrosis and MBFR can be assessed at the bedside by flash-replenishment myocardial contrast echocardiography (MCE).

Methods 25 subjects with genetically proven septal HCM and 25 athletes all with grey zone septal hypertrophy (13.7±1.2 mm) were recruited. There were no significant differences in age (p=0.57, 33±8 years/32±8 years), gender(males-HCM:21, Atheletes:25) and degree of septal LVH (p=0.71, 14±0.89 vs 13.7±1.03) between HCM and athletes. All subjects underwent rest and stress vasodilator myocardial contrast echocardiography and quantitative analysis of CBV (dâ), blood velocity (dâ/s), myocardial blood flow (db/s^2) and MBFR(stress MBF/rest MBF) of the septum and apex was performed.

Results Patients with HCM had significantly lower CBV (15.56±12.45 vs 18.30±12.6; p value=0.01) at rest and significantly lower resting MBF (14.10±15 vs 36.1±14.7; p=0.032) compared to athletes. MBFR was also significantly reduced compared to athletes (2.49 vs 5.67; p value=0.027). The receiver-operator characteristics (ROC) curve for CBV and MBFR demonstrated areas under the curve of 0.65 and 0.84 respectively. A cut-off of MBFR of 4.8 provides a sensitivity and specificity of 99% and 81% respectively for the detection of pathological LVH. The positive predictive value for predicting pathological LVH was 88% with a negative predictive value of 92%.

Conclusions Quantitative MCE reliably distingisuishes physiological from pathological LVH in patients with grey zone hypertrophy who pose a diagnostic dilemma.