Abstract: 554

Ethnic differences in the phenotypic expression of HCM on CMR

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Topic(s):
Cardiac Magnetic Resonance: Myocardium

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Background:
Hypertrophic cardiomyopathy (HCM) has a variable phenotypic expression. Numerous studies have noted that individuals of African/Afro-Caribbean origin (black) and Caucasians (white) demonstrate marked differences on ECG and echocardiography. However, there is a paucity of literature on cardiac MRI (CMR) findings of ethnic differences in HCM.

Purpose:
Assess if phenotypic differences on CMR exist between black and white individuals with HCM.

Methods:
 Patients with HCM were recruited from a dedicated inherited cardiac conditions clinic if they were NYHA class 1, had a blood pressure =140/90mmHg, no evidence of LV outflow tract obstruction and were not known to have ischemic heart disease (n = 119, males = 99, white = 76, aged 16-65 years). Sequences were performed on a 3T Phillips scanner, using standard techniques and analysed using semi-automated software (MRI extended workspace 2.6.3.3, Phillips and Circle, Cardiovascular Imaging Inc, release 5.6.1, Calgary, Canada). Native T1 was calculated using ShMOLLI sequences for the basal, mid and apical septal segments and the mid-ventricular short axis slice.

Results:
Comparison of left ventricular (LV) mass between ethnicities demonstrated higher LV mass in black compared to white HCM patients (p < 0.001, absolute values and normalised for body surface area). Mean LV mass (normalised) for black and white HCM patients was 91.21g/m² and 74.29g/m² respectively.

Strain analysis demonstrated a 7% lower peak global radial strain percentage and a 3% lower peak global circumferential strain percentage in black HCM patients compared to white HCM patients (p = 0.010, p = 0.001 respectively).

Black HCM patients demonstrated less late gadolinium enhancement (LGE) than white HCM patients by mass (grams) and by percentage of myocardium (auto-threshold using 6 standard deviations) (p = 0.005, p < 0.001 respectively).

Analysis of native T1 demonstrated that black HCM patients had a lower native T1 in the basal septum compared to white HCM patients (p = 0.006).

There were no statistically significant ethnic differences in maximal LV wall thickness, LV end diastolic volume, left atrial area, LV stroke volume, LV ejection fraction, or peak global longitudinal strain percentage.

Conclusion:
This is one of the first CMR studies assessing for ethnic differences in tissue characterisation in HCM between black and white patients. Findings from this study found black HCM patients had greater LV mass, reduced peak global radial and circumferential strain percentage, lower quantity of LGE, and lower native T1 values compared to white HCM patients.
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