Abstract: 4251

Results from the Hungarian Cardiac Magnetic Resonance Registry of Structural Heart Disease and Aborted Sudden Cardiac Death in Athletes

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Topic(s):
Sports Cardiology: Arrhythmias

Citation:

Funding Acknowledgements:
Project no. NVKP_16-1-2016-0017 has been implemented with the support provided from the National Research, Development and Innovation Fund of Hungary

Introduction: Sudden cardiac death (SCD) is the most common cause of death in athletes occurring usually during intensive training. Cardiac magnetic resonance (CMR) has a crucial role in the detection of structural myocardial abnormalities.

Aims: Our aim was to investigate the etiology of SCD and to estimate the prevalence of myocardial structural heart diseases among Hungarian athletes using CMR.

Methods: Between January 2011 and January 2019 we performed CMR scans on 228 athletes (199 males, age: 29.1±13.2) with suspected structural myocardial disease. Twelve athletes were investigated after aborted sudden cardiac death and normal coronary angiography.

Results: CMR confirmed the diagnosis of structural myocardial disease in 62 athletes (26.2%) (28.8±9.1 years, 59 male): hypertrophic cardiomyopathy (HCM) in 14 cases (22.6%), arrhythmogenic right ventricular cardiomyopathy (ARVC) in 9 cases (14.5%), noncompaction (NCCMP) in 6 cases (9.7%) and dilated cardiomyopathy (DCM) in 5 cases (8.1%). Subendocardial late gadolinium enhancement (LGE), reflecting myocardial scar, was typical of previous myocardial infarction (post MI) in 3 cases (5.5%). Acute myocarditis was found in 2 cases (3.6%). Nonischaemic LGE pattern was found in 20 cases (32.2%): patchy subepimyocardial LGE suggesting previous myocarditis in 8 athletes, and with aspecific pattern in 12 athletes. Athletes with nonischaemic LGE had normal clinical and laboratory parameters without wall motion abnormalities, in their cases further investigations ruled out systemic disease. One athlete was diagnosed with Fabry-disease, one with coronary artery abnormality (anomalous origin of the left main coronary artery from the right sinus of Valsalva), one athlete showed pheochromocytoma-related Tako-Tsubo cardiomyopathy (each 1.6%). Five athletes with confirmed structural heart disease were investigated after sustained ventricular tachycardia, seven athletes after aborted SCD: ARVC (n=6), aspecific LGE pattern (n=4), HCM (n=1) and pheochromocytoma-related Tako-Tsubo cardiomyopathy (n=1) were diagnosed.

Conclusion: In our national CMR registry the most common structural alteration was nonischaemic fibrosis, the most common cardiomyopathy was HCM, and the leading cause of SCD in Hungarian competitive athletes was ARVC. The national registers are highly important for a better understanding the etiology and the geographical differences of SCD in athletes.
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