Cardiovascular magnetic resonance reveals pathophysiologic background in paediatric patients with ventricular tachycardia and normal echocardiographic findings

Giannakopoulou A., Mavrogeni S., Karanasios E., Loukopoulos S., Andreou N., Papadopoulos G.
Cardiology Department, Children’s Hospital “Aghia Sophia”, Athens, Greece.
Onassis Cardiac Surgery Center, Athens, Greece.
First Dept of Paediatrics, National and Kapodistrian University of Athens.

Introduction and purpose:
To evaluate the pathophysiologic background of ventricular tachycardia (VT) in paediatric patients with normal echocardiographic findings using cardiovascular magnetic resonance (CMR).

Methods:
Between 2000-2016, 110 patients (60 male/50 female), aged 10-18 years, with recent history of VT and normal echocardiographic findings, were referred in our tertiary center for CMR evaluation. (Table 1)

CMR was performed using a 1.5 T magnet and included functional evaluation in short and long axis, oedema assessment using T2w imaging and fibrosis evaluation using late gadolinium enhancement (LGE).

Results:
• Right and left ventricular function was normal in all paediatric patients. However, the CMR tissue characterization revealed evidence of acute myocarditis in 35/110 and various types of cardiomyopathies in 55/110 (noncompaction cardiomyopathy, arrhythmogenic right ventricular cardiomyopathy, arrhythmogenic right ventricular, mild hypertrophic, restrictive and dilated cardiomyopathy). In 20/110 no morphologic or functional abnormalities were identified by CMR. (Table 2)
• The T2 ratio was 3.4±0.03 and 1.5±0.04 in myocarditis and cardiomyopathy group, respectively (p<0.05). In contrary the LGE was 5±2% and 15±3% in myocarditis and cardiomyopathy group, respectively (p<0.05). (Table 3)

Conclusion:
After CMR evaluation of a paediatric population with history of recent VT and normal echocardiographic findings, evidence of myocarditis and cardiomyopathies was identified. However, in 18% of them no functional or anatomical abnormality was identified.