

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



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## 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  $3.4 \pm 0.03$  and  $1.5 \pm 0.04$  in myocarditis and cardiomyopathy group, respectively ( $p < 0.05$ ). In contrary the LGE was  $5 \pm 2\%$  and  $15 \pm 3\%$  in myocarditis and cardiomyopathy group, respectively ( $p < 0.05$ ). (Table 3)

**Table 1: Patient demographic characteristics**

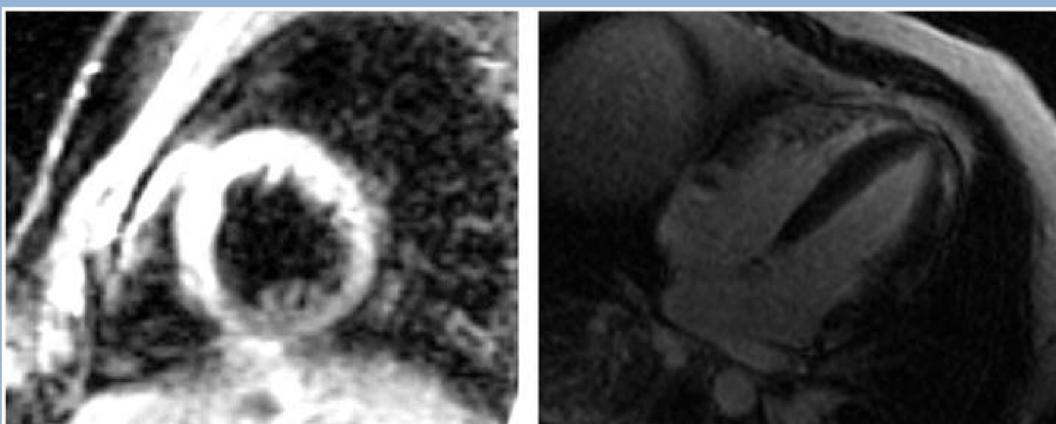
study	2000-2016
n	110pts
male/female	60/50
Age	11± 6
History of VT	110

**Table 2: CMR tissue characterization**

<b>1. acute myocarditis</b>	35/110
<b>2. types of cardiomyopathies</b>	55/110
• noncompaction	6
• arrhythmogenic right ventricular	8
• dilated	25
• restrictive	4
• mild hypertrophic	12
<b>3. Normal tissue</b>	20/110

**Table 3: Statistics**

Group	myocarditis	cardiomyopathy	p
<b>T2 ratio</b>	$3.4 \pm 0.03$	$1.5 \pm 0.04$	<0.05
<b>LGE</b>	$5 \pm 2\%$	$15 \pm 3\%$	<0.05



**Image 1:** Cardiac magnetic resonance (CMR) images (T2, left, with evidence of high signal due to oedema and late gadolinium-enhanced image (LGE), right, with epicardial LGE in apicolateral area of left ventricle (LV)) from a pediatric patient with infective myocarditis.

## 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