

# Utility of Cardiovascular Magnetic Resonance for Cardiac Structural Abnormalities Detection in Patients Presenting with Ventricular Arrhythmia and Normal Echocardiography



Tarinee Tangcharoen MD, Watcharee Prasertkulchai M.Sc, Sukit Yamwong MD, Piyamitr Sritara MD.

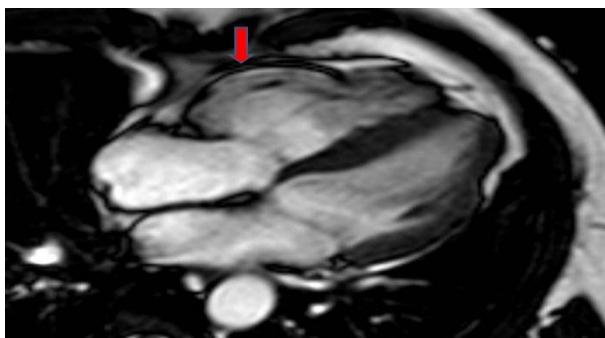
Division of Cardiology, Department of Internal Medicine, Faculty of Medicine, Ramathibodi hospital, Mahidol University, Bangkok Thailand



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**Objective :** To evaluate whether cardiovascular magnetic resonance imaging (MRI) provides additional information for cardiac structural abnormalities in patients presenting with ventricular arrhythmia and normal echocardiography findings.

**Methods:** Patients who presented with ventricular arrhythmia, either premature ventricular complex (PVC), non-sustained ventricular tachycardia (NSVT), palpitation, syncope or family history of sudden cardiac death from suspected ventricular arrhythmia were recruited. All of the patients had normal left ventricular systolic function and no evidence of arrhythmogenic right ventricular dysplasia (ARVD) by echocardiography criteria. Cardiac MRI was performed under 1.5 T magnetic resonance scanner (Philips Achieva release 3.2) Resting ventricular systolic function was acquired using steady-state free precession sequence in short-axis and axial view. All patients were given either Gadopentetate dimeglumine or Gadobenate demeglumine (total 0.2 mmol/kg) for late gadolinium enhancement sequence. Images were analyzed using Extended MR Workspace release 2.6. Impaired left and right ventricular function was defined as left ventricular ejection fraction (LVEF) and right ventricular ejection fraction (RVEF) less than 50% and 40% respectively. Wall motion abnormalities were observed in both ventricles. The ARVD was diagnosed using a modified ARVD/C taskforce criteria. Myocardial scar was defined as hyper-enhanced area within myocardium. Statistical analysis was done by SPSS.



**Figure 1** Cardiac MRI showed dyskinetic movement of right ventricle (arrow) in 47 year old man presented with syncope and EKG showed non-sustained VT (LBBB morphology). His initial echocardiography could not detect wall motion abnormalities in the right ventricle, however, the MRI findings were compatible with ARVD/C criteria (RVEDVI = 124.43 ml/m<sup>2</sup>, RVEF 42% and regional RV dyskinesia).

**Results :** Total 75 patients were included (age 44 ± 16; male 45.3%; 42 patients with PVC, 14 patients with NSVT, 9 patients with syncope, 10 patients with either palpitation or family history of sudden cardiac death). 10 patients (13.3%) had cardiac structural abnormalities detected by cardiac MRI. ARVD is the most common abnormal findings (6 patients fulfilled 1 major ARVD/C criteria and 1 patients fulfilled 1 minor ARVD/Criteria) whereas 3 patients had non-ischemic myocardial enhancement. Among the arrhythmic problems, 6 from 14 patients (42.9%) who presented with NSVT had cardiac abnormalities detected by MRI whereas 2 from 42 patients (4.8%) who presented with PVC had cardiac abnormalities. Table 1 showed data comparisons between patients who presented with VT and others.

**Conclusions:** Despite of initial normal echocardiographic findings, cardiac MRI provides relevant additional cardiac abnormalities information especially in patients who presented with ventricular tachycardia.

	NSVT (n=14)	Other arrhythmic problems (n=61)	p
Age	52 ± 14	42 ± 15	0.032
Male	9 (64%)	25 (41%)	0.14
Cardiac MRI abnormalities (ARVD or non-ischemic scar)	6 (42.9%)	4/61 (6.6%)	0.002
LVEDV	131.4 ± 27.3	137.8 ± 38.4	0.550
LV ejection fraction	62.1 ± 7	63.0 ± 8.3	0.70
RVEDV	152.9 ± 52	155.2 ± 66	0.94
RV ejection fraction	51.2 ± 11.3	55.6 ± 9.7	0.15

**Table 1** demonstrates different findings between patients who presented with non-sustained ventricular tachycardia and patients who presented with other arrhythmic problems (PVC or palpitation symptoms). Patients with history of NSVT had higher prevalence of cardiac abnormalities detected by cardiac MRI despite of normal echocardiography findings.