Successful Treatment of Idiopathic Left Ventricular Tachycardia-induced Cardiomyopathy by Catheter Ablation: A Case Report

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Sustained chronic tachyarrhythmias often lead to cardiac dysfunction known as tachycardia-induced cardiomyopathy or tachycardiomyopathy. Generally, cardiac function will recover if the tachyarrhythmia is successfully treated. Herein, we report a case of idiopathic left ventricular tachycardia-induced cardiomyopathy treated by catheter ablation and reversed left ventricular function.

Key words: tachycardiomyopathy, idiopathic left ventricular tachycardia, catheter ablation

Introduction

Tachycardia-induced cardiomyopathy or tachycardiomyopathy refers to impairment of the left ventricular function secondary to chronic tachycardia, which is partially or completely reversible after normalization of heart rate and/or rhythm\(^{1,2}\). It has been recognized that tachycardiomyopathy occurs in experimental models and also in patients with supraventricular or ventricular tachyarrhythmias\(^\text{(1-5)}\). In the absence of disease due to an abnormal heart structure, ventricular tachycardia (VT) is called idiopathic. This idiopathic VT is usually paroxysmal but occasionally incessant in nature and may result in tachycardiomyopathy, which can be treated by radiofrequency catheter ablation\(^\text{(3-5)}\). We report a case of idiopathic left VT-induced tachycardiomyopathy. After successful radiofrequency ablation of the tachycardia, the ventricular function was restored to normal.

Case Report

A 35-year-old woman was admitted to our hospital due to progressively worsening dyspnea. She had a history of palpitations for one year. One week before arrival, she began suffering from orthopnea and edema in the lower extremities was also noticed.

In the emergency room, the patient’s blood pressure was 90/60 mmHg and the ventricular rate was around 162 beats per min. Physical examination demonstrated that the jugular veins were engorged and there were basal crackles noted on both lung fields. Cardiac auscultation revealed diminished S1.

The electrocardiogram (ECG) (Fig. 1) showed wide QRS tachycardia with right bundle branch block morphology and a mean ventricular rate of 162 beats per min. Capture beat and A-V dissociation were also noted. A chest X-ray showed cardiomegaly with pulmonary congestion (Fig. 2).
Fig. 1  ECG performed in the Emergency Room

Fig. 2  Chest X-ray at admission
Laboratory data showed a blood nitrogen level of 17 mg/dL, creatinine 1.0 mg/dl, sodium 137 mEq/L, potassium 4.2 mEq/L and glucose 157 mg/dL. Synchronized cardioversion of 100 joules was delivered. This resulted in restoration of sinus rhythm.

After admission, echocardiography revealed global left ventricular hypokinesia and the ejection fraction (EF) decreased to 32%. (Fig. 3) Cardiac catheterization revealed no stenosis of the coronary arteries. The electrophysiological study indicated the VT cycle length was 370ms (Fig. 4). Radiofrequency energy delivery at the inferobasal part of left ventricle resulted in termination of the VT. (Fig. 5, Fig. 6) Following ablation, the patient has remained asymptomatic for six months. A repeated echocardiography showed normal LV function with an EF of 62%.

**Discussion**

The existence of tachycardia-induced cardiomyopathy caused by incessant tachycardia, usually supraventricular, is well established\(^1,2\). The mechanism of tachycardiomyopathy may be related to a decrease in sarcolemmal sodium/potassium ATPase activity in chronic tachycardia and result in the defect of myocyte contractile function\(^3\). Primary ablation for incessant supraventricular tachycardia and idiopathic VT is effective and safe\(^3-5\). However, this patient presented with idiopathic left ventricular tachycardia-induced cardiomyopathy. Recovery of her LV function occurred after catheter ablation. This demonstrates that the prognosis of tachycardiomyopathy improves if it is properly treated by drugs or catheter ablation\(^1-5\). The diagnosis of tachycardiomyopa-

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**Fig. 3** M-mode of the echocardiography before (left) and after (right) ablation: the LV function is improved after ablation
Fig. 4  ECG during spontaneous VT and pace mapping from the LV

Fig. 5  P-A view of the successful ablation site (arrow)
Idiopathic left ventricular tachycardia-induced cardiomyopathy treated by catheter ablation

Fig. 6  Lateral view of the successful ablation site (arrow)

... is not always simple but is crucial. Early recognition and treatment is critical in the case of tachycardiomyopathy.

References

以電燒灼術成功治療原發性左心室頻脈
引起之心肌症：病例報告

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持續性的心律過速會造成心臟功能變差，稱之為心搏過速引發之心肌症。一般而言這種心肌症在成功治療後心臟功能會恢復。在此，我們提出一例原發性左心室頻脈引起之心肌症以電燒灼術成功治療後，左心室功能恢復正常之案例。

關鍵詞：心搏過速引發之心肌症，原發性左心室頻脈，電燒灼術