# Tachycardia-induced cardiomyopathy

Alireza Ahmadi[1], Ali Zolfi-Gol[2], Mahfar Arasteh[3]

Case Report

## Abstract

**BACKGROUND:** Tachycardia-induced cardiomyopathy (TIC) is a rare cause of dilated cardiomyopathy (DCMP). The diagnosis can be missed because tachycardia is a common symptom in DCMP.

**CASE REPORT:** We reviewed a case 5-year-old with palpitation and dyspnea with symptoms and signs of heart failure that diagnosed as DCMP initially. Then, in the evaluation for cause of tachycardia, atrial tachycardia was detected. Hence, treatment with flecainide was started and after 3 months, left ventricular (LV) systolic function and symptoms of the patient was relieved.

**CONCLUSION:** TIC should be suspected in all patients with unexplained LV dysfunctions in the setting of a persistent tachyarrhythmia.

**Keywords:** Dilated Cardiomyopathy, Heart Failure, Tachyarrhythmia

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## Introduction

Tachycardia-induced cardiomyopathy (TIC) is a form of dilated cardiomyopathy (DCMP) caused by supraventricular and ventricular tachyarrhythmias. The diagnosis requires a high index of suspicion, as the culprit tachyarrhythmia may not always be apparent. We report a case of TIC referred to our center with palpitation and dyspnea for more evaluations.

TIC is a form of DCMP and heart failure that is caused by persistent or frequent paroxysmal supraventricular or ventricular tachyarrhythmias.[1] The clinical manifestations of TIC are associated with ventricular systolic dysfunction. Regardless of etiology, persistent tachycardia predisposes patients to develop ventricular dilatation and left ventricular (LV) dysfunction.[2] On the other hand, TIC is generally reversible once the underlying arrhythmia is controlled.[3] It is therefore important to make diagnosis early and treat the tachycardia responsible for the condition promptly. A common clinical problem is determining if the tachycardia is the primary cause of the cardiomyopathy or it is a consequence of a cardiomyopathy of different etiology, which makes the diagnosis difficult.[4]

## Case Report

In March 2012, a 5-year-old boy with palpitation and dyspnea was referred to our center for more evaluations. His symptoms began after an upper respiratory infection 3 months before admission. The patients had received antibiotic, but his symptoms continued and progressed. In initial physical examination, he was not cyanotic but was fairly pale. He had tachycardia (heart rate = 170) and respiratory distress too. In cardiac examination S1 and S2 were normal; a grade II-III/VI systolic murmur in lower sternal border was auscultated. The lungs were clear. In abdominal exam, abdomen was soft with no guarding and tenderness. There is no hepatomegaly and no splenomegaly. His laboratory data includes: white blood cells = 4500/ml; creatine phosphokinase = 88 µ/l; hemoglobin = 11/9 g/l; lactate dehydrogenase = 578 µ/l; platelet = 254,000/µl; Ca = 10/4 mg/dl; Mg = 2/5 mg/dl; erythrocyte sedimentation rate was within normal range. C-reactive protein was negative. Electrolytes were within normal values.

Chest X-ray revealed a cardiomegaly with normal pulmonary blood flow. Electrocardiogram showed atrial tachycardia, normal axis, normal QRS, and QT interval duration. Transthoracic

1- Assistant Professor, Department of Pediatrics AND Isfahan Cardiovascular Research Center, Isfahan Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran
2- Pediatric Cardiology Fellowship, Department of Pediatrics, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran
3- General Practitioner, Isfahan Cardiovascular Research Center, Isfahan Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran
Correspondence to: Alireza Ahmadi, Email: ahmadi_cardio@yahoo.com

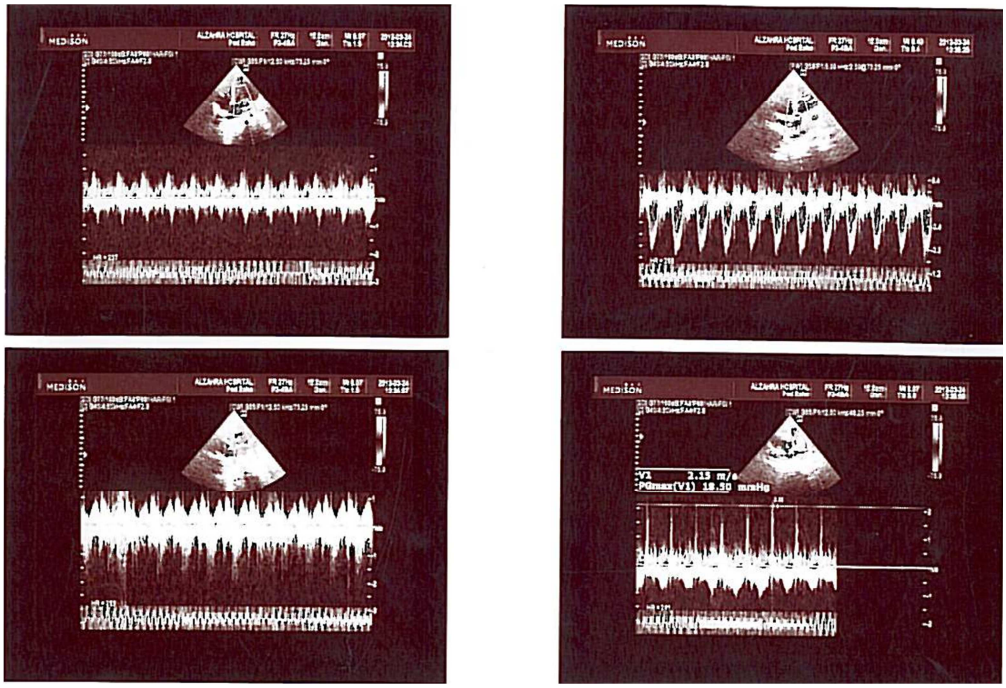

**Figure 1.** Panel representative trans thoracic echocardiography (TTE) shortly after admission

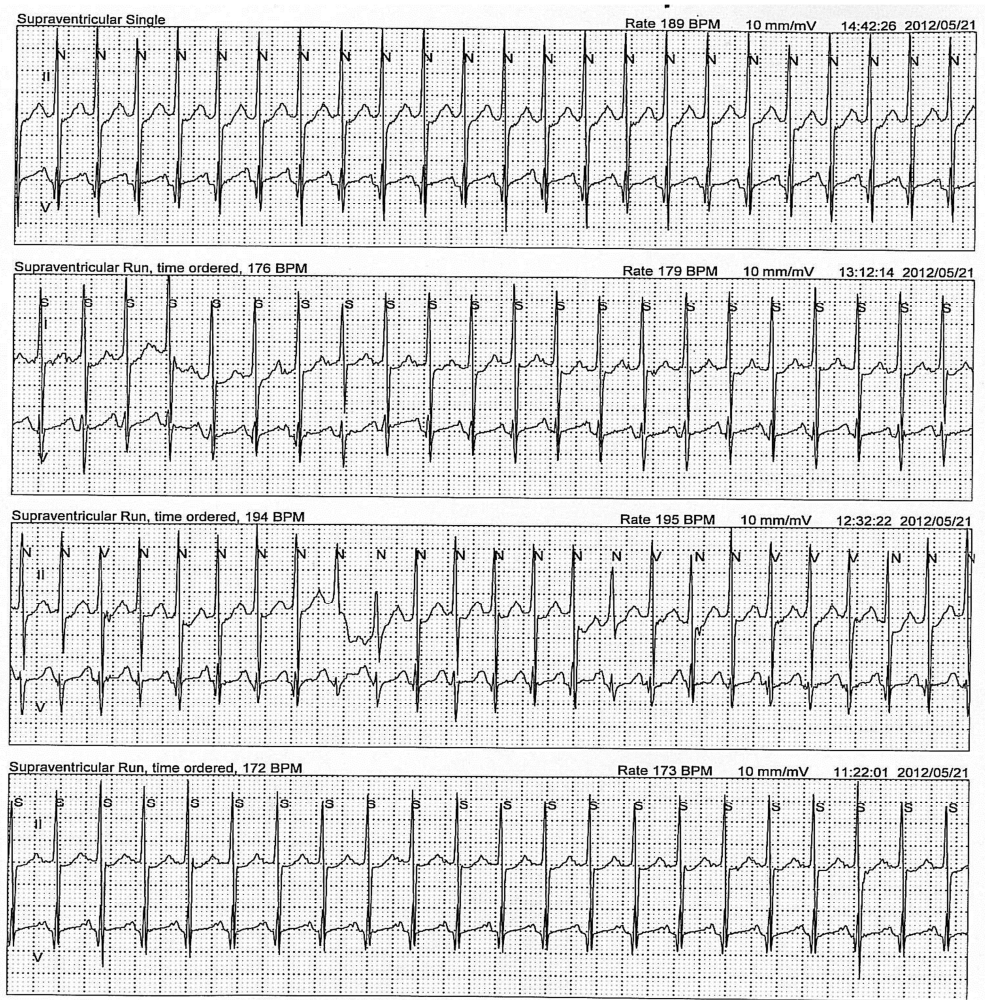


**Figure 2.** Holter monitoring shows atrial tachycardia (heart rate = 189 beat/min)

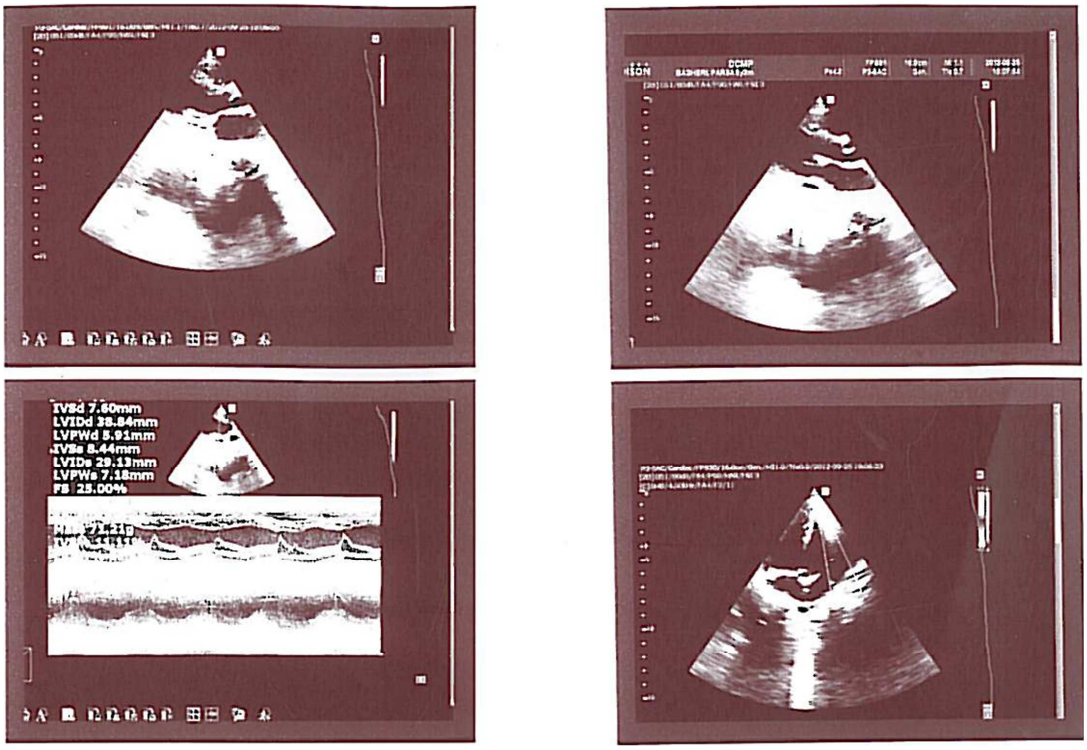


**Figure 3.** Trans thoracic echocardiography (TTE) obtained 3 month after flecainide therapy. Note the significant improvement in systolic function

echocardiography demonstrated DCMP, dilated left atrium and LV, markedly reduced LV ejection fraction (LVEF) at 22-30% (Figure 1). There was no family history of cardiac disease or sudden death.

He had no remarkable response to conventional treatment (digoxin, captopril, and L-carnitin) for DCMP. Tachycardia was referred to congestive heart failure. So, carvedilol was added to previous treatment for 1 month, but it was not effective. For more evaluation of tachycardia Holter monitoring was performed, and atrial tachycardia with mean heart rate of 189 beat/min was detected (Figure 2). After that, he was treated with flecainide. After 3 months, treatment with flecainide, his signs and symptoms improved and ejection fraction increased (LVEF = 57%) (Figure 3). With this treatment, no side-effects was occurred.

## Discussion

TIC is an under diagnosed reversible form of DCMP.[5,6] TIC greatly depends on the ventricular rate. The patients with higher ventricular rate develop cardiomyopathy earlier.[7,8] The time to onset of LV dysfunction also depends on the duration and type of the tachycardia and any underlying structural cardiac disease.[9] Controlling the heart rate can result in significant improvement or even normalization of systolic function. Generally, the restoration of systolic function was obtained within about 4 weeks after controlling the tachycardia.[10] It is of paramount importance to recognize the condition as soon as possible and manage underlying tachyarrhythmia in order to restore systolic function.

## Conclusion

The huge useful effect of heart rate control on cardiac function is clearly demonstrated in our patient. Since diagnosis may be difficult and some patients are misdiagnosed as idiopathic cardiomyopathy, TIC should be suspected in all patients with unexplained LV dysfunctions in the setting of a persistent tachyarrhythmia.

## Conflict of Interests

Authors have no conflict of interests.

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