

CASE REPORT

A rare case of pacemaker induced tachycardia in an elderly woman with cor triatriatum sinistrum

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Abstract

Pacemaker induced tachycardia (PIT) is a rare iatrogenic rhythm disorder which typically occurs in patients with dual-chamber pacemakers and has different causes, including oversensing of atrial tachyarrhythmia waves. Cor triatriatum sinistrum is a congenital abnormality infrequent in adults, associated with a high risk of atrial tachyarrhythmia. We present the case of a 80-year-old woman incidentally diagnosed with cor triatriatum sinistrum echocardiographically, implanted with a DDD pacemaker for sinus node disease, who developed atrial tachyarrhythmia (paroxysmal atrial fibrillation and left atrial tachycardia), which triggered a PIT, successfully aborted by automatic mode switch. This is the first case in literature that associates cor triatriatum sinistrum and PIT.

INTRODUCTION

Pacemaker induced tachycardia (PIT) is a rare iatrogenic rhythm disorder which typically occurs in patients with dual-chamber pacemakers [1], and it represents any undesired rapid pacing rate, resulting from ventricular stimulation, as a consequence of tracking of the atrial electrical activity, or pulse generator malfunctioning in the rate responsive mode. Causes of PIT include endless loop tachycardia, atrial arrhythmia tracking, myopotential tracking and sensor induced tachycardia [2]. PVARP represents the period after a sensed or paced ventricular event, during which the atrial sensing circuit is refractory; any atrial event occurring during the PVARP will not be sensed by the atrial sensing circuit [2]. The most common form of PIT is endless loop tachycardia, which requires the presence of retrograde conduction over the atrioventricular node, forming the retrograde limb of the circuit, and the pacemaker forming the anterograde limb

of the circuit. Oversensing of atrial depolarizations in the case of atrial tachyarrhythmias with subsequent ventricular tracking is a less common type of PIT [3].

Cor triatriatum sinistrum is a rare congenital abnormality usually diagnosed during childhood; few cases remain asymptomatic and are diagnosed during adulthood. Typically, the atrium is divided into two distinct chambers, usually by a thick fibro-muscular septum, which is either membranous with transverse or horizontal orientation, band-like or funnel shaped [4].

We describe a rare case of PIT in a patient with a DDD pacemaker and cor triatriatum sinistrum.

CASE PRESENTATION

An 80-year-old woman was admitted to our hospital with an onset of acute left ventricular failure during the last 24 h. The patient

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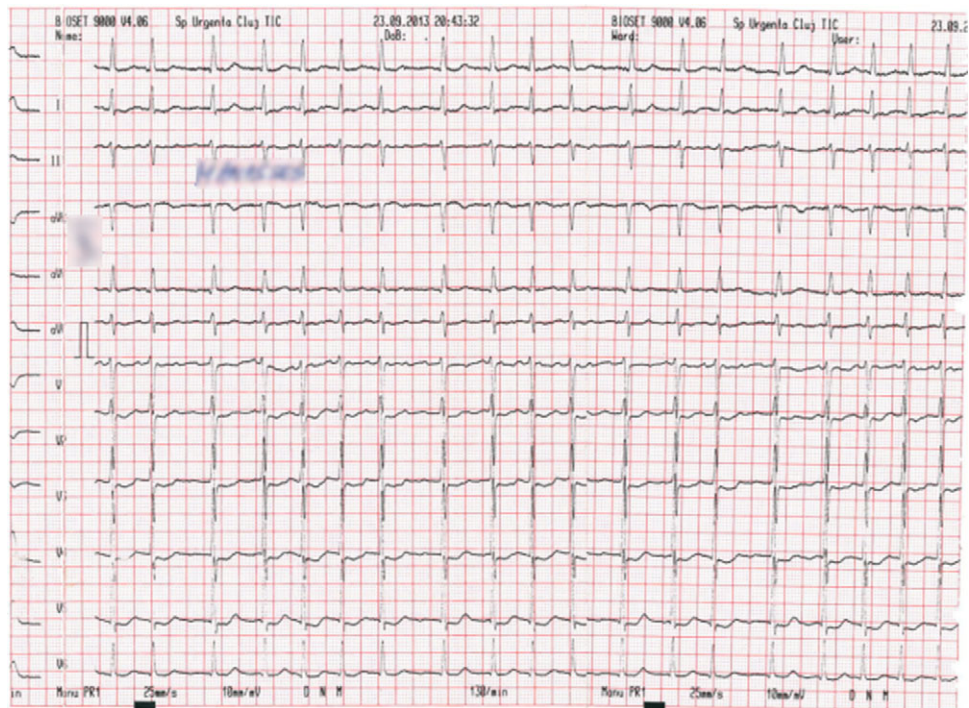


Figure 1: Twelve lead ECG showing atrial fibrillation with a heart rate of 130 beats/min, QRS axis at 0°, ST depression V3–V6.

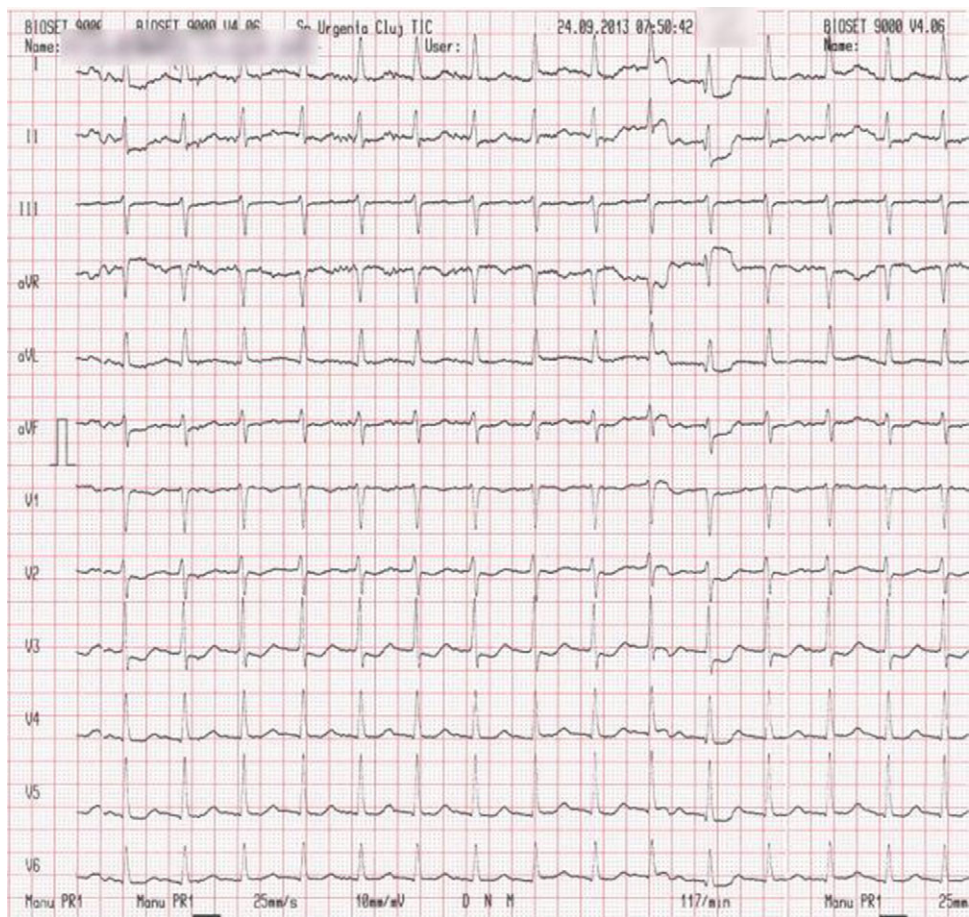


Figure 2: Narrow and regular QRS complex tachycardia with a ventricular rate of 120 beats/min, compatible with a left atrial tachycardia (P wave positive in lead V1, II and aVF, flattened in aVL) with 2:1 ventricular conduction.

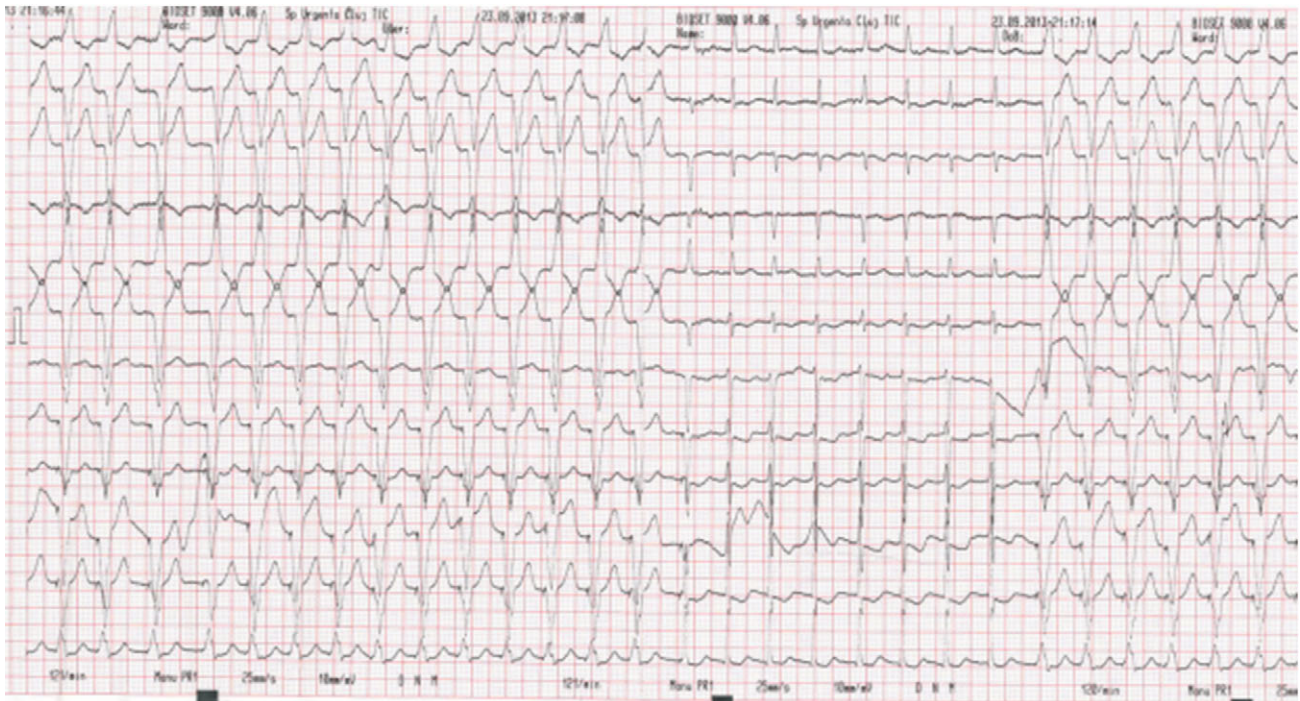


Figure 3: The first and the last part of the ECG shows a regular wide-complex QRS tachycardia, with a ventricular rate of 120 beats/min, with a pacing spike preceding each QRS complex, compatible with a pacemaker induced tachycardia, while the middle part of the tracing shows atrial tachycardia with conduction to the ventricles occurring via the normal conduction system (narrow QRS complexes).

had been previously diagnosed with arterial hypertension, dyslipidemia, chronic ischemic heart disease, cor triatriatum sinistrum (incidental finding by transthoracic echocardiography), and had an AAI pacemaker implanted for sinus node disease (implanted in 2005), which was upgraded to DDD pacemaker (Biotronik, Talos DR) in 2013.

Laboratory parameters were characterized by the presence of dyslipidemia (HDL-cholesterol 44 mg/dl) and hyperglycemia (147 mg/dl).

At admission, the electrocardiogram (ECG) showed sinus tachycardia (120 beats/min) and signs of left ventricular hypertrophy and ischemia.

Chest radiography displayed grade II pulmonary venous hypertension and normal positioned pacemaker leads.

Echocardiography showed a non-dilated left ventricle, with mild concentric hypertrophy, moderate systolic-diastolic dysfunction, hypokinesia in the anterior descending coronary artery territory, grade II mitral regurgitation, grade II tricuspidan regurgitation, mild secondary pulmonary hypertension, dilated left atrium and cor triatriatum sinistrum.

During the hospitalization period, heart rhythm monitoring revealed atrial fibrillation with high ventricular rate (Fig. 1), and, subsequently, atrial tachycardia with 2:1 ventricular transmission—120 beats/min (Fig. 2), which triggered a PIT (Fig. 3).

The PIT from the present case could be explained by the fact that, in the case of a 2:1 atrial tachycardia, every second P wave falls outside of the PVARP, being subsequently sensed by the atrial channel and tracked by the ventricular channel. PIT was terminated with automatic mode switch (from DDD to DDI mode).

The patient consequently received anticoagulant treatment (score CHA₂DS₂-VASC = 6). Intracavitary thrombi were excluded by transesophageal echocardiography.

Subsequently, a diagnostic electrophysiological study was performed, during which left atrial tachycardia was induced, which was converted to sinus rhythm with external electric shock (biphasic 100J). Antiarrhythmic treatment was associated (amiodarone) and the dosage of beta-blocker (metoprolol) was increased, with no recurrence of atrial tachyarrhythmia.

DISCUSSIONS

Possible termination of PIT include: (i) automatic mode switch, from a synchronous tracking mode (DDD, VDD) to an asynchronous tracking mode (DDI, DVI) (as in the present case); (ii) automatic extension of PVARP; and (iii) manual programming to a non-tracking mode (DDI, VVI), for pacemakers that are not equipped with automatic mode switching; subsequently cardioversion of the atrial arrhythmia can be performed, with the pacemaker programmed back to DDD mode [5]. Reprogramming of the pacemaker in DDD mode is preferred because of the known hemodynamic advantages, compared to single chamber pacing [3].

Currently, there are studies showing that anatomic and hemodynamic alterations consecutive to cor triatriatum sinistrum predispose to atrial arrhythmia, such as atrial fibrillation [4, 6–8] or atrial tachycardia [4, 9, 10], but there is no data in the literature describing the case of a PIT in a patient with cor triatriatum sinistrum.

CONCLUSION

Our case presents a rare congenital abnormality with increased risk of atrial tachyarrhythmia, which favored the development of PIT in a patient with DDD pacemaker. This is the first case in literature that associates cor triatriatum sinistrum and PIT.

CONFLICTS OF INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this article.

ETHICAL APPROVAL

Written consent was signed by the patient at hospital admission, in order to anonymously use the medical data for scientific purposes.

REFERENCES

1. Velagic V, Matasic R, Cikes M. Pacemaker-mediated tachycardia in an unconventional resynchronisation device. *European Society of Cardiology—EP case report* 2015. escardio.org.
2. Song S Recognition and management of pacemaker-mediated tachycardia. *CardioRhythm Conference* 2009, accessed online at 2009. cardiorhythm.com.
3. Cay S, Guray U, Demir C. A rare type of pacemaker mediated tachycardia. *Türk Aritmi Pacemaker ve Elektrofizyoloji Dergisi* 2009;7:136–40.
4. Nassar P, Hamdan R. Cor triatriatum sinistrum: classification and imaging modalities. *Eur J Cardiovasc Med* 2011;3:84–7.
5. Barold S, Stroobandt R, Sinnaeve A *Cardiac Pacemakers Step by Step—An Illustrated Guide*. Oxford, UK: Blackwell Futura, 2004;225–234. 305–6.
6. Sen T, Guray Y, Kormaz S. Cor triatriatum sinister in a 67-year-old man with atrial fibrillation. *Tex Heart Inst J* 2010;37:246–7.
7. Zepeda I, Morcos P, Castellanos R. Cor triatriatum sinister identified after new onset atrial fibrillation in an elderly man. *Case Report Med* 2014. doi:10.1155/2014/674018. Article ID 674018, 5 pages.
8. Nawaz N, Jones A. Cor triatriatum sinister in an 88-year-old male with new-onset atrial fibrillation. *J Innovations Cardiac Rhythm Manage* 2015;6:1997–2002.
9. Ejima K, Shoda M, Manaka T, Hagiwara N. Successful catheter ablation and documentation of the activation and propagation pattern during a left atrial focal tachycardia in a patient with cor triatriatum sinister. *J Cardiovasc Electrophysiol* 2010;21:1050–4.
10. Avari M, Nair S, Kozlovskaya S, Nashef S. Cor triatriatum sinistrum: presentation of syncope and atrial tachycardia. *BMJ Case Rep* 2017. doi:10.1136/bcr-2016-218395.