

## Positional Atrial Sense Failure in a Rate-drop Pacemaker Causing Frequent Tachycardia Attacks

The Editor,

Sir,

Selected patients with cardio-inhibitory reflex syncope may benefit from cardiac pacemakers, particularly rate-drop response algorithm may reduce syncope episodes. However, sometimes inappropriate rate-drop responses may present challenging diagnostic problems. We discuss a case who has a pacemaker implanted with rate-drop algorithm for frequent reflex syncope, but soon after implantation she complained of frequent short tachycardia attacks. This turned out to be a frequent inappropriate rate-drop response due to positional atrial sense failure.

The patient was a 30-year-old woman who presented with frequent syncope episodes without apparent reason. Echocardiography and all other clinical investigations turned out to be normal. A tilt test was then performed. During the tilt test, she had a pause of 25 seconds and she had a syncopal episode simultaneously with the pause which was very similar to previous episodes. After careful evaluation of the patient, we decided to implant a permanent pacemaker with a rate-drop algorithm (Medtronic Adapta, Minneapolis, USA). After an uneventful implantation, the device was programmed to AAI DDD mode with an intervention rate of 100, after drop size of 25 ppm or drop rate of 50 ppm, during a 25-second detection window and she was discharged from hospital.

During the first week of implantation, she complained of tachycardia attacks of short duration, particularly when she was asleep. Holter test demonstrated that when she was asleep the pacemaker fired two times inappropriately. Interrogation of the device with telemetry did not diagnose any problem with atrial and ventricular sense, capture and impedance parameters, but telemetry had recorded five rate-drop episodes in 1 week. We reprogrammed the rate-drop algorithm by increasing drop size and drop rate and decreasing intervention rate to 90. However, again she continued to have recurrent short tachycardia attacks when she was asleep even

though the frequency of tachycardia was decreased. She said she increased the number of pillows to prevent tachycardia attacks. Then pacemaker controls repeated when she was laying in supine and sitting positions. In supine position, atrial sense values were low and were about 0.7 mV; in sitting position it was approximately 4 mV (Figs. 1 and 2). There was positional atrial undersensing when she was lying supine that caused the pacemaker to interpret it as atrial asystole and trigger a rate-drop response. We corrected atrial lead by second intervention and her tachycardia attacks disappeared afterwards.

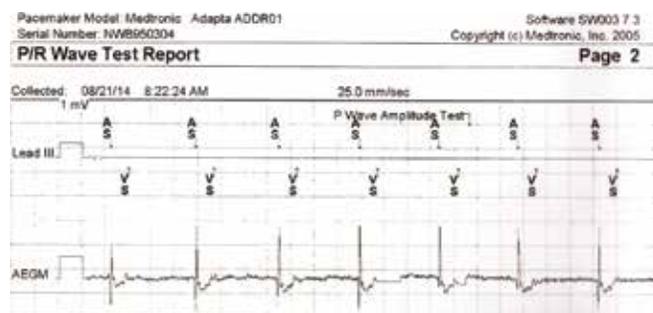


Fig. 1: Atrial intracardiac electrogram (EGM) is approximately 4 mV when the pacemaker interrogated while the patient was erect or sitting.

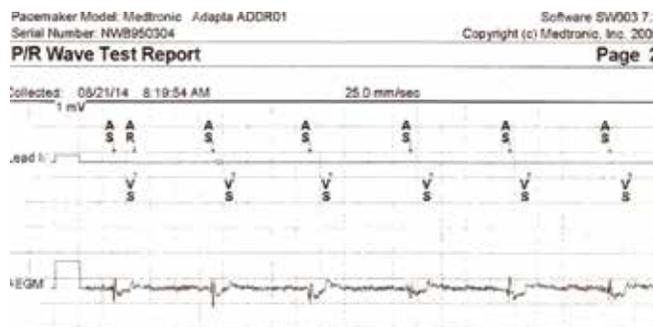


Fig. 2: When the patient assumed supine position, atrial EGM fell to 0.7 mV.

Permanent pacemaker therapy may be helpful for patients who have significant symptomatic vasovagal syncope associated with bradycardia documented spontaneously or at the time of tilt-table testing (1). Since rate-drop algorithm works generally in AAI mode, atrial sense failures may be interpreted by a pacemaker as sinus pause triggering rate-drop response. Intermittent

and positional atrial sense failures may cause sudden, short tachycardia attacks. This patient had more tachycardia attacks when she was in supine positioning which caused lead dislodgement, but in erect positioning, there were few tachycardia episodes. This case demonstrates that if a patient with a rate-drop response pacemaker describes frequent, short tachycardia attacks developed after pacemaker implantation, we must think of the possibility of intermittent atrial sense failure, and we must check atrial sense values for both supine and erect positions.

**Keywords:** Cardio-inhibitory reflex, echocardiography, rate-drop pacemaker, tachycardia attacks.

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#### **AUTHORS' NOTE**

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