

## **Positional Atrial Sense Failure in a Ratedrop 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 decline syncope episodes. But sometimes inappropriate rate-drop responses may present challenging diagnostic problems. We discuss a case who has been implanted a pacemaker with rate- drop algorithm for frequent reflex syncope; But soon after implantation she complained frequent short tachycardia attacks. This turned out to be frequent inappropriate rate-drop response due to positional atrial sense failure.

The patient was a thirty years old woman presented with frequent syncope episodes without apparent reason. ECG, Echocardiography and all other clinical investigations turned out to be normal. A tilt test then performed. During the tilt test she had a pause of 25 seconds and she had a syncope episode simultaneously with the pause 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). After uneventful implantation, the device was programmed to AAI DDD mode with an intervention rate 100 after drop size of 25 ppm or drop rate of 50 ppm during 25 second detection window and she was discharged from hospital.

During the first week of implantation she complained 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 has recorded five rate-drop episodes in one week. We reprogrammed the rate-drop algorithm by increasing drop size, drop rate and decreasing intervention rate to 90. But again she continued to have recurrent short tachycardia attacks when she was asleep though the frequency was decreased. She said she increased pillow number to prevent tachycardia attacks. Then pacemaker controls repeated when she was laying supine and sitting position. In supine position atrial sense values were low and were about 0, 7 mV, in sitting position it was approximately 4 mV (Figures A and B). There was positional atrial undersensing when she was laying supine that caused the pacemaker interpret it as atrial asystole and triggering a rate-drop response. We corrected atrial lead by second intervention and her tachycardia attacks disappeared afterwards.

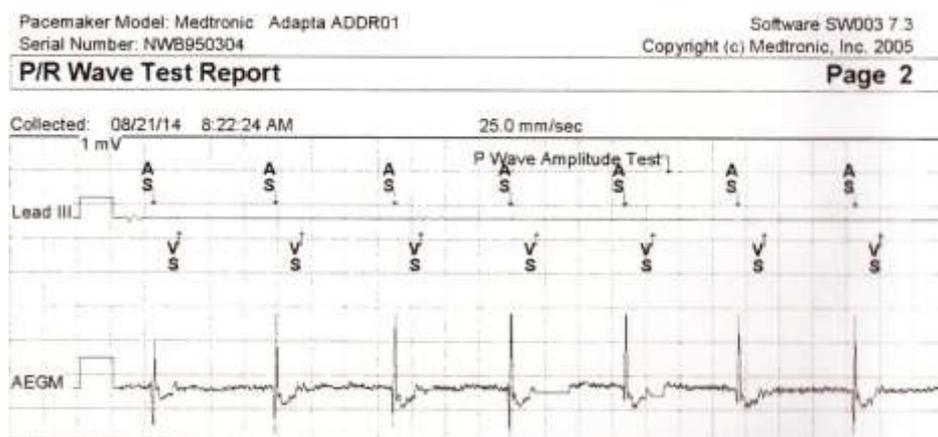


Fig 1: Atrial EGM is approximately 4 mV when the pacemaker interrogated while patients was erect or sitting.

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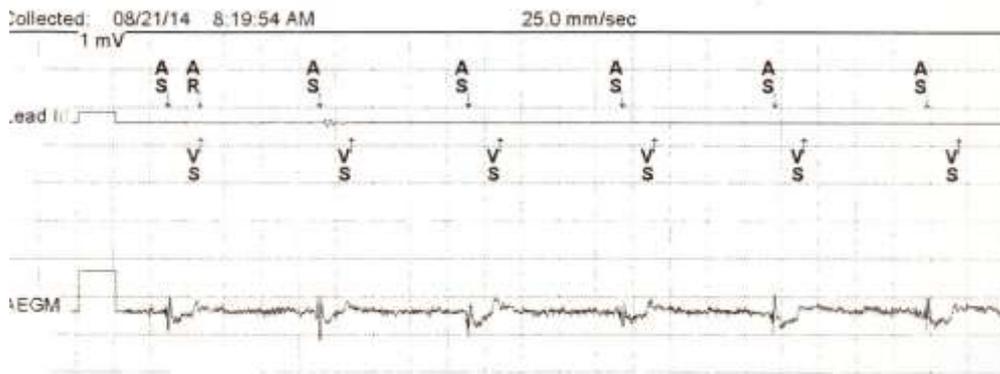


Fig 2: When the patient assumes supine position, Atrial EGM falls to 0.7 mV.

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 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 at supine position which caused lead dislodgement but at erect position there were few tachycardia episodes. This case demonstrates that if a patient with rate-drop response pacemaker describes frequent short tachycardia attacks developed after pacemaker implantation we must think the possibility of intermittent atrial sense failure, and we must check atrial sense values for both supine and erect position.

**Keywords:** Cardio-inhibitory reflex, echocardiography, ratedrop pacemaker, tachycardia attacks

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#### **AUTHORS' NOTE**

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