Atrial tachycardia masquerading as high ventricular rate event in a patient with sick sinus disease and a DDD pacemaker

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Introduction: Tachy-Brady syndrome is a form of sick sinus disease in which atrial tachycardia (AT) or atrial fibrillation (AF) may occur intermittently with bradycardia. These events, post pacemaker implant need to be detected correctly so that they can be treated for rate control and anticoagulation. Pacemakers are designed with algorithms to detect high atrial rates and then mode switch to a non-tracking mode. Here, we present a case of a patient with DDD pacemaker who had multiple episodes of atrial tachycardia. However, the device detected 5 of these episodes as high V-rate episodes instead of high A-rate episodes. This misinterpretation can have clinical implications for the patient. We explain why this can occur in the device and how it was troubleshot (in the absence of specialised algorithms), by adjusting the post-ventricular atrial blanking period (PVAB).

Methods: A 66-year-old male, known diabetic and hypertensive, with a significant sinus pauses and syncope underwent a dual chamber DDD pacemaker (SJM Accent DR) implantation. He was asymptomatic on follow up; but routine pacemaker interrogation showed 17 episodes of mode switch and 5 high V-rate episodes. On interrogation of the high V-rate episodes, it was seen that patient had atrial tachycardia during these episodes; but the marker strip did not detect consecutive A-beats. Undersensing of atrial electrogram (EGM) was ruled out as some of the low amplitude EGMs were properly annotated. The atrial beats before the QRS were properly annotated as AR as they fell in the PVARP. It was found that the atrial beats following after the QRS were not detected as they fell in the PVAB. This undercounting of the atrial EGMs led to labeling these 5 episodes as high V-rate events. The SJM Accent pacemaker done not have specialized algorithms like Blanked flutter search (Medtronic), 2:1 Lock-in protection (Biotronik) and Atrial Flutter response (BSC) which would prevent this. The default PVAB and PVARP values in this device are 110 and 275 ms. The PVAB was reduced to 80 ms subsequently, after which the mislabeling by the device was corrected. Reducing the PVAB further is not advisable as this might pick up the QRS as atrial activity causing double counting resulting in a “false” mode switch. There is an inverse relationship between the duration of the PVAB and the detection of atrial arrhythmias. Shortening the PVAB in this case allowed us to troubleshoot the problem in this case.

Result: N/A

Conclusion: In patients with DDD pacemakers, detailed interrogation of high V-rate episodes and analysis of the EGMs and their annotations should be carried out to prevent AT from being detected as VT. This can have clinical implications for the patient in means of treatment and prognosis. Careful adjusting of the PVAB can help prevent this problem.