Optimal Setting of “Stored Electrogram” Algorithms in Pacemakers for Detection of Repetitive Non-Reentrant Ventriculoatrial Synchrony (RNRVAS)

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Background: RNRVAS is a pacemaker-related adverse phenomenon that causes AV asynchrony and compromises hemodynamics especially in reduced cardiac function. With technical limitations, automatic detection of RNRVAS is still difficult in currently distributed devices. Therefore, the occurrence of RNRVAS is unclear. Purpose: To establish the method for detecting RNRVAS by adjusting the setting of storing electrograms (EGM) in a pacemaker (Method). Three of EGM-storing methods ((A) “High Atrial Rate”, (B) “AMS Entry or Exit”, and (C) “AT/AF Detection”) in a biventricular pacemaker (Frontier II, SJM) were evaluated in terms of detection of RNRVAS. According to each of algorithms, we calculated and estimated the response in three methods for detecting RNRVAS, and subsequently undergo the simulation to reproduce the response in each of methods by using a pacemaker and a simulator. Result: Method (A) failed to detect any episodes of RNRVAS due to “short-long” alternating sequence of atrial events. With occurrence of atrial premature beats, method (B) could detect some of RNRVAS events even if atrial tachycardia detection rate (ATDR) is high. Method (C) could detect most of RNRVAS events and its durations by optimizing ATDR. The present result corresponded to our computation of the response in three methods. Conclusion: We suggest that the optimal method for detection of RNRVAS be the “AF/AT detection” algorithm.

Keywords: RNRVAS, optimal setting, stored electrogram