Simulation of Monitoring Strategies for Atrial Fibrillation Detection

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Paroxysmal atrial fibrillation (PAF) is a difficult disorder to investigate because of its intermittent and sometimes asymptomatic nature. The monitoring strategies usually adopted for a PAF patient include sporadic ambulatory ECG control, transtelephonic monitoring, event monitor, sporadic 24h Holter, 7-days Holter. Given the intermittent nature of both arr-hythmic events and current monitoring methods, the ability of monitoring strategy to diagnose PAF is highly dependent on whether or not the moment selected for monitoring coincides with the occurrence of PAF episodes. The aim of this study was to simulate several daily ECG monitoring strategies applied on data reporting date, time and duration of mode switch episodes, extracted from Burden II Study (patients implanted with pacemaker for Brady-Tachy Syndrome). Starting from this database of 98 patients, daily monitoring strategies were simulated by varying the hour of beginning and the duration of each daily recording, and the number of monitoring con-secutive days. The first important result is that the number of detected pa-tients varies depending on the hour of the day when the monitoring starts, with peaks in the morning (9-10 A.M.). The lowest number of detected pa-tients is obtained at late evening (10-11 P.M.). We found that an optimized 2-hour monitoring for 60 consecutive days can detect almost 60% of patients experiencing PAF episodes in the observational period; when performed on 30 consecutive days the percentage of detected patients de-creases to about 48%. A shorter monitoring (half-an-hour) allows to detect up to 35% (for 60 consecutive days). One-day and 7-days Holter monitoring turned out to detect about 10% and 35% of patients with AF episodes, respectively. The number of detected patients from our database could be an underestimation of the potential detectable patients from a real population, given the limited number of logged AF episodes on pacemaker memory. In conclusion, these results represent an important indication for the optimization of ECG daily monitoring for PAF or post-ablated patients.