Application of a New Robust ECG T-Wave Delineation Algorithm for the Evaluation of the Autonomic Innervation of the Myocardium - DTU Orbit (24/12/2018)

T-wave amplitude (TWA) is a well known index of the autonomic innervation of the myocardium. However, until now it has been evaluated only manually or with simple and inefficient algorithms. In this paper, we developed a new robust single-lead electrocardiogram (ECG) T-wave delineation algorithm that is able to detect the T-wave with a wavelet based method and automatically calculate the TWA. We evaluated the algorithm on the QT database, achieving a sensitivity of 99.92% for the T wave peak and 99.38% for the T wave end. In addition, the percentage of records automatically delineated with high precision was higher than previous published works. Finally, the algorithm was applied to study the influence of anticholinergic and antiadrenergic drugs (i.e. atropine and metoprolol) on the TWA. It was observed that atropine significantly decreased the TWA when compared to baseline level, that head-up tilt caused a decrease of TWA and that metoprolol blunted this decrease. Through the development of a robust algorithm, this study opens the way for further research on the T-wave analysis for the assessment of the autonomic innervation of the ventricular myocardium.

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