SAFE AUTOMATIC 1-LEAD ECG SCREENING FOR ATRIAL FIBRILLATION

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What is new?

- Systematic screening for atrial fibrillation using intermittent 1-lead ECGs detects more atrial fibrillation, but a vast number of ECGs require manual interpretation
- A computerized algorithm can safely be used to rule out pathology in >85 % of ECGs, reducing the need for manual interpretation 8-fold
- The computerized algorithm was 100 % sensitive on an individual basis

Intermittent ECG recorder Zenicor-EKG

Introduction

Opportunistic screening for atrial fibrillation (AF) using pulse palpation in individuals over 65 years of age has been recommended by the European Society of Cardiology in order to reduce AF associated morbidity.

In the STROKESTOP study systematic screening using intermittent ECGs increased AF detection 4-fold as the condition commonly is paroxysmal in nature. However, intermittent ECG screening generates a vast number of ECGs, which can become cumbersome.

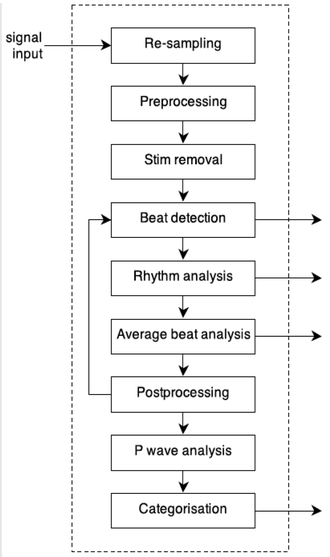
Aim

We aimed to validate the performance of an AF screening algorithm against manual ECG analysis by specially trained nurses and physicians (gold standard) in 30 second intermittent 1-lead ECG recordings.

Methods

The STROKESTOP study is a systematic screening study for AF using intermittent ECG recordings.

Individuals in the study without known AF registered 30 sec ECG recordings in lead I twice daily for a fortnight. All ECGs were manually interpreted (gold standard). Of these, 80,149 ECG recordings in 3,209 individuals were analysed using a computerised algorithm.



The five steps of signal processing performed by the algorithm

Results

Of 80,149 ECGs 69,789 (87.1%) were classified as normal by the algorithm. The manual interpretation (gold standard) agreed on 69,758 ECGs making the negative predictive value of the algorithm 99.9%.

The number of ECGs requiring manual interpretation in order to find one pathological ECG was reduced from 288 to 35. AF was diagnosed in 84 patients by manual annotation, in all of whom the algorithm indicated pathology.

On an ECG level 278 ECGs were manually annotated as AF, and of these the algorithm marked 272 ECGs as pathological (sensitivity 97.8%).

Conflicts of Interest

Emma Svennberg has received lecture fees from MSD-Pfizer, Boehringer-Ingelheim, Bayer and Sanofi, and a research grant from Boehringer-Ingelheim.

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