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Automatic screening of atrial fibrillation by smart wristband on in/outpatients

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Introduction & Aim: Atrial fibrillation (AF) is the most common cardiac arrhythmia; non-invasive diagnostic systems are of great interest. The aim of this study is to evaluate the capacity of automatic screening by smart wristband, with records of the pulse signal photo-plethysmography (PPG).

Methodology: The PPG is obtained with a wristband device and analyzed by computer. The beat and rhythm detection is compared with Holter ECG. The ability of discrimination of atrial fibrillation and sinus rhythm (SR) is verified in/outpatient situations. During outpatient situations is discarded no valid data by artefacts. The wearable is placed on the left wrist, the contact between the skin and the sensor is as firmly as possible.

Result: ECG and PPG are recorded simultaneously. It shows the beats detection with different specificities between rest and movement situations (56-96%), however the sensitivity is more stable (96-100%). It also presented 11 patients during electrical cardio-version, recording 280 and 131 minutes of AF and SR respectively, it had a sensitivity of 99.3% and the specificity of 95.5%. It indicate how 15 outpatients, recording 4166 minutes, had 57% and 36% valid time for the analysis and a sensitivity of 93% and the specificity of 99.4% to discriminate AF or SR.

Conclusion: This work demonstrates that it is possible the automatic discrimination of atrial fibrillation by information extracted from a device placed on the wrist. Future experiments should be performed in a large population and discriminating other arrhythmias.

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