Abstract: **P6541**

**Wrist band photoplethysmography pulse morphology-based autocorrelation analysis enables atrial fibrillation detection without the need of pulse detection**

**Authors:**
E-S Valiaho\textsuperscript{1}, P Kuoppa\textsuperscript{1}, JA Lipponen\textsuperscript{1}, TJ Martikainen\textsuperscript{2}, H Jantti\textsuperscript{1}, TT Rissanen\textsuperscript{3}, I Kolk\textsuperscript{2}, M Castren\textsuperscript{4}, J Halonen\textsuperscript{2}, MP Tarvainen\textsuperscript{1}, JEK Hartikainen\textsuperscript{1}, \textsuperscript{1}University of Eastern Finland - Kuopio - Finland, \textsuperscript{2}Kuopio University Hospital - Kuopio - Finland, \textsuperscript{3}North Karelia Central Hospital - Joensuu - Finland, \textsuperscript{4}University of Helsinki - Helsinki - Finland,

**Topic(s):**
Atrial Fibrillation - Diagnostic Methods

**Citation:**
None

**Background:**
Atrial fibrillation (AF) is often asymptomatic and intermittent making its detection a major clinical challenge. A photoplethysmography (PPG) wrist band with algorithm-based detection of AF provides a promising solution for screening of AF. However, the shapes of individual pulse waveforms vary in AF decreasing pulse detection accuracy.

**Purpose:**
The purpose of this study was to evaluate the utility of PPG wrist band pulse morphology in detection of AF.

**Methods:**
A 5-minute PPG was recorded with a PPG wrist band from patients with AF or sinus rhythm. A simultaneously registered ECG served as the golden standard for the rhythm analysis and was interpreted by two cardiologists. In addition to using the inter-beat-interval (IBI) based AFEvidence algorithm in comparison, we extracted a feature straight from the PPG signal, without the need of pulse detection. This feature was calculated as the average of absolute autocorrelation values over different lags. The feature describes the regularity of the PPG signal and is decreased if the shape and periodicity of pulse waves vary. The performance of this PPG morphology-based method in detection of AF was evaluated and compared to the AFEvidence.

**Results:**
The study population consisted of 213 patients (106 AF, 107 sinus rhythm). The sensitivity and specificity of PPG morphology-based autocorrelation AF detection method were 98.1% and 94.4%. For AFEvidence, the sensitivity and specificity were 96.2% and 98.1%, respectively (p=.146 between the methods, McNemar test).

**Conclusions:**
The PPG morphology-based autocorrelation method detects AF with good accuracy without the need of pulse detection. The method seems promising in detection of AF and should be studied further.
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E-S Valiaho 1, P Kuoppa 1, JA Lipponen 1, TJ Martikainen 2, H Jantti 1, TT Rissanen 3, I Kolk 2, M Castren 4, J Halonen 2, MP Tarvainen 1, JEK Hartikainen 1

1 University of Eastern Finland – Kuopio – Finland, 2 Kuopio University Hospital – Kuopio – Finland, 3 North Karelia Central Hospital – Joensuu – Finland, 4 University of Helsinki – Helsinki – Finland

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Funding Acknowledgements:

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