BMJ Open Triage tests for identifying atrial fibrillation in primary care: a diagnostic accuracy study comparing single-lead ECG and modified BP monitors

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ABSTRACT

Objective: New electronic devices offer an opportunity within routine primary care settings for improving the detection of atrial fibrillation (AF), which is a common cardiac arrhythmia and a modifiable risk factor for stroke. We aimed to assess the performance of a modified blood pressure (BP) monitor and two single-lead ECG devices, as diagnostic triage tests for the detection of AF.

Setting: 6 General Practices in the UK.

Participants: 1000 ambulatory patients aged 75 years and over.

Primary and secondary outcome measures: Comparative diagnostic accuracy of modified BP monitor and single-lead ECG devices, compared to reference standard of 12-lead ECG, independently interpreted by cardiologists.

Results: A total of 79 participants (7.9%) had AF diagnosed by 12-lead ECG. All three devices had a high sensitivity (93.9–98.7%) and are useful for ruling out AF. WatchBP is a better triage test than Omron autoanalysis because it is more specific—89.7% (95% CI 87.5% to 91.6%) compared to 78.3% (95% CI 73.0% to 82.9%), respectively. This would translate into a lower follow-on ECG rate of 17% to rule in/rule out AF compared to 29.7% with the Omron text message in the study population. The overall specificity of single-lead ECGs analysed by a cardiologist was 94.6% for Omron and 90.1% for Merlin.

Conclusions: WatchBP performs better as a triage test for identifying AF in primary care than the single-lead ECG monitors as it does not require expertise for interpretation and its diagnostic performance is comparable to single-lead ECG analysis by cardiologists. It could be used opportunistically to screen elderly patients for undiagnosed AF at regular intervals and/or during BP measurement.

Strengths and limitations of this study

- Three devices for detecting atrial fibrillation (AF) were tested on an unselected elderly primary care population of 1000 individuals.
- The prevalence of AF expected for this setting, which allowed us to determine the operating characteristics of each monitor with precision.
- Our population is generalisable to similar primary care settings worldwide.
- A reference standard (12-lead ECG) was performed on all patients, and interpreted blindly by cardiologists.
- The specificity of one cardiologist was substantially lower than the other three.
- Only 12 new cases of AF were detected in this setting, which is as expected for a primary care population such as this.

it significantly increases morbidity and mortality.[3] The main significance of AF is as a major independent risk factor for stroke and thromboembolism,[4] particularly in older patients. A large evidence base supports the efficacy of oral anticoagulation in reducing AF stroke risk by two-thirds.[5] AF may be asymptomatic but can be identified by detecting a characteristic irregularity in pulse rhythm. Despite this, it was found to be undiagnosed in 3.8% of patients aged over 75 years in a large UK screening study.[6] Indeed, undiagnosed AF is associated with 3.8–6.1% of all strokes.[7 8] Given the importance of identifying patients with risk of stroke, the high prevalence of AF and the effective prevention strategies, there is a strong case to consider screening for AF.

European guidelines for the management of AF recommended opportunistic pulse assessment by a primary care practitioner with a follow-up ECG for an irregular pulse, an approach which is more cost-effective

INTRODUCTION

Atrial fibrillation (AF) is the most common cardiac arrhythmia; present in more than 10% of patients aged 75 years or over,[1 2] and