Reviewer’s report

Title: Screening for atrial fibrillation with intermittent ECG recording in an out-of-hospital population

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Reviewer: Marco Perez

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Summary

Dr. Hendrikx and colleagues have submitted a manuscript entitled “Screening for atrial fibrillation with intermittent ECG recording in an out-of-hospital population”. In their study, the authors recruited nearly 1000 patients without established AF but with CHADS2 score of 1 or greater and provided a hand-held device for intermittent ECG recordings with the instructions to record at least twice daily and during any palpitations for 28 days. They were able to identify 4% of this patient population with newly diagnosed AF.

The subject of AF screening in patients who may benefit from anticoagulation is of great concern. Stroke is the most devastating consequence of AF and identifying patients with AF for prophylaxis is important. There are currently monitoring devices, however most are wearable and cumbersome, and are not typically used for screening asymptomatic patients. A device such as this, if proven effective, could change the practice of more routine recommendation.

Major Comments

The major limitation I observed with this study is the very high incident rate of AF. The authors attempted to exclude patients with baseline AF, which I believe is critical for this type of study. However, 10 of the 37 patients were found to have AF on Day 1, which suggests that they would have been identified on baseline ECG screening, which was not done for this study. Although the authors acknowledge this in the discussion, they still included these patients in their total count. These subjects should have been excluded.

Another major limitation is the lack of assessment of accuracy of this device. There is comment that the sensitivity and specificity of AF detection are 96% and 92% respectively, however, no direct reference is made (only a reference for technical description). The major concern is that accuracy of spot-checking will have a higher false-positive rate. Many patients have short (< 30second) runs of atrial tachycardia which can easily be mislabeled as an episode of AF on this type of recording. The high rates of “new AF” makes me suspect some of these will indeed be false positives.

Ideally, this study should have been performed along with a more continuous monitoring device to help assess the accuracy of the outcomes…however, given
the study is complete and continuous recordings are not available, the authors should address further this major limitation in the discussion.

Minor Comments

Were the patients who subsequently had their charts/ECGs reviewed and found to have had histories of AF prior to enrollment excluded? These patients should also be excluded.

Since the focus is on the device itself, the authors should address the potential advantages/disadvantages and performance of this type of device compared to other existing technologies, such as patch-based continuous monitoring (Zio) etc.

The term “prevalence” is misused throughout the manuscript, including Table 1 and in the discussion. Prevalent AF is the frequency of AF in a cross-sectional sample. In this study, those with “prevalent” AF should have been excluded. The AF that was subsequently detected is “incident” AF.

It is not correct to “average” CHADS2 score and report and compare the means. CHADS2 is a categorical variable, not a continuous variable. The difference between CHADS2 of 2 vs 3 is not the same as 3 vs. 4. Therefore, CHADS2 should be split into categories and compared using chi sq. The top of table 1 appeared to do this correctly, but then mean CHADS2 were compared incorrectly at the bottom of table 1 and results reported in the text.

May be helpful to also report CHADS-VASC scores if the data is available.

Table 2 reports “persisting” AF. This should be “persistent” AF and should be defined. I assume these are the patients that went into AF after enrollment and stayed in AF for > 7 days, but this should be clearly defined. If there are patients who were in AF at Day 1, and remained in AF throughout the study, these were likely permanent AF patients, and should have been excluded.

Bottom of table 2 reports Mean, SD and Range, but SD and Range don’t make sense for the categorical values. Perhaps the authors meant to report standard errors of the mean? Or n(?).

Picking up 5 patients with conduction system disease who subsequently needed PPM is quite significant and this information should be expanded. This seems like a very high rate for otherwise asymptomatic patients.

In the range for time to first AF in Table 2, there is a range of 1-38. The authors noted that the study was for 28 days. Were events after 28 days excluded? If not, authors should state this more clearly.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Needs some language corrections before being published
**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I declare that I have no competing interests.