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Diagnostic accuracy of smartwatch in detecting atrial fibrillation: a systemic review and meta-analysis

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Introduction: Atrial fibrillation (AF) is the most common sustained arrhythmia and an important risk factor for stroke and heart. Recent technology advances allowed for heart rhythm monitoring using Smartwatches which can be used for early AF diagnosis.

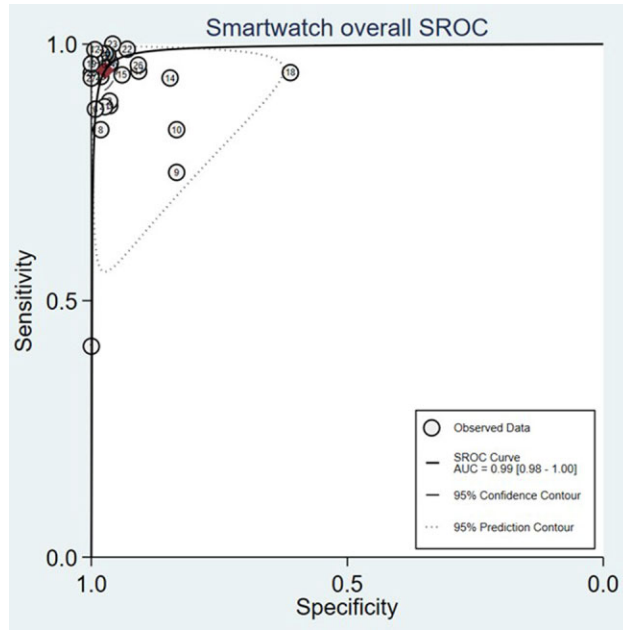
Purpose: We performed a systemic review and meta-analysis to assess the accuracy of AF diagnosis by smartwatches.

Methods: We systematically searched Medline, Embase and Cochrane electronic databases up to September 28th, 2022 for observational studies of the diagnostic accuracy of smartwatches devices in detecting AF. Studies with 12-lead ECG or single-lead ECG interpreted by a cardiologist as gold standard were included. We calculated the area under the curve (AUC) of the summary receiver operating characteristic curves (SROC) and pooled sensitivities and specificities.

Results: A total of 20 studies were included enrolling 3447 patients, 57%(95% CI: 55-59%) male with average age of 68.3years (95% CI: 63 – 74). The pooled prevalence of AF was found to be 40% (95% CI 27 – 53%). In the overall analysis of all smartwatches, the AUC was 0.99 (95% CI: 0.98-1.00) (Figure 1), the sensitivity 94%(95% CI: 90 – 96%) and the specificity 97%(95% CI: 95 – 98%) (Figure 2). Smartwatches in primary prevention showed an AUC of 0.97 (95% CI: 0.96-0.99), sensitivity of 83%(95% CI: 52 – 96%) and specificity of 98%(95% CI: 87 – 100%) whereas in secondary prevention showed an AUC of 0.99 (95% CI: 0.98-1.00), sensitivity of 95%(95% CI: 94 – 97%) and specificity of 97%(95% CI: 96 – 98%). In the subgroup analysis by technology, smartwatches with single lead ECG showed an AUC of 0.99 (95% CI: 0.98-1.00), sensitivity of 95%(95% CI: 89 – 97%) and specificity of 97%(95% CI: 94 – 99%) whereas smartwatches with photoplethysmography pulse waveform technology showed an AUC of 0.99 (95% CI: 0.97-0.99), sensitivity of 95%(95% CI: 92 – 96%) and specificity of 97%(95% CI: 95 – 99%).

Conclusions: Smartwatches proved an excellent diagnostic accuracy for AF diagnosis.

9.3.7 - Noninvasive Diagnostic Methods



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