International Journal of Cardiology 203 (2016) 465–473

Contents lists available at ScienceDirect

International Journal of Cardiology

journal homepage: www.elsevier.com/locate/ijcard

Screening for atrial fibrillation with automated blood pressure measurement: Research evidence and practice recommendations

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ARTICLE INFO

Article history:
Received 2 September 2015
Received in revised form 19 October 2015
Accepted 24 October 2015
Available online 26 October 2015

Keywords:
Arrhythmia
Blood pressure monitoring
Self-measurement
Home blood pressure
Clinic
Stroke

ABSTRACT

Several guidelines recommend opportunistic screening for atrial fibrillation (AF) in subjects aged ≥65 years using pulse palpation during routine blood pressure (BP) measurement. However, this method has limited diagnostic accuracy. A specific algorithm for AF detection during automated BP measurement was developed and implemented in a novel oscillometric device (Microlife WatchBP Home-A). In 2013, the UK National Institute for Health and Care Excellence (NICE) recommended this device for AF screening during routine office BP measurement in primary care in subjects ≥65 years. A review and meta-analysis of the evidence on the diagnostic accuracy of this algorithm were performed. Six studies (n = 2332) investigated the accuracy of AF detection using the Microlife BP monitor and estimated a pooled sensitivity at 0.98 (95% CI 0.95, 1.00) and specificity 0.92 (0.88, 0.96). Analysis of 4 studies (n = 1126) showed more readings to improve specificity (from 0.86 to 0.91) and sensitivity (from 0.97 to 0.99). Taking 3 sequential readings with at least 2 detecting AF gave the highest diagnostic accuracy. A single study (n = 139) of paroxysmal AF screening with home BP monitoring (3316 days) showed sensitivity 99% and specificity 93%. Another study (n = 46) of AF screening with 24 h ambulatory BP monitoring showed that AF detected in >15% of all readings has high probability of AF diagnosis requiring confirmation by 24 h electrocardiography. AF detection with routine automated BP measurement is a reliable screening tool in the elderly, which requires confirmation by electrocardiography. Paroxysmal AF might also be detected by routine automated home or ambulatory BP monitoring.

1. Introduction

Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia and an important risk factor for stroke [1]. Its prevalence is estimated at 1–2% of the general population [2,3] and increases with age from 0.5% at 40–50 years to 5% in subjects over 65 years, and 14% in those over 85 years [4,5]. However, there is evidence that the true prevalence of AF is much higher [6,7]. The reasons why AF frequently remains undetected are straightforward. Approximately one third of people with AF have no clear symptoms [8,9], and even in symptomatic cases, these are attributed to other reasons. In addition, in case of paroxysmal AF (pxAF), episodes of the arrhythmia may be of short duration and therefore difficult to detect [8]. These issues suggest the need of more extended and reliable AF screening [10].

2. Screening for AF

The importance of AF screening is increasingly recognized and recommended by most cardiovascular societies [11–16] (Table 1). Since hypertension is the most important risk factor of AF and showed to affect up to 90% of the participants in AF trials [17], most guidelines recommend pulse palpation to be performed in primary care clinics during routine blood pressure (BP) measurement in patients aged 65 years and older; so-called opportunistic screening [18].

Pulse palpation, although inexpensive, has moderate diagnostic accuracy with sensitivity and specificity values of 87 and 81%, respectively [19]. The consequence of this low sensitivity might be an increase in AF related morbidity and mortality. Moreover, low specificity comes at high costs and an increased burden for health care. Due to the low prevalence of AF of approximately 8% in subjects of 65 years and older [19] low specificity leads to too many false positive findings. Since patients in whom an arrhythmia is detected need to be referred for a 12-lead electrocardiography (ECG) for confirmation [18] (£31, $46; prices NHS 2011) this comes at higher costs. The SAFE study

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http://dx.doi.org/10.1016/j.ijcard.2015.10.182