Research Article

Switching from traditional to automatic sphygmomanometer increases opportunistic detection of atrial fibrillation in hypertensive patients

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Abstract

Routine pulse palpation is one of the screening method to detect asymptomatic atrial fibrillation (AF) in clinical practice. Recently new automatic sphygmomanometers with embedded algorhytms to detect irregular heart beat and possible AF have been commercialized. Whether the switch from the traditional sphygmomanometer to these devices modifies AF detection in usual care is unknown. 12294 patients of 30 GPs members of the Italian College of General practitioners working in Bologna with recorded diagnosis of Hypertension and BP recording were extracted before and after the adoption and use of an automatic device. 14 other GPs who were using a traditional device (Riva-Rocci or aneroid sphygmomanometer), volunteered to provide the same data extraction from their personal database. Heart rhythm should be evaluated while measuring BP with usual devices. This information may be lost with with a few automatic devices, therefore the use of automatic devices with algorithms which can detect possible AF is an appealing choice. Our data show that switching from the traditional device to an automatic device with algorithm for irregular beat detection increases the identification rate of previously unknown AF in hypertensive population.

Keywords: atrial fibrillation, hypertensive patients

Abbreviations: BP - Blood Pressure, AF - Atrial Fibrillation, CE - European Community

Introduction

Routine pulse palpation is the recommended screening method to detect asymptomatic atrial fibrillation (AF) in clinical practice[1]. Since this is part of the blood pressure (BP) measurement technique when using the Riva Rocci (mercury) device or the aneroid device, most patients are evaluated for rhythm irregularity while checking their BP, and, if pulse isn't palpated, heart rhythm can be evaluated through auscultation of Koroktoff' sounds. According to the European Community law (2007/51 CE; 2007 September 27th), the mercury sphygmomanometers should not be sold any more, therefore aneroid or automatic devices will replace them in a few years. Recently new devices with embedded algorithms to detect irregular heart beat and possible AF have been commercialised. Whether the switch from Riva-Rocci or aneroid sphygmomanometer to this device will affect detection of AF in usual care is unknown. We explored this issue using a retrospective, naturalistic observation of a group of GPs who abandoned the "old" Riva-Rocci or the aneroid sphygmomanometer and adopted this new device.

Methods

In September 2011 the members of the Italian College of General Practitioners based in Bologna (a medium size city in Central Italy) decided to standardize their office BP measurements. They received an unconditional grant for 30 automatic upper arm blood pressure monitors (Microlife- Afib ®) to be used in office by the GP him/herself. This device embeds an algorithm that calculates the irregularity index (standard deviation divided by mean) based on interval times between heartbeats; if the irregularity index is above a certain threshold value, atrial fibrillation is likely to be present and an atrial fibrillation icon is displayed on the screen. The 30 general practitioners who received the device agreed to a later proposal to examine their database to evaluate detection of new AF patients. They all had the same professional software (Millewin®), and used an automatic extraction. All the patients with recorded diagnosis of hypertension were identified, then BP recording and AF diagnosis were extracted before (365 days preceding the use of Microlife) and after (4 months since starting the use of Microlife) the adoption of the automatic devices. The proposal to examine AF detection was made after four months after they received the devices, therefore the GPs weren't aware of this study during the usual professional activity. This study was also neither planned nor known by Microlife. Fourteen other GPs, who were using the traditional device, volunteered to provide the same data extraction from their personal database.

Results

The 30 participants GPs cared for 48,184 individuals, 12,294 (25.5%) of whom had hypertension (mean age 69.9±13.4). The 16 control GPs cared for 23,218 patients, 5,757 (24.8%) with hypertension (mean age 69.7±13.6). The four-monthly AF detection rate for the original group and the control group is reported in table 1. All the new detected AF were then confirmed on ECG. Statistical analysis was made with the chi-square (χ^2) test.

Table 1: Four-monthly AF detection rate in the original GP group and in the control group*

N° GPs and (n° hypertensive patients)	Detected AF % and (n° pts) October 2010- January 2011	Detected AF % and (n° pts) February 2011- May 2011	Detected AF % and (n° pts) June 2011- September 2011	Detected AF % and (n° pts) October 2011-January 2012
30 (12294) - original group	0.37% (46) *	0.3% (39) *	0.37% (45) *	0.63% (77) **
16 (5757) - controls	0.35% (20) ‡	0.45% (26) ‡	0.56% (32) ‡	0.33% (19) ‡‡

*‡ Use of the traditional device: original group vs controls: p NS (χ^2 = 3.0421, df 1)

** Use of the automatic device (other quarters use of traditional device)

**‡‡ Original group: use of the automatic device vs traditional device in AF detection: p < 0.005 (χ^2 = 9.487, df 1)

Discussion

Atrial fibrillation can be difficult to diagnose as it is often asymptomatic and intermittent (paroxysmal). The irregularity of heart rhythm can be detected by palpation of the pulse. It may therefore be detected in patients who present with symptoms such as palpitations, dizziness, blackouts and breathlessness, but may also be an incidental finding in asymptomatic patients during routine examination. The diagnosis must be confirmed with an ECG, which should be performed in all patients, whether symptomatic or not, in whom atrial fibrillation is suspected due to the detection of an irregular pulse. Heart rhythm should be evaluated while measuring BP with traditional sphygmomanometers, while this information may be lost with automatic devices, therefore the use of automatic devices with algorithms which can detect possible AF is an appealing choice. The hypothesis that these devices are equal or superior to systematic pulse palpation is currently under investigation by NICE[2]. At the moment the consequences of switching from the classical Riva-Rocci devices to these new ones in usual care isn't known. The AF opportunistic screening in people aged ≥ 65 leads to a 1.63% detection rate while usual care has a detection rate of 1.04%, very similar to that observed in our hypertensive population (1.13%)[3]. Our data show that, at least in the short term, switching from the usual device to an automatic device with algorithm for irregular beat detection increases the identification rate of previously unknown AF in the hypertensive population. While waiting for a formal appraisal, GPs who wish or must renounce to their "old" Riva-Rocci can use this device implementing their "usual care" performances.

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