Comparison of Microlife BP A200 Plus and Omron M6 Blood Pressure Monitors to Detect Atrial Fibrillation in Hypertensive Patients

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ABSTRACT

Introduction: Self-monitoring home blood pressure (BP) devices are currently recommended for long-term follow-up of hypertension and its management. Some of these devices are integrated with algorithms aimed at detecting atrial fibrillation (AF), which is common essential hypertension. This study was designed to compare the diagnostic accuracy of two widely diffused home BP monitoring devices in detecting AF in an unselected population of outpatients referred to a hypertension clinic because of high BP. Methods: In 503 consecutive patients the authors simultaneously compared the accuracy of the Microlife® BP A200 Plus (Microlife) and the OMRON® M6 (OMRON) home BP devices, in detecting AF. Results: Systolic and diastolic BP as well as heart rate (HR) values detected by the two devices were not significantly different. Pulse irregularity was detected in 124 and 112 patients with the OMRON M6 and Microlife BP A200 Plus devices, respectively. Simultaneous electrocardiogram (ECG) recording revealed that pulse irregularity was due to AF in 101 patients. Pulse irregularity detected by the OMRON M6 device corresponded to AF in 101, to supraventricular premature beats in 18, and to frequent premature ventricular beat in five patients, respectively. Pulse irregularity detected by the Microlife BP A200 Plus device corresponded to AF in 93, to supraventricular premature beats in 14, and
to ventricular premature beats in five patients. The sensitivity for detecting AF was 100%, the specificity was 92%, and diagnostic accuracy 95% for the OMRON M6 and 100%, 92%, and 95 for the Microlife BP A200 Plus, respectively. AF was newly diagnosed by ECG recordings in 47 patients, and was detected in all patients by the OMRON device, and in 42 patients by the Microlife device. **Conclusion:** These results indicate that OMRON M6 is more accurate than Microlife BP A200 Plus in detecting AF in patients with essential hypertension. Widespread use of these devices in hypertensive patients could be of clinical benefit for the early diagnosis and treatment of this arrhythmia and related consequences.

**Keywords:** atrial fibrillation; diagnostic accuracy; hypertension; self-blood pressure measurement

**INTRODUCTION**

Atrial fibrillation (AF) is the most common sustained arrhythmia in clinical practice.\(^1\)\(^,\)\(^2\) It is frequently asymptomatic and, as such, is the initial presentation that results in AF detection. AF is also associated with an increased long-term risk of stroke.\(^1\)\(^,\)\(^2\) Episodes of AF leading to stroke are particularly frequent in essential hypertension, especially in the elderly.\(^3\)\(^,\)\(^4\) Hence, diagnostic strategies capable of early detection of asymptomatic, as well as symptomatic, AF in hypertensive subjects appear mandatory.\(^5\)

Self-monitoring home blood pressure (BP) devices are currently widely recommended for the long-term follow-up of hypertension and its management.\(^6\)\(^,\)\(^7\) Recent advances in technology and computer techniques, have made it possible to integrate self-monitoring home BP devices with algorithms aimed at detecting AF during routine BP measurements, thereby offering the potential for early detection and management of AF and, as a consequence, for stroke prevention.\(^8\)\(^,\)\(^9\) Commercially available automated devices for self-BP monitoring with integrated algorithms for the detection of AF are based on the oscillometric method. Two self-monitoring home BP devices have been tested for their accuracy in detecting AF: the Microlife® BP A200 Plus (Microlife, Microlife AG, Widnau, Switzerland) and the OMRON® M6 (OMRON, OMRON Healthcare Co., Kyoto, Japan). Both instruments have been reported to be quite accurate in detecting AF when compared with electrocardiogram (ECG), taken as the reference standard.\(^8\)\(^-\)\(^10\) However, a direct comparison of the accuracy of these two instruments in detecting AF in the same unselected individuals with essential hypertension has never been undertaken.

Accordingly, the present study was designed to compare the diagnostic accuracy of these two home BP-monitoring devices in detecting AF in an unselected population of outpatients referred to a hypertension clinic because of high BP. A secondary aim was to evaluate the degree of comfort of the two BP measurements devices, which could be of relevance for long-term compliance.

**METHODS**

**Patient Population and Study Design**

The patient population included 550 consecutive patients referred to our hypertension clinic. Exclusion criteria were age <18 years, the presence of a pacemaker, and/or an implanted defibrillator. All patients gave written informed consent to participate in the study. Twenty-nine patients were excluded because of their unwillingness to be studied. BP measurements were obtained at the clinic in a quiet room with patients seated comfortably. BP measurements started after a 10-minute rest period. Different