

Accuracy of the BP A100 blood pressure measuring device coupled with a single cuff with standard-size bladder over a wide range of arm circumferences

Elisa Bonso, Francesca Dorigatti and Paolo Palatini

The objective of this study was to determine the accuracy of the Microlife BP A100 blood pressure measuring device tested according to the requirements of the International Protocol of the European Society of Hypertension. The BP A100 model is designed to provide accurate blood pressure measurements over a wide range of arm circumferences using a single cuff with standard-size bladder. Device evaluation was performed on 33 patients with a mean \pm SD age of 59 ± 19 years (range 30–89 years). Their systolic blood pressure (SBP) was 143 ± 23 mmHg (range 108–180 mmHg), diastolic blood pressure (DBP) was 87 ± 16 mmHg (range 60–108 mmHg), and arm circumference was 31 ± 4 cm (range 22–42 cm). In nine patients, the arm circumference was at least 33 cm. Blood pressure measurements were performed in the sitting position. The BP A100 passed all three phases of the European Society of Hypertension protocol for SBP and DBP. Mean blood pressure differences between device and observer were -2.9 ± 4.9 mmHg for SBP and -2.6 ± 4.6 mmHg for DBP. Similar device–observer

differences were observed in the patients divided into two subgroups according to whether their arm circumference was above or below the median in the group. In conclusion, the present results indicate that the Microlife BP A100 monitor coupled with a single cuff with standard size bladder provides accurate blood pressure readings over a wide range of arm circumferences. *Blood Press Monit* 14:216–219 © 2009 Wolters Kluwer Health | Lippincott Williams & Wilkins.

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Department of Clinical and Experimental Medicine, University of Padova, Padua, Italy

Correspondence to Dr Paolo Palatini, Dipartimento di Medicina Clinica e Sperimentale, Università di Padova, via Giustiniani, 2-35128 Padova, Italy
Tel: +39 049 821 2378; fax: +39 049 875 4179; e-mail: palatini@unipd.it

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Introduction

Cuff sizes have been the source of controversy for many years [1–3]. The use of cuffs containing bladders of inappropriate dimensions may be the source of substantial error that leads to erroneous conclusions in clinical practice. Undercuffing spuriously elevates the recorded blood pressure (BP) in patients with large arms leading to overdiagnosis of hypertension. Most guidelines recommend a bladder width and length of 40 and 80% of arm circumference, respectively [4,5]. Thus, several cuffs of different size should be available to avoid miscuffing. These recommendations are often neglected by health-care professionals, because they imply availability of a wide variety of cuffs and measurement of arm circumference [6,7]. To avoid these problems, several procedures have been worked out [1,8], but for reasons of cost and practicality none became popular. Recently, some manufacturers produced automatic devices for self-BP measurement provided with a single cuff of standard size for patients with a wide range of arm size [9]. Recently, the Microlife Company produced an oscillometric device, the BP A100, aiming to provide accurate BP measurements up to an arm circumference of 42 cm with the use of a single cuff with inflatable bladder 24×13 cm. The device was previously validated in patients with arm

circumference between 22 and 34 cm using small, standard, and large cuffs according to the patient's arm circumference [10]. The aim of this study was to verify the accuracy and reliability of this device according to the recommendations of the International Protocol of the European Society of Hypertension (ESH) in a sample of patients with a wide range of arm circumferences using a single standard-size bladder [11].

Methods

Patients

Participants were selected from outpatient clinics and wards at the University of Padova, Italy. Fifty-five patients were included based on the baseline BP until each of the required bins was filled. Twenty-two patients were excluded because BP ranges were complete ($n = 15$), Korotkoff sounds were of poor quality ($n = 2$), BP was out of range ($n = 1$), and there was atrial fibrillation ($n = 4$). Thus, the BP A100 device coupled with a wide range soft cuff 22–42 cm was evaluated in 33 patients (17 women) with a mean \pm SD age of 59 ± 19 years (range 30–89 years). Their systolic BP (SBP) was 143 ± 23 mmHg (range 108–180 mmHg), diastolic BP (DBP) was 87 ± 16 mmHg (range 60–108 mmHg), and arm circumference was 31 ± 4 cm (range 22–42 cm). In nine patients, the arm circumference