

CONCEPTS IN HYPERTENSION

A Journal Article Based Approach to Understanding the Clinical Aspects of Hypertension

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Article of Interest

Kikuya, et al. Accuracy and reliability of wrist-cuff devices for self-measurement of blood pressure. *Journal of Hypertension*. 2002. ([Click to Access](#))

Context and Study Objective

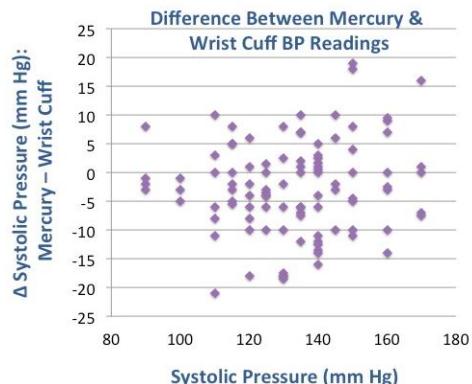
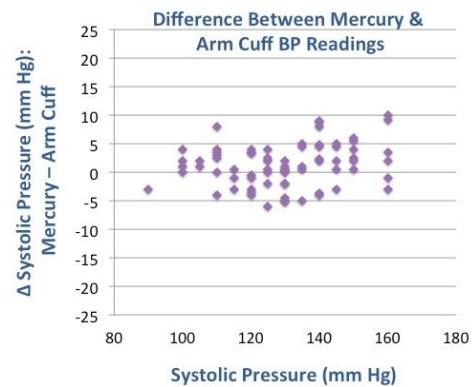
Electronic wrist-cuff blood pressure (BP) monitors have become increasingly popular given their ease of use. Kikuya et al sought to compare the accuracy and reliability of electronic wrist and arm-cuff BP machines with a mercury sphygmomanometer (auscultatory method). The effects of various wrist positions on wrist-cuff based BP readings were also assessed.

Design, Setting, and Participants

Using normotensive individuals, BP was measured by the auscultatory method ("gold standard") with simultaneous measurement in the contralateral arm by an electronic wrist or arm monitor (Manufacturers: Omron, A&D, Matsushita Denko). This process was repeated eight times per patient, alternating the arm used for manual or electronic monitoring. Two trained observers listened simultaneously during auscultatory readings. During measurements, the wrist was supported at the level of the heart. Separately, BP was measured with the wrist-cuff unit while the wrist was flexed or extended. The study was not sponsored by the machine manufacturers.

Results

-500 participants aged 50-55 were studied. Pressures ranged from 135-140/76-82 mm Hg. BMI was not reported.
-Simultaneous auscultation by two observers resulted in identical BP readings using a mercury sphygmomanometry.
-Figures: While there were only modest differences in BP between auscultatory and device based readings, the standard deviations for these readings were 6.0/5.5 mm Hg (arm cuff) and 10/8.0 mm Hg (wrist cuff).
-Upon wrist-cuff measurement, blood pressures differences of $5 \pm 11/4 \pm 9$ mm Hg were recorded depending on wrist position (dorsal vs plantar flexion).



Clinical Perspective

-In light of the large standard deviations recorded, this study demonstrates that wrist-cuff BP machines result in unreliable readings (i.e. values are highly variable despite consistent auscultatory readings).
-Moreover, variable wrist position further compromises consistent readings with wrist based devices.
-As performed in the study, wrist units should be positioned at the level of the heart. However, I find that patients often place their wrist at their side leading to further measurement errors.
-As such, I limit wrist-cuff units to morbidly obese patients with upper arm circumferences that exceed even large cuffs and elderly individuals for whom it is difficult to place a cuff around the bicep.