Reverting to simplicity: palpating SBP

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Journal of Hypertension 2011, **29**:27–28

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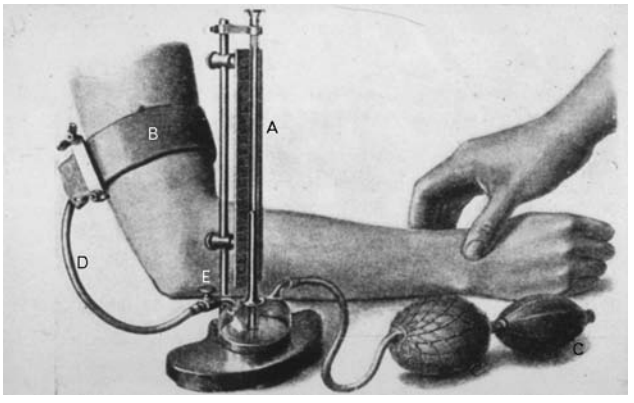
Blood pressure (BP) measurement in clinical practice was made possible by the pioneering work of a number of clinical scientists and physiologists at the close of the nineteenth century. The work of von Basch, Potain, Hill, Barnard and perhaps most notably Marey, paved the way for the Italian clinician, Scipione Riva-Rocci to introduce the limb-occluding technique for palpatory measurement of SBP in 1896. (Fig. 1) [1].

Just a decade later, the enigmatic Russian surgeon, Nicolai Sergeivich Korotkoff, described the auscultatory technique that enabled the measurement of both SBP and DBP [2]. During the twentieth century, the auscultatory technique became the established method for measuring BP, and it still remains the most commonly used method in clinical practice, although it is now being progressively replaced by automated techniques.

Fig. 1



The palpatory technique for blood pressure measurement by Scipione Riva-Rocci (1896). A, mercury column; B, arm cuff; C, inflating bulb; D, connecting rubber tube; E, regulating valve.

However, it is interesting to note that the guidelines for BP measurement recommend that palpation of SBP, as described by Scipione Riva-Rocci, should precede auscultation of SBP and DBP as described by Korotkoff. For example, the European Society of Hypertension guideline [3] states that 'palpatory estimation is important, because phase I sounds sometimes disappear as pressure is reduced and reappear at a lower level (the auscultatory gap), resulting in systolic pressure being underestimated unless already determined by palpation.' This guideline, in agreement with other reports [4], also recommends the palpatory technique in patients in whom auscultatory end points may be difficult to judge accurately, such as pregnant women, patients in shock and during exercise.

Remarkably, in over a century of clinical use, a formal comparison between the palpatory and the auscultatory measurement of SBP has never been conducted.

Now van der Hoeven *et al.* [5] from Amsterdam have rectified this omission by assessing the auscultatory technique of BP measurement at the brachial artery as described by Korotkoff against the palpatory technique at the radial artery as described by Scipione Riva-Rocci for the measurement of SBP in a group of middle-aged patients. Using the International Protocol of the European Society of Hypertension [6], they found that the palpatory technique underestimated SBP by 6 mmHg, as compared with the auscultatory technique, over three averaged comparisons. When this correction factor is used, the palpatory technique offers an acceptable alternative for auscultatory measurement of SBP [5]. The reasons for having to add the correction factor may be due to a delay between the phenomenon that generates an auscultated sound and a palpatory impulse. However, because a radial pulse wave was felt in some patients before the first Korotkoff sound was heard, a delay between auscultated sounds and pulse wave transmission to the radial artery cannot be the whole explanation. The significant positive correlation between BMI and the difference between the palpatory and the auscultatory techniques might be explained by the presence of subcutaneous fat around the radial artery making palpation more difficult [5].

van der Hoeven *et al.* [5] have quantified the difference between palpatory and auscultatory measurements with the aim of proposing a correction factor to make the BP information provided by the palpatory technique comparable to that obtained with auscultation of the Korotkoff sounds. This approach, which takes the BP measurement performed with the auscultatory method as reference value, could be empirically justified by the fact

0263-6352 © 2010 Wolters Kluwer Health | Lippincott Williams & Wilkins DOI:10.1097/HJH.0b013e32834091ba

that almost all available information on the prognostic value of BP readings taken in the doctor's office, as well as of their changes with treatment, was obtained with the use of the auscultatory technique [4,7]. On a strict theoretical basis, however, taking auscultatory readings as a 'gold standard' against which to calibrate palpatory readings could be a matter of debate, given the well known inaccuracies that have characterized BP readings obtained through the use of auscultatory approach [3].

There are some shortcomings in this study which the authors acknowledge: the number of patients studied was small and not representative of a general population; the protocol was modified by taking simultaneous, rather than sequential readings; and the sites for comparison were different. Indeed the last point may be the most important; would simultaneous palpation and auscultation at either the radial or brachial arteries have given agreement without the need for a correction factor? The Amsterdam group might consider assessing this important issue in a future study.

Keeping these misgivings aside, how will this study influence practice? The authors' claim that 'Scipione Riva-Rocci's technique should not be put at rest, but deserves to live on as a simple, cheap and always available tool' is justified. This is all the more so, as SBP becomes increasingly recognized as contributing more to cardiovascular disease than DBP, especially in elderly persons. [8] The Amsterdam study supports the European Society of Hypertension (ESH) recommendation to palpate BP before auscultation. However, the ESH guideline recommends palpation of SBP at the brachial artery and for the reasons already stated, this should be done at the radial artery if the correction factor is to be added [3]. Surprisingly, although one of the authors of the Amsterdam study is also a member of the expert committee of the WHO that drew up recommendations for a BP measuring device in low-resource settings, the use of the palpatory technique in this circumstance is not mentioned [9]. Although palpatory measurement of SBP with a mercury sphygmomanometer in low-resource settings requires training of personnel, it is a less complicated technique than auscultatory measurement and does not require a stethoscope. However, this advantage may be of little practical advantage, as the banning of mercury gathers global momentum [10]. For this and other reasons, measurement of BP in low-resource countries with robust, inexpensive, solar-powered automated or semi-automated devices is preferred [9].

In conclusion, the results of the study by van der Hoeven *et al.* [5] suggest that the palpatory technique could be a reliable, easy and useful approach to measure SBP in daily practice. This could be the case not only in low-resource settings but also in developed countries.

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