How to calibrate blood pressure measuring devices?

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Introduction

Approximately 100 years have passed since the legendary development by the Italian Riva Rocci to measure blood pressure by an upper arm cuff with the mercury manometer. The invention was based on the first description of sound phenomena above the brachial artery by the Russian Korotkoff during upper arm compression.

Today non-invasive sphygmomanometers are one of the most commonly used medical devices. Lax meter maintenace and calibration can lead to overdetection and underdetection of hypertension.

The standards

The European Standards EN1060-1, *Non-invasive sphygmomanometers* and EN 1060-2 *Supplementary requirements* as well the ANSI/AMMI SP-10 tell us in detail how to calibrate blood pressure measuring devices.

According to EN1061-1 the following equipment is needed:

1. Calibrated pressure reference meter with an accuracy of 0.8 mmHg (0,1 kPa)

2. Infexible metal container with 500 ml +/- 5% capacity

3. Pressure generator, for example a pumpball with release valve

4. Tee connector and tubings

1 Reference meter
2 Metal container 500 ml
3 Pumpball with release valve
4 Instrument beeing tested

The Calibration Procedure

To prepare the calibration, the equipment is conneted as shown in the picture above.

Check each instrument to be sure that it is at zero and do not inflate beyond 300 mmHg. Slowly inflate the instruments to 250 mmHg and compare the readings. They should be the same, however, a deviation of +/- 3 mmHg is acceptable. Repeat this procedure at 200 mmHg, 150 mmHg, 100 mmHg, 50 mmHg and 0 mmHg. If the deviation is greater than +/- 3 mmHg at any of these points, the instrument being tested is inaccurate and needs adjustment or repair.

Instruments that fall out of calibration should be immediately taken out of service and referred to qualified service personnel for repair.

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