Blood Pressure … How to Measure

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Why ..!

Control of Hypertension begins
with …

accurate BP Measurement
“Blood pressure measurement is often considered “routine” and is often performed by those with the least training”

Blood Pressure Assessment

Blood pressure of all adults should be measured by any trained healthcare professional whenever it is appropriate.

Patients should be assessed at all appropriate medical visits

- To determine cardiovascular risk
- To monitor antihypertensive treatment
Suspects ...

- Equipment factors
- Observer factors
- Patient factors
Sources of Error in BP Measurement

- Conversation with observers
- No rest period
- Atrial Fibrillation
- White coat effect
- Alcohol
- Caffeine
- Smoking
- Full bowel/bladder
- Crossed legs
- Single arm
- Auscultatory gap
- Quick deflation
- Korotkoff IV
- Digit preference
- Expectation bias
- Distractions
- Background noise
- Hearing acuity
Blood Pressure Assessment:
Patient preparation and posture

Standardized technique:

Patient
1. No caffeine in the preceding hour.
2. No smoking or nicotine in the preceding 15-30 minutes.
3. No use of substances containing adrenergic stimulants such as phenylephrine or pseudoephedrine (may be present in nasal decongestants or ophthalmic drops).
4. Bladder and bowel comfortable.
5. Quiet environment. Comfortable room temperature.
6. No tight clothing on arm or forearm.
7. No acute anxiety, stress or pain.
8. Patient should stay silent prior and during the procedure.
Blood Pressure Assessment: Patient preparation and posture

Standardized technique:

Posture

The patient should be calmly seated for at least 5 minutes, with his or her back well supported and arm supported at the level of the heart. His or her feet should touch the floor and legs should not be crossed.

The patient should be instructed not to talk prior and during the procedure.
Recommended Technique for Measuring Blood Pressure

Standardized technique:

- Use a mercury manometer or a recently calibrated aneroid or a validated electronic device.
- Aneroid devices should only be used if there is an established calibration check every 6-12 months.
Recommended Technique for Measuring Blood Pressure

**Electronic oscillometric devices:**
- Use a validated electronic device according to BHS, AAMI or IP standards.
- For self blood pressure measurement devices, a logo on the packaging ensures that this type of device and model meets the international standards for accurate blood pressure measurement.

AAMI=Association for the Advancement of Medical Instrumentation; BHS=British Hypertension Society; IP: International Protocol.
Select a cuff with the appropriate size
## Cuff size

<table>
<thead>
<tr>
<th>Arm circumference (cm)</th>
<th>Size of Cuff (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From 18 to 26</td>
<td>9 x 18 (child)</td>
</tr>
<tr>
<td>From 26 to 33</td>
<td>12 x 23 (standard adult model)</td>
</tr>
<tr>
<td>From 33 to 41</td>
<td>15 x 33 (large, obese)</td>
</tr>
<tr>
<td>More than 41</td>
<td>18 x 36 (extra large, obese)</td>
</tr>
</tbody>
</table>
Recommended Technique for Measuring Blood Pressure (cont.)

- Locate brachial and radial pulse
- Position cuff at the heart level
- Arm should be supported
Recommended Technique for Measuring Blood Pressure (cont.)

- To exclude possibility of auscultatory gap, increase cuff pressure rapidly to 20-30 mmHg above level of disappearance of radial pulse

- Place stethoscope over the brachial artery
Recommended Technique for Measuring Blood Pressure (cont.)

- Drop pressure by 2 mmHg / sec
  - Appearance of sound (phase I Korotkoff) = systolic pressure
- Record measurement

- Drop pressure by 2 mmHg / beat
  - Disappearance of sound (phase V Korotkoff) = diastolic pressure
- Record measurement

- Take 2 blood pressure measurements, 1 minute apart
Recommended Technique for Measuring Blood Pressure (cont.)

Possible readings:
184 / 100
136 / 100
184 / 86 = correct
136 / 86
Recommended Technique for Measuring Blood Pressure

Standardized technique:

• For initial readings, take the blood pressure in both arms and subsequently measure it in the arm with the highest reading.

• Thereafter, take two measurements on the side where BP is highest.
Recommended Technique for Measuring Blood Pressure (cont.)

Record the blood pressure to the closest 2 mmHg on the manometer

as well as the arm used

and whether the patient was supine, sitting or standing.
Recommended Technique for Measuring Blood Pressure (cont.)

- Avoid digit preference for five (5) or zeros (0) by not rounding up or down.
- Record the heart rate.
The seated blood pressure is used to determine and monitor treatment decisions.

The standing blood pressure is used to test for postural hypotension, if present, which may modify the treatment.
Blood Pressure Assessment: Patient preparation and posture

Standing position

For patients over age 65, diabetics and patients being treated with antihypertensives, check if there are postural changes while taking blood pressure reading, i.e. after one to five minutes in the standing position and under circumstances when the patients complains of symptoms suggestive of hypotension.
## Threshold for Initiation of Treatment and Target Values

<table>
<thead>
<tr>
<th>Condition</th>
<th>Initiation</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diastolic ± systolic hypertension</td>
<td>( \geq 140/90 )</td>
<td>(&lt; 140/90 )</td>
</tr>
<tr>
<td>Isolated systolic hypertension</td>
<td>( \geq 160 )</td>
<td>(&lt; 140 )</td>
</tr>
<tr>
<td>Diabetes</td>
<td>( \geq 130/80 )</td>
<td>(&lt; 130/80 )</td>
</tr>
<tr>
<td>Renal disease</td>
<td>( (\geq 130/80) )</td>
<td>(&lt; 125/75 )</td>
</tr>
<tr>
<td>Proteinuria &gt;1 g/day</td>
<td>( (\geq 125/75) )</td>
<td></td>
</tr>
</tbody>
</table>
Blood pressure measurement with specific devices

- Mercury Blood Pressure Monitor
- Aneroid Blood Pressure Monitor
- Electronic Blood Pressure Monitor
Aneroid devices should not be used if there is not an established calibration check every 6-12 months.
The Message …

BP measurement should not be performed lightly.

Use standardized protocol

The measurement of blood pressure through auscultation remains the most widely accepted method in everyday practice.

Reliance on automated devices may lead to inaccurate readings in the presence of arrhythmias.

Mercury sphyg. are still considered the gold-standard measuring devices for indirect blood pressure determination

Aneroid sphygmomanometers are considered accurate if calibrated with a mercury manometer at regular intervals.