Office Blood Pressure Measurement

DEVICE
- Use validated automated electronic upper-arm cuff device.
- Prefer a device that takes triplicate readings automatically.
- If validated automated devices not available, use a manual electronic auscultatory device (LCD or LED display, or digital countdown, or good quality aneroid). Deflate at 2-3 mmHg/sec rate. Use 1st and 5th Korotkoff sound for systolic and diastolic BP.
- Annual maintenance of device is necessary.

CUFF
- Select cuff size according to the individual’s arm circumference.
- Automated electronic devices: select cuff size according to device instructions. Each electronic device has its own cuffs, which are not interchangeable with those of other devices.
- Manual auscultatory devices: use a cuff with bladder length at 75-100% of individual’s arm circumference and width 37-50%.

MEASUREMENTS
- 2-3 office visits at 1-4-week intervals are usually required.
- At initial visit measure BP in both arms.
- Measure standing BP in treated hypertensives when there are symptoms suggesting postural hypotension.

INTERPRETATION

<table>
<thead>
<tr>
<th>Office BP (mmHg)</th>
<th>Diagnosis</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal-Optimal BP (&lt;130/85)</td>
<td>Normotension highly probable</td>
<td>Remeasure after 1 year (6 months if other risk factors).</td>
</tr>
<tr>
<td>High-normal BP (130-139/85-89)</td>
<td>Consider masked hypertension</td>
<td>Perform home and/or ambulatory BP monitoring. If not available confirm with repeated office visits.</td>
</tr>
<tr>
<td>Hypertension Grade 1 (140-159/90-99)</td>
<td>Consider white-coat hypertension</td>
<td></td>
</tr>
<tr>
<td>Hypertension Grade 2-3 (≥160/100)</td>
<td>Sustained hypertension highly probable</td>
<td>Confirm within a few days or weeks*. Ideally use home or ambulatory BP monitoring.</td>
</tr>
</tbody>
</table>

* Treat immediately if office BP is very high (e.g. ≥180/110 mmHg) and there is evidence of target organ damage or cardiovascular disease.

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24h Ambulatory Blood Pressure Monitoring (ABPM)

DEVICE

→ Use validated automated electronic upper-arm cuff device.
→ Select cuff size according to device instructions.
→ Each device has its own cuffs, which are not interchangeable with those of other devices.
→ Annual maintenance of device is necessary.

IMPLEMENTATION

→ Perform ABPM preferably on a routine working day.
→ 10-15 min needed to initialise and fit the device.
→ Frequency of measurement 20-30 min during day and night.
→ Fit cuff on bare non-dominant arm.
→ Select cuff size according to device instructions.
→ Take a test measurement.
→ Remove the monitor after 24 hours.

INSTRUCTIONS TO PATIENT

→ Explain the device function and procedure.
→ Advise to follow usual daily activities and to remain still with arm relaxed at each measurement.
→ Advise not to drive. If this is necessary, then stop if possible or ignore measurement.
→ Advise to avoid taking a shower or bath during ABPM.
→ Provide a form to record sleeping times, drug intake, and any symptoms or problems during the recording.
→ Mark the brachial artery so that if the cuff becomes loose the patient can refit it.
→ Explain how to switch off the monitor in case of malfunctioning.

EVALUATION OF RECORDING

→ Determine day (awake) and night (asleep) periods only according to patient’s report.
→ Repeat ABPM if <20 valid awake or <7 asleep BP readings.

INTERPRETATION

<table>
<thead>
<tr>
<th>ABPM thresholds for hypertension diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>24h average:</td>
</tr>
<tr>
<td>≥130/80 mmHg</td>
</tr>
<tr>
<td>Daytime (awake) average:</td>
</tr>
<tr>
<td>≥135/85 mmHg</td>
</tr>
<tr>
<td>Night-time (awake) average:</td>
</tr>
<tr>
<td>≥120/70 mmHg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Asleep BP dip compared to awake BP (systolic and/or diastolic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asleep BP fall</td>
</tr>
<tr>
<td>≤10%</td>
</tr>
<tr>
<td>&lt;10%</td>
</tr>
</tbody>
</table>

¹ Apply only if day/night BP is calculated using the individuals’ sleeping times.
² The diagnosis must be confirmed with repeat ABPM.

HOME BLOOD PRESSURE MONITORING (HBPM)

DEVICE

→ Use validated automated upper-arm cuff device.
→ Select cuff size according to device instructions. Each device has its own cuffs, which are not interchangeable with those of other devices.
→ Prefer devices with automated storage and averaging of multiple readings, or with mobile phone, PC or internet link connectivity enabling data transfer.
→ Manual auscultatory devices, automated wrist devices, finger-cuff devices, wristband wearables and cuffless devices are generally not recommended.

HBPM SCHEDULE

For diagnosis and before each office visit

→ Measurements for 7 days (at least 3).
→ Morning and evening measurements.
→ Before drug intake if treated and before meals.
→ Two measurements on each occasion with 1 min between them.

Long-term follow-up of treated hypertension

→ Make duplicate measurements once or twice per week (most frequent) or per month (minimum requirement).

PATIENT TRAINING

→ Use a reliable device.
→ Conditions and posture for measurement.
→ Measurement schedule before office visit and between visits.
→ Interpretation of measurements. Inform patients about usual BP variability.
→ Action if BP is too high or too low.

INTERPRETATION

→ Prefer automated report and averaging of readings stored in device memory (or mobile). Otherwise, review readings reported in a logbook.
→ Assess home measurements of 7 days (at least 3 days with at least 12 readings).
→ Discard the first day and calculate the average of all the other readings.
→ Average home BP ≥135/85 mmHg indicates hypertension. Individual readings have little diagnostic accuracy.