Blood Pressure measurement

“The measurement of blood pressure is the clinical procedure of greatest importance that is performed in the sloppiest manner.”

The ‘silent killer’

Causes death from:

- Strokes
- Heart Attacks
- Peripheral Vascular Disease

If untreated, leads to:

Renal failure, heart failure

Thresholds for intervention

- BP ≥ 220/120 mmHg: treat immediately
- BP >180-189/110/119 mmHg: confirm over 1-2 weeks, then treat
- BP 160-179/100-109 mmHg: with CVD complications: confirm over 3-4 weeks, then treat
- BP 140-159/90-99 mmHg: with CVD risk confirm over 12 weeks, then treat.

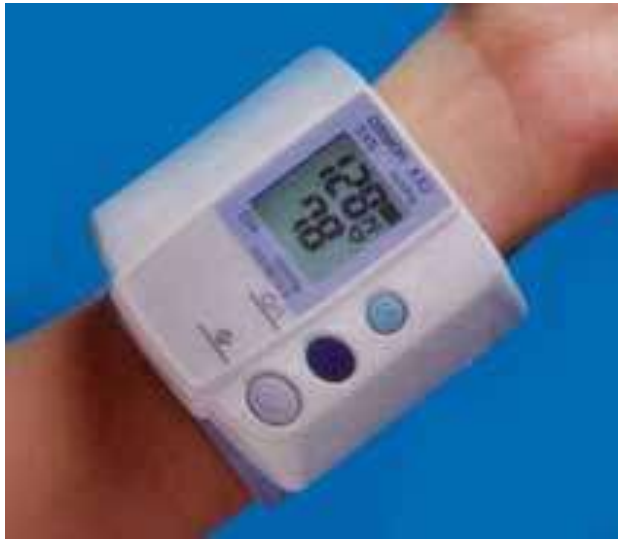
Blood pressure measurement sources of error

- Errors due to manometer
- Errors due to cuff
- Errors due to the observer
- Errors due to the patient.

Which machine?

- Every practice should be using a validated manometer
- All manometers should be recalibrated and serviced annually


120
80
65



Manometers – electronic advantages

- You can effortlessly take several readings
- Meanwhile you can check pt records
- Some ‘whitecoat’ effect can be detected
- You can rely on the readings of other health care professionals.

(These advantages partly outweigh the disadvantage of the possible, slight inaccuracy of some devices).

Manometers – automatic disadvantages

- Inadequate choice of cuff sizes
- Large cuffs are long enough but too deep
- Need for the equivalent of the ‘alternative adult cuff’ only available with the mercury manometer.

BP measurement

- Three or more readings, separated by 1 minute
- Discard first reading and average last two
- If large difference take further readings.

BP measurement -cuffs

- Cuff too small or too big
- Normal cuff too small for 15% of patients
- Cuff not level with the heart
- Leaky rubber tubing or bladder*
- Faulty inflation/deflation device*

* Applies to mercury manometers only.

Which arm?

- 6% of hypertensives can have as much as a 10 mmHg difference between arms
- If BP higher in one arm than the other, this arm must be used from then on
- Document this in records so that everyone uses the same arm.

Technique

- Patient seated and relaxed, not talking, legs uncrossed
- Tight arm clothing removed
- Correct cuff size
- Arm supported with cuff horizontal with heart
- Inform patient of discomfort and that several measurements will be taken
- Mercury manometer on firm and level surface at eye level
- Locate brachial or radial pulse.

Technique – cont'd

- Place stethoscope gently over brachial artery
- Inflate mercury rapidly, 30 mmHg above occlusion of pulse
- Deflate very slowly, 2 mmHg per second
- Record first of regular sounds (systolic BP)
- Record diastolic as disappearance of sound
- Record measurements to the nearest 2 mmHg
- Repeat twice more and average last two.

TAKING A BLOOD PRESSURE VIDEO

- https://geekymedics.com/blood-pressure-measurement/

BP measurement - observer

- Mercury column not level with the eyes
- Failure to hear the Korotkoff sounds
- Wrong diastolic endpoint (K4 or K5)
- Subjective detection of Korotkoff sounds
- Rapid cuff deflation
- Single one off reading.

Stethoscope

‘I have never managed to communicate to any patient, that there is really no point in trying to talk to me when I am using a stethoscope’.

Gardiner – Hospital Doctor - 1993

Stethoscope

- Good quality
- Short tubing
- Well fitting ear pieces (cleaned regularly)
- Place gently over the brachial artery
- Avoid touching the cuff and tubing.

Posture

- Routine - seated
- Standing in patients with symptoms or diabetic (diabetic nephropathy) and the elderly
- Supine position unnecessary, inconvenient and cuff position often below the heart.

BP measurement - patient

- Anxiety and unfamiliarity
- Animated discussion about the latest news
- Ambient temperature
- Full bladder!
- Postural hypotension
- Difference between arms.

Patient

- Consent is taken as read when patient rolls up sleeve
- Explain the procedure, that it may be a little uncomfortable and that several readings will be taken
- Seated, relaxed, not speaking
- Tight arm clothing removed
- Arm supported (not hyper extended) with cuff level with the heart.

Explanation to the patient

- Tell the patient their blood pressure reading
- Write BP down – use co-operation cards
- Give relevant leaflets/booklets on life style issues (not too many at a time)
- Reassure patient that this is a risk factor not a disease (unless left untreated)
- Do not lose to follow-up.

‘White coat’ hypertension

- Effective method of diagnosing a rise in blood pressure associated with having blood pressure measured
- Maybe from anxiety
- 10-20% of subjects labelled ‘hypertensive’ may have ‘white coat’ effect.

Ambulatory blood pressure measurement (ABPM)- indications

- Borderline hypertension
- White coat hypertension
- Isolated systolic hypertension
- Nocturnal blood pressure
- Resistant hypertension
- Hypotensive symptoms.

Abnormal Blood Pressure

- Blood pressure **abnormalities** may include:
- **Hypertension:** blood pressure of greater than or equal to 140/90 mmHg if under 80 years old or greater than or equal to 150/90 mmHg if you're over 80 years old.
- **Hypotension:** blood pressure of less than 90/60 mmHg.
- **Narrow pulse pressure:** less than 25 mmHg of difference between the systolic and diastolic blood pressure. Causes include aortic stenosis, congestive heart failure and cardiac tamponade.
- **Wide pulse pressure:** more than 100 mmHg of difference between systolic and diastolic blood pressure. Causes include aortic regurgitation and aortic dissection.
- **Difference between arms:** more than 20 mmHg difference in blood pressure between each arm is abnormal and may suggest aortic dissection.

Management of High blood Pressure

- Lifestyle changes :quitting smoking, drinking alcohol in moderation, maintaining a healthy weight, reducing dietary sodium, and staying physically active.
- Not all patients with hypertension need antihypertensive drug therapy.
- In fact, medication is generally suggested for only patients with out-of-office daytime blood pressures higher than 135mm Hg systolic or higher than 85 mmHg diastolic, or an average office blood pressure higher than 140/90 mmHg if out-of-office readings aren't available.
- Specifically they need to have at least one of the following: cardiovascular disease, type 2 diabetes mellitus, chronic kidney disease, be over 65 years old, or have an elevated risk of coronary artery disease.
- On the flip side, it's generally recommended not to give antihypertensive medication to patients with stage 1 hypertension and are either over age 75 years old or have no organ damage.

Home monitoring

- Gives patients empowerment
- May improve medication concordance
- Device used must be validated
- Multiple **day** time recordings, over 7 days (eliminating ‘white coat’ effect) with BP taken in the morning and evening
- First 24 hour readings should be discarded
- Home measurements usually lower than clinic readings.

Conclusion

- Stage1 hypertension is 130-139/ 80-89
- Stage 2 if systolic greater than 140 and diastolic greater that 90
- First line treatment is lifestyle changes such as diet, exercise and stress reduction
- Drug therapy if blood pressure vert high or risk of adverse events
- If unsure and patient looks unwell, call a senior clinician.