Blood pressure

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Blood pressure measurements assist with assessment of a patient’s cardiovascular status. They reflect the pressure exerted by blood on the wall of blood vessels.

Anatomy and physiology

The body relies on blood pressure to deliver essential oxygen to – and remove waste products from – tissues, cells and vital organs. It is maintained by a combination of neural, chemical and renal controls. Blood pressure is dependent on cardiac output, blood volume in the cardiovascular system and peripheral resistance. It is made up of two parameters:

- **Systolic pressure** – the higher pressure – is an indication of the integrity of the heart, arteries and arterioles, and reflects the higher pressure in the major arteries after ventricular systole (contraction);
- **Diastolic pressure** – the lower pressure – indicates blood vessel resistance and is the minimum pressure after ventricular diastole (Dougherty and Lister, 2004).

Korotkoff’s sounds

The various noises heard when taking a blood pressure are known as Korotkoff’s sounds:

- **Phase one** is the appearance of faint yet clear tapping sounds, which gradually increase in intensity;
- **Phase two** is the softening of sounds, which may sound like blowing or swishing;
- **Phase three** is the return of sharper sounds that do not regain the intensity of phase one;
- **Phase four** is a distinct muffled sound, which becomes soft and blowing;
- **Phase five** is silence.

Preparation

- The equipment – an electrical device or stethoscope and sphygmomanometer – should be checked to ensure it is in working order to minimise reading errors.
- The patient should be given an explanation of why their blood pressure is being taken and the procedure itself, so that informed consent can be obtained.
- It is also important to reassure the patient and allay any anxieties, as these may affect the reading.
- Ensure the correct cuff size is used. Incorrect size may result in inaccurate readings. Most national guidelines advocate a large cuff for all patients (Mulrow, 2001).

The procedure

- If possible, ensure the patient has rested in a quiet environment before starting the procedure to minimise inaccurate readings from recent exercise or exertion.
References


Keywords

- Observations
- Assessment
- Blood pressure

Manual reading
- Estimate the systolic pressure (Fig 3). Allow the cuff to deflate and wait 15–30 seconds.
- Place stethoscope bell over the brachial artery with the pump valve closed (Fig 4).
- Re-inflate the cuff to 20mmHg or 30mmHg above the estimated systolic pressure. Deflate the cuff by releasing the valve at about 2mmHg/second (Fig 5), noting the systolic pressure when Korotkoff’s sounds are heard in phase one and phase five (Dougherty and Lister, 2004). Round up to the nearest 2mmHg.

Electrical device
- Place the cuff on the patient’s arm and press start (Fig 6). Remind the patient the cuff may tighten considerably before starting to deflate.

Recording the results
- Document the readings immediately and compare against normal values, taking into consideration the patient’s condition and any pre-existing factors.
- For first assessments, measure blood pressure from both arms; the side with the higher reading should be used thereafter (McAlister and Straus, 2001).

Contraindications
Patients with a side affected by stroke, mastectomy or renal fistula should avoid having blood pressure readings taken on this side.
- If a patient has an IV catheter in one arm, use the other arm to take the reading to prevent potential damage to the catheter and interruption of administration of medication.

Common causes of error
- Accuracy may be affected by patient anxiety and the cuff position and size.
- Pressing down on the stethoscope bell can place too much pressure on the brachial artery, which may affect the reading.
- Poor understanding of Korotkoff’s sounds. The practitioner needs to understand the different sounds to take the reading at the appropriate time.

Professional responsibilities
Any health care worker measuring blood pressure must receive approved training and complete supervised practice. It is the individual’s responsibility to ensure their theoretical and practical knowledge and skills are maintained. Local protocols and guidelines must be adhered to at all times.