

Examination of CVS PART 1

DR UMMAR

PULSE

- A pulse wave is a waveform that is felt by the finger, produced by cardiac systole which traverses the arterial tree in a peripheral direction at a rate much faster than that of the blood column.

EXAMINATION

- Rate,
- Rhythm
- Volume
- Character
- A-P deficit
- Condition of vessel wall
- R-F delay
- Whether felt in all peripheral locations & symmetry.

- Radial pulse – Rate & rhythm
- Carotid pulse – Vol & character
- Brachial pulse – BP.

RADIAL PULSE

- Feeling for the waveform is not useful here as it is too far from the heart.
- Use your 1st and 2nd fingers to feel just lateral to the tendon of the flexor carpi radialis and medial to the radial styloid process at the wrist.



BRACHIAL ARTERY

- Brachial artery :Feel at the medial side of the antecubital fossa, just medial to the tendinous insertion of the biceps.



CAROTID ARTERY

- This is the best place to assess the pulse volume and waveform.
- Find the larynx, move a couple of centimetres laterally and press backwards medial to the sternomastoid muscle.
- Be sure not to compress both carotids at once for fear of stemming blood flow to the brain particularly in the frail and elderly.



FEMORAL ARTERY

- This is another useful place for assessing the waveform unless there is disease or abnormality in the abdominal aorta.
- The patient is usually stripped to their underwear by this point in the examination and should be lying on a bed or couch with their legs outstretched. The femoral pulsation can be felt midway between the pubic tubercle and the anterior superior iliac spine.



POPLITEAL ARTERY

- This lies deep in the popliteal fossa and is surrounded by strong tendons. It can be difficult to feel and usually requires more pressure than you expect.
- With the patient lying flat and knees slightly flexed, press into the centre of the popliteal fossa with tips of the fingers of the left hand and use the fingers of the right hand to add extra pressure



POSTERIOR TIBIAL

- Palpate at the ankle just posterior and inferior to the medial malleolus.



DORSALIS PEDIS

- This runs lateral to the exterior hallucis longus tendon on the superior surface of the foot between the bases of the 1st and 2nd metatarsals.



PULSE RATE

- Counted for 1 full min by palpating the radial artery.
- Normal pulse rate – 60-100/min.
- Sinus bradycardia - <60/min.
- Sinus tachycardia - >100/min.

PULSE RHYTHM

- Normal sinus rhythm - Regular
- Young patients – phasic variations d/to “Sinus arrhythmia”.
- Regularly irregular rhythm – Atrial tachyarrhythmias with fixed AV block, ventricular bigemini, trimgemini.
- Irregularly irregular rhythm – Atrial / ventricular ectopics, AF, Atrial tachyarrhythmias with variable AV block

PULSE VOLUME

- Assessed by palpating Carotid artery. (closest to heart & least subjected to damping & distortion in arterial tree)
- But Pulse Pressure gives accurate measurement of pulse vol.
- When PP between 30-60mmHg – Normal vol pulse. <30mmHg - Small vol pulse. (Heart failure) >60mmHg - Large vol pulse. (AR)
- Pulse vol depends on SV & Arterial compliance

PULSE CHARACTER

➤ **Hyperkinetic pulse:**

- Rapid rise
- High amplitude (Large vol & wide PP)

➤ **Collapsing/Water-Hammer/Corrigan's pulse :**

- Rapid upstroke (High SBP) – d/to increased SV
- Rapid downstroke (Low DBP) – d/to diastolic run off to LV / to periph
- Large SV volume → stretching of carotid arteries → aortic sinus reflex
↓ reduced peripheral vasc resist

➤ **Pulsus bisferiens :**

- Single pulse wave with 2 peaks in systole.
- Best felt in Brachial & Femoral artery.
- D/to ejection of rapid jet of bld through aortic valve.

➤ **Pulsus Dicroticus :**

- Single pulse wave with 2 peaks – one in systole & other in diastole,
- d/to very low SV & decreased peripheral resistance

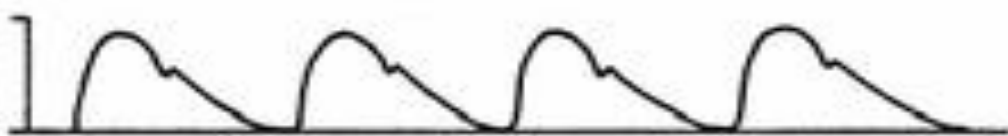
➤ **Pulsus alterans :**

- Alternating small & large vol pulse with irregular rhythm.
- Best appreciated by palpating radial & femoral pulses.

➤ **Pulsus paradoxus :**

- During Inspiration - ↑sed RV Vol & Stroke Vol but; ↓sed LV svolume & SV. Therefore, Fall in BP during inspiration.
- When the fall in BP during inspiration - >10mmHg ↓ Pulsus Paradoxus.

Normal pulses



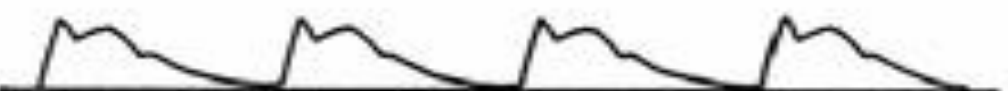
Small and weak pulses



Large & bounding pulses



Bisferiens pulses



Pulsus alternans



PULSE DEFICIT

- Difference between HR & PR when counted simultaneously for 1min.
- Heart beats which follow short diastolic interval ↓ Not able to generate sufficient pressure. Hence, not palpable at the radial artery.
- Deficit >10/min is most likely AF. VPCs.

➤ **RF DELAY:**

- Delay of femoral pulse compared with radial pulse.
- Seen in CoA

BLOOD PRESSURE

- The lateral force exerted by the bld column per unit area of the vascular wall that is expressed in mmHg.
- Measured by “Sphygmomanometer”.
- KOROTKOFFS SOUNDS
- I – 1st appearance of clear, tapping sounds. Represent SBP.
- II – Tapping sounds are replaced by soft murmurs.
- III - Murmurs become louder.
- IV – Muffling sounds.
- V – Disappearance of sounds. Corresponds to DBP.

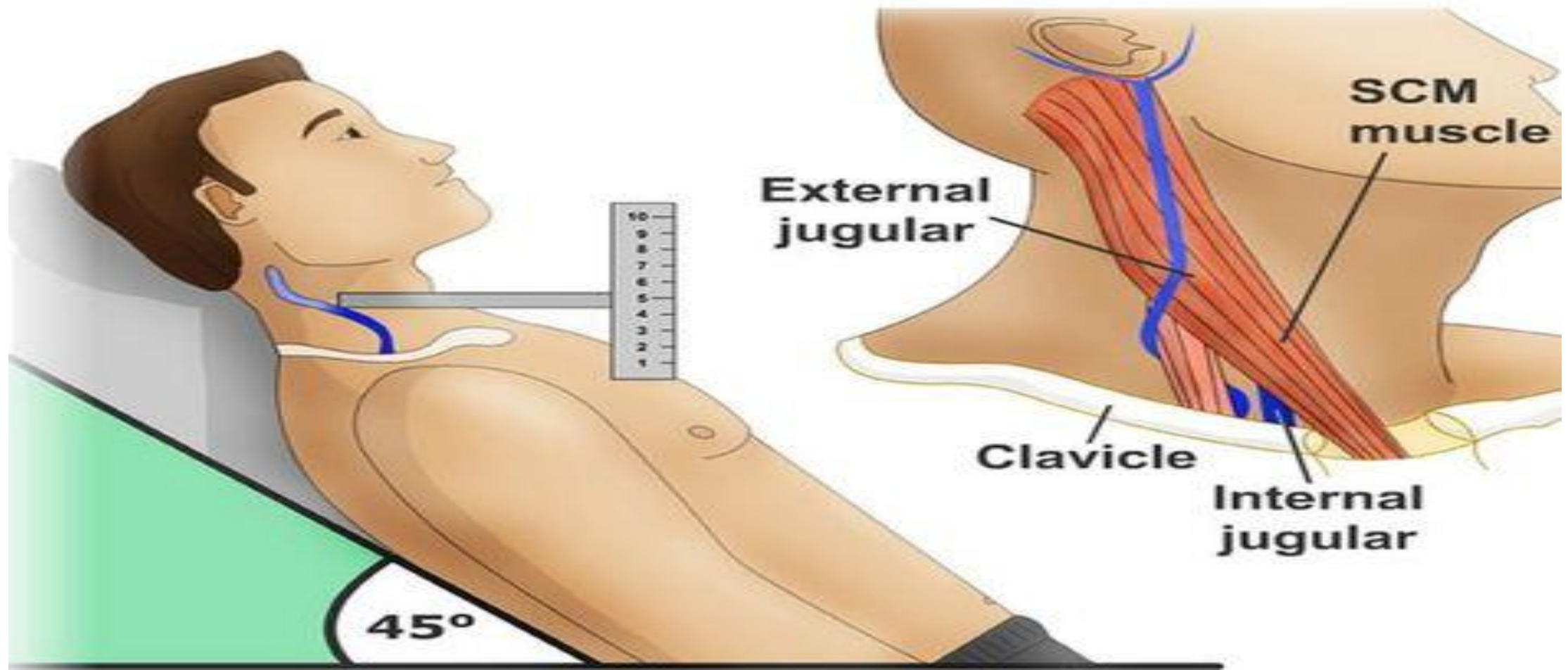
DIMENSIONS OF BP CUFF

- Length of the bladder – twice that of width.
- Avg. length of bladder - 25cms.
- Air bag in the cuff – extend for atleast 2/3rd of arm length & circumference.
- Mid-portion of air bag should lie over the brachial artery.
- Inflate the cuff to >20mmHg above sounds disappear.
- Deflate the cuff @ 2-3mmHg/sec.
- Manometer @ the same level of the cuff & observer's eye

JUGULAR VENOUS PRESSURE

- Expressed as vertical height from the sternal angle to the zone of transition of distended & collapsed IJV.
- Normal – approx 5cms when recorded in reclining pos at 45 angle.
- R-IJV is selected because;- larger, straighter & has no valves.
- IJV is situated between 2 heads of sternocleidomastoid.

Jugular venous pressure



JVP

- a wave: caused by atrial contraction. Seen just before the carotid pulse.
- c point: slight AV-ring bulge during ventricular contraction.
- x decent: atrial relaxation.
- v wave: tricuspid closure and atrial filling.
- y decent: ventricular filling as tricuspid valve opens

EXAMINATION OF PRECORDIUM

- Inspection: Look for
- Scars.
- Any abnormal chest shape or movements .
- Pacemaker or implantable defibrillator usually implanted over the left pectoral region.
- Any visible pulsations.

- PALPATION:
- Fingertips – To feel pulsations
- Base of fingers – Thrills,
- Base of hand – Heaves

Apical impulse

- The lowermost & the outermost point of maximum cardiac impulse from the sternum & the clavicle at which the cardiac impulse is felt.
- Produced by the LV & LV portion of IVS.
- Normal site • Confined to only 1 ICS.
 - Area of 2.5 sq.cm.
- Normal duration of thrust - <1/3rd of systole.

Parasternal impulse

- Grading (AllMS grading) :
- I – Visible but not palpable.
- II – Visible & palpable & obliterable.
- III – Visible & palpable but not obliterable.
- Seen in RV enlargement or LA enlargement.

Thrills :

- Palpable equivalents of murmurs.



Fig. 3.19: Palpating the apical impulse with hand



Fig. 3.19: Palpating the apical impulse with hand



Fig. 3.20: Locating the apical impulse with the finger