THE CARDIOVASCULAR SYSTEM
PHYSICAL EXAMINATION

Overview

The cardiovascular examination should include the following:
- General inspection from the end of the bed.
- General examination of:
  - Hands / pulse
  - Arms (pulses, BP)
  - Face
  - Neck
- Examination of the chest
  - Inspection
  - Palpation
  - Auscultation
- Auscultation of the lung bases
- Examination of the feet/legs

Preparation

- Wash your hands
- Introduce yourself to the patient if you have not already done so and check the identity of the patient
- Ask the patient’s permission to carry out the examination
- Give a brief explanation to the patient before you start. Further explanation/instructions can be given as you proceed.
- Equipment
  - Stethoscope
- Patient position
  - Ideally the patient should be reclined at 45 degrees, hands by the side and chest exposed
  - In female patients, the bra will need to be removed for you to carry out the examination effectively. Do not expose the patient’s chest until you are ready to examine the precordium.

General Observations

- Check visually from the end of the bed. Note:
  - Obvious discomfort/pain, ease of movement and whether breathless
  - Colour – pallor, cyanosis
  - Items around the bed (e.g. ECG, GTN spray, IV infusions)
  - Prosthetic valves may be audible
**Hands**

- Inspect both hands; nails, back and palms.
  - You should be able to recognise, and know the significance of, the following: clubbing, splinter haemorrhages, anaemia, peripheral cyanosis, Osler’s nodes, janeway lesions. You may also note tar staining.
- Feel the radial pulse for at least 15 seconds. You should take note and understand the significance of the following:
  - Rate - beats per minute
  - Rhythm – is it regular, regularly irregular or irregularly irregular?
  - Character – slow-rising, plateau, collapsing, bisferiens.
  - Volume
- Compare both radial pulses for any asynchrony (radial-radial delay)

**Arms**

- Feel for both brachial pulses
  - Located medial to the biceps tendon at the cubital fossa
  - Note the character and volume
- Blood pressure
  - May need to be measured in both the right and left arm (certainly on the first occasion); standing (if the patient is at risk of postural hypertension) and supine.
  - May choose to leave this until the end of examination.

**Face**

- Gently pull down lower eyelids and ask the patient to look up. Inspect for:
  - Pale conjunctiva of anaemia
  - Corneal arcus and xanthalasma of hypercholesterolaemia
- Look for mitral facies – distinctive flush (malar flush) associated with mitral stenosis
- Ask patient to open mouth and then stick out their tongue
  - Look for central cyanosis
  - Note dental hygiene

**Neck**

- Check Jugular Venous Pressure (JVP)
  - With the head resting back on the pillow ask the patient to turn the head to the left
  - Look for pulsation along the right internal jugular vein.
  - The height of the pulsation is measured vertically in cm from the sternal angle. Add 5cm to get the JVP.
  - You should know how the JVP can be differentiated from carotid pulsation
- Carotid pulses
  - Located anterior to SCM.
  - Palpate one at a time.
  - Auscultate for carotid bruits
The Chest

INSPECTION

With the chest exposed look carefully for
- Scars, visible pulsation, pacemaker, abnormal chest shape.

PALPATION

Apex Beat
- Using the palmar surface of the fingers locate the lowermost lateral point that pulsation of the heart can be felt. This is the apex beat
  - Normally 5th intercostal space, left mid clavicular line.
  - Will be displaced in hypertrophy
- Note the character of the apex beat. You should be able to recognise and know the significance of common abnormalities
- If unable to feel the apex beat, roll the patient to the left bringing the heart into closer proximity to the chest wall and try again (however you cannot now comment on the location).

General Palpation
Place the hand flat onto the chest to the left and then to the right of the sternum. You should recognise and know the significance of:
- ‘Heave’ - A sustained forceful pulsation
- ‘Thrill’ – A palpable murmur felt as a shudder or vibration beneath the finger.

AUSCULTATION

On auscultation you need to be able to identify the first (S1) and second (S2) heart sounds, any additional sounds, such as an S3 or S4 and any valvular murmurs.

There is no standard order for auscultation, but it is common practice to start at the apex and proceed towards the base. The order suggested below is a logical one and results in minimal movement for the patient.

- Listen with the diaphragm of the stethoscope over the 4 main areas.
  - These areas do not relate exactly to the anatomical position of the valves. It is the area at which the sound of each valve is best heard.
- 5th intercostal space, left midclavicular line
  - Apex, mitral valve
  - S1 heard best here
- 4th intercostal space, left sternal edge
  - Tricuspid valve
- 2nd intercostal space, left sternal edge

Practice Tip!
Auscultation of the heart sounds requires practice. You need to listen to a lot of hearts to be familiar with the normal sounds. This is something you can practice on yourself as well as your colleagues

Practice Tip!
If you are unsure which is the first and second heart sound or where a murmur is occurring, palpate the carotid pulse while listening to the heart. The carotid pulse occurs with S1 or systole.
Pulmonary valve
- 2nd intercostal space, right sternal edge
  - Aortic valve
  - S2

If you hear a murmur you should note which area it is loudest, whether it occurs in systole or diastole and whether it radiates to any other area. Left-sided heart murmurs are accentuated by holding the breath in expiration and right-sided heart murmurs are accentuated by holding the breath in inspiration.

Murmurs can sometimes radiate to areas where heart sounds cannot normally be auscultated and may be exaggerated by certain manoeuvres. If you think you hear a murmur the following areas can be auscultated to help identify its origin.

- Listen over left axilla
  - Mitral regurgitation
- Roll the patient to the left, listen will the bell over the mitral area
  - Enhances auscultation of murmur of mitral stenosis
- Listen over carotid arteries
  - Aortic stenosis
- Sit the patient forward, ask them to breathe out and hold it while you listen over the 5th intercostal space at the left sternal edge.
  - Aortic regurgitation

While the patient is still sitting forward:
- Auscultate the lung bases for any evidence of pulmonary oedema.
- Inspect the sacrum for signs of peripheral oedema (in a bed bound patient this is the lowest point of gravity causing fluid to collect here).

**Feet**
- Inspect and palpate for peripheral oedema
  - Warn the patient as palpation may be tender
  - Press firmly over the tibia for five seconds and behind the medical malleolus and feel if an indentation remains afterwards.
  - If pitting is present, see how high up the legs it goes.

**Peripheral Oedema**
The site of oedema is affected by gravity therefore will gather at the ankles in a mobile patient and the sacrum in a seated patient.

**Completing the Examination**
- Abdominal exam for ascites, hepatosplenomegaly.
  - Signs of right heart failure
- Full peripheral vascular examination
  - Radial and brachial pulses, carotids, abdominal aorta, popliteal and foot pulses.
- Fundoscopy
  - In cases of diabetes, hypertension, endocarditis.
- Bedside investigations
  - Such as temperature and urine dipstick
  - Blood pressure if not done earlier.
- Cover patient / assist to redress if necessary
- Thank the patient