

Context for the session

The session objectives for this session are:

- Discuss common causes of chest pain and their key features
- Describe how to gather a history of a patient presenting with chest pain including risk factors and the patient's perspective
- Describe the key red flags in the assessment of chest pain
- Formulate a differential diagnosis in a patient presenting with chest pain
- Demonstrate the cardiovascular examination
- Outline the basic components of the ECG and demonstrate ECG interpretation

Students will have covered the following in the two-week chest pain block:

In **Case-Based Learning** students are asked to compare and contrast two different cases of: a 20-year-old man with central, sharp, chest pain (pericarditis); and a 52-year-old man with central chest pain (tight band) radiating into his left arm and jaw (STEMI)

In **Lectures, workshops and practicals**:

- Structures in the thorax that may give rise to pain
- Interpreting the ECG: normal variations in adults; stable angina, acute coronary syndromes, ST-elevation myocardial infarction; first degree, second degree and complete heart block; atrial fibrillation, and pulmonary embolism
- Systemic arterial hypertension and its complications
- Pathophysiology of ischaemic heart disease
- Investigation and risk factors for ischaemic heart disease and myocardial infarction
- Pharmacological manipulation of cardiac and vascular function
- Pulmonary Embolism
- Non-cardiovascular causes of chest pain: gastric/duodenal ulcer, pancreatitis, cholecystitis, biliary colic and peptic ulcer disease (including perforation), sickle cell crisis, familial mediterranean fever, anxiety and panic attacks, non-cardiac and medically unexplained chest pain.
- Using imaging to elucidate the cause of chest pain.

Specifics for chest pain in GP clinical contact

Introduction

As part of the “Chest pain” theme this fortnight, we would like you to discuss with your group how patients with chest pain present in practice. What you focus on depends on the patient(s) that you have invited to attend.

As with the previous sessions:

- refer to the [Year 2 GP handbook](#), which covers the information common to all sessions.
- use the suggested session plan below as a guide on how to use your time with your group

Please allow time for:

- introductions (reflecting on any learning/action points from previous sessions)
- student-led interaction with patient(s), and
- summing up at the end/planning for next session (with you this is urinary symptoms and thirst 6th March 2025)

Suggested session plan

• AM	PM	Activity	Details
0900	1400	Introduction 30 mins	•Take register •Check in with your students •Review the session plan and learning objectives •Brainstorm topic
0930	1430	Clinical interview 45 mins	Students practise taking a clinical history with a patient and presenting this to the GP/group, considering clinical reasoning.
1015	1515	Break 10 minutes	
1025	1525	Examination 45 mins	Students consider/practice relevant clinical examination and summarising findings to the GP/group
1110	1610	Break 10 minutes	
1120	1620	Debrief 30 minutes	•Discuss the day's cases & draw out learning points •Tutor Feedback
1150	1650	Wrap up 10 mins	•Summarise learning points and identify new learning needs •Plan for next time
1200	1700	Close	•Submit register

The above is only a guide, and GP teachers are at liberty to use the time flexibly, according to the patients met and group's needs.

(Expert) patients

Suitable patients for this block are:

- Someone with a history of chest pain e.g. stable angina or previous acute coronary syndrome
- Someone with a previous symptomatic heart rhythm abnormality, pericarditis or pleurisy
- Any patient with relevant history willing to undergo cardiovascular examination. It is useful (although not essential) that they have signs, such as abnormality of heart rhythm (e.g. AF), valve disease (aortic stenosis), heart failure or other signs of cardiac disease.

Tasks

Ask them to reflect on their previous case (Anaemia, blood and clotting)

- What information may be directly relevant to this session? e.g. anaemia and pulmonary embolism as causes of chest pain.

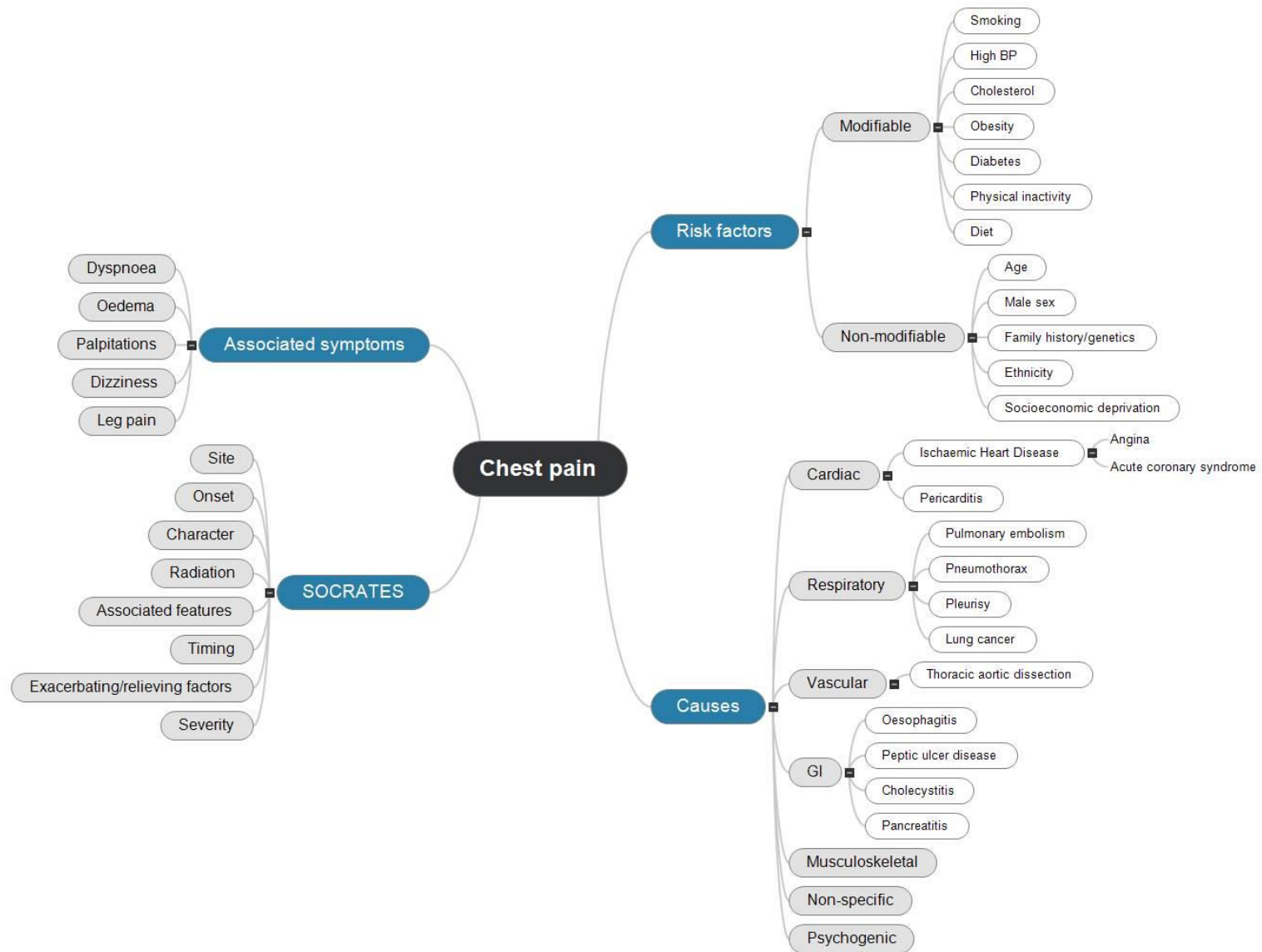
Assess their learning needs for this session

- What do students know about chest pain and its causes? (A suggested mind map is given on the next page)
- How do patients with these problems present?
- What are serious features that you look out for in a patient presenting with chest pain?
- What are the modifiable and non-modifiable risk factors?
- How do you assess a patient with chest pain?

Take the group through cardiovascular examination, with a volunteer patient; and one or two ECGs, starting from the basics.

Towards the end the session, get them to recap on what you've covered today, and ask them to each identify one or two learning points/things to look-up for next time.

Below is the information given to students via OneNote, before they attend the session.



Student information

In this clinical contact session, you will think about different types of chest pain, and how different causes of chest pain present.

You will meet patients and practice gathering information from the history in someone who has had chest pain or heart disease, and you will practice the examination of the cardiovascular system.

You will be asked to observe and give feedback to your colleagues using the examination checklists in this workbook.

Cardiovascular disease

Cardiovascular disease includes

- Coronary heart disease (myocardial infarction (MI) and angina)
- Cerebrovascular disease (transient ischaemic attack (TIA) and stroke)
- Peripheral vascular disease

In the UK there are approximately 2.3 million people living with coronary heart disease, 1.2 million with stroke or TIA, and 0.4 million with peripheral arterial disease.

The incidence of cardiovascular disease increases with age. Coronary heart disease is almost twice as common in men as women, and cerebrovascular disease is around a third more common in men.

Cardiovascular disease is the most common cause of mortality in the UK, accounting for around a quarter of all deaths.

What are the risk factors for cardiovascular disease?

There are many risk factors for cardiovascular disease. These can be divided into non-modifiable risk factors, and modifiable risk factors.

Table: Cardiovascular risk factors

Non-modifiable risk factors	Modifiable risk factors
• Age • Male sex • Family history • Ethnicity • Socioeconomic deprivation • Genetic factors	• Smoking • High blood pressure • High cholesterol • Obesity • Diabetes • Physical inactivity

By examining all these risk factors, doctors can predict who is at greatest risk of developing cardiovascular disease in the future. Those individuals can then receive lifestyle advice or drug treatment aimed at improving modifiable risk factors.

Causes of chest pain

Think about the anatomy of the thorax from superficial to deep and the structures in the thorax that can cause chest pain. Consider the pathology that you are aware of in these structures and how pathology in the different structures cause different types of pain and different presentations.

- Cardiac: Ischaemic heart disease – angina, Acute Coronary Syndrome (Unstable Angina, NSTEMI, STEMI), Pericarditis
- Respiratory: Pleurisy, Pulmonary Embolism, Pneumothorax
- Vascular: Thoracic Aortic dissection
- GI: Oesophagitis, Peptic Ulcer disease, cholecystitis or pancreatitis
- Musculoskeletal

History

What are the specific areas to cover in chest pain? What are the risk factors for cardiovascular disease?

- Assess the pain e.g. using SOCRATES

SITE • Where is the pain? • Can you point to it?	Cardiac pain tends to be diffuse and central. Costochondritis often tenderness over the upper sternum and costal cartilages. Tip: 70-80% of pain associated with an MI is reported in the middle/upper sub-sternal region and the pain is often described as “constricting” or a “crushing” sensation. However, sometimes the pain is atypical or even absent (a “silent MI”). It must be remembered that every patient is different, and they will not all present with the classic sub-sternal chest pain.
ONSET • How did the pain start?	A sudden onset of a severe pain indicates a serious cause such as an acute coronary syndrome, pulmonary embolism or thoracic dissection
CHARACTER • Can you describe the pain or discomfort? • Is it a dull ache, sharp, stabbing or crushing pain? • Does the pain change with repositioning?	Cardiac pain is often dull and heavy or constricting. Pleuritic pain is sharp and worse on inspiration. Tip: Repositioning tends not to change chest pain caused by ischaemia. If repositioning improves the pain, perhaps the issue is of musculoskeletal origin, pleuritic, or pericarditis (where the pain is sometimes relieved by sitting up and leaning forward)
RADIATION • Does the pain go anywhere else?	Roughly 66% of patients with an MI will experience radiating pain. Common sites include the anterior chest, shoulders and arms. Less common is pain that extends to the neck and jaw. Some patients may describe their pain radiating to the jaw and feeling like a dull ache or a tooth ache, whilst some may describe the radiation as a band around the ribs

ASSOCIATED FEATURES • Do you get any other symptoms with the pain? • Feelings of impending doom or fear?	Accompanying symptoms of acute coronary syndromes e.g. MI may include: • Nausea or vomiting • Sweating/clammy • Dizziness, feeling faint ACS and thoracic dissection may produce autonomic symptoms like nausea, vomiting and diaphoresis. The patient may also experience dizziness, hypotension and bradycardia or a feeling of impending doom and feeling scared. Aortic dissection can produce a neurological deficit.
TIMING • How long have you had the pain for? • Is the pain intermittent (starts and stops) or is it continuous (ongoing)?	Intermittent pain may be angina, gastroesophageal reflux or musculoskeletal pain. Tip: Angina typically lasts for 2-5 minutes if the precipitating factor is removed, for example exercise. Pain associated with an MI is usually persistent.
EXACERBATING/RELIEVING FACTORS • What makes the pain better? • What makes the pain worse?	Angina is worse on exertion, pleuritic pain on inspiration, musculoskeletal e.g. soft tissue or bone injury is worse with movement of the chest wall, pericarditis is often worse for lying down and better for sitting forward.
SEVERITY/SYMPTOMS • Can you rate the pain out of ten? • Any other symptoms?	

- Identify specific history and associated features of cardiovascular pain and distinguish from other causes of chest pain
- Associated cardiovascular symptoms
 - Specific history of heart failure as a complication e.g. exertional dyspnoea, oedema, orthopnoea, paroxysmal nocturnal dyspnoea
 - Palpitations; check frequency and rhythm (you can ask the patient to tap it out) and any associated symptoms e.g. light-headedness or chest pain with the palpitations.
 - Dizziness and blackouts; history of sudden faintness with or without loss of consciousness
 - Leg pain; intermittent claudication, acute ischaemia or symptoms of DVT
- Systems review

- **Past medical history.** What other medical problems does the patient currently have or have had in the past? Has the patient been admitted to hospital previously? When and why? Has the patient had any operations in the past? “Do you see your GP regularly for anything?”
 - In the context of chest pain: Risk of coronary artery disease is increased with diabetes, hypertension or hypercholesterolaemia. Ask about previous cardiovascular disease or thromboembolism. Malignancy raises the risk of recurrence, metastases, and risk of thromboembolism.
- **Medications:** Are patients on treatment that suggests previous cardiovascular disease, or to modify cardiovascular risk? Remember from the pharmacology block:
 - NIDDEM: Name, Indication, Details, Dates, Effects, Monitoring
 - 5 Cs: Complementary, over-the-Counter, Contraception, unCommon routes, Changes
 - 5 As: Allergy, Adverse effects, Adherence, Any interactions, Adjustment
- **Family history:** Risk of coronary artery disease is increased by a first degree relative with premature coronary artery disease (< 55 years in a man or <65 years in a woman)
- **Background:** What is the lifeworld of the patient? This encompasses the traditional “social history” e.g. occupation, living situation, smoking, alcohol intake but also includes activity levels, connectedness and risk factors. Smoking is an example of a modifiable risk factor for cardiovascular disease.
- **Patient perspective:** What are the patient’s ideas, concerns and expectations about what is going on and what will happen now? What impact are their symptoms having on them? What emotions are associated with the situation?

Cardiovascular examination

You should have an opportunity on clinical contact to either perform or observe and feedback on a colleague performing a cardiovascular examination. You are expected to continue to practice this in your own time.

Setting up for examination	Setting up: Use the acronym WIPPPE to help you remember what to do: • Wash hands • Introduce yourself and identify patient • Permission (gain from patient) • Position (45 degrees for CVS/resp) • Pain (check if patient has any pain) • Exposure (adequately expose patient)
General	General Appearance: Look at the patient from the end of the bed: Do they appear to be in pain? Do they look unwell? Are they breathless? Do they have any obvious scars such as a midline sternotomy scar from heart surgery? Are there any drips, inhalers, oxygen?
Hands and nails	Look for: - Clubbing. Here there is loss of the angle between the nail and the nail bed. Causes of clubbing include:

 Figure 1 Finger clubbing	Cardiac—endocarditis, cyanotic congenital heart disease, atrial myxoma. Thoracic—bronchial carcinoma, chronic lung suppuration (empyema/abscess, bronchiectasis, cystic fibrosis), fibrosing alveolitis. GI—inflammatory bowel disease, cirrhosis, GI lymphoma, coeliac disease Congenital.
 Figure 2 Splinter haemorrhage	Capillary refill time: press the nail bed of a finger measure the time it takes to return to the normal colour, it should be less than 3 seconds Palmar erythema Splinter haemorrhages (these can be caused by infective endocarditis or trauma) Rarer signs of infective endocarditis include Osler's nodes and Janeway lesions Dupuytren's contracture: This is a localised formation of scar tissue beneath the skin of the palm of the hand.
Radial pulse	Here it is important to assess the rate and the rhythm. For the rate count for 15 seconds and multiply by 4. Is the rhythm regular, irregularly irregular or regularly irregular? If irregular, you should feel the pulse for at least 30 seconds.
Respiratory rate	Count the respiratory rate by finding the number of breaths every 15 seconds and multiply by 4.
Collapsing pulse	This is a sign of aortic regurgitation. Lift the patient's arm into the air with the palm of your hand over the radial pulse, if the pulse is collapsing you will feel the pulse fall away under your fingers. It is important to do this for at least 30 seconds otherwise you may miss this sign.
Radio-radial delay and radio-femoral delay (including both femoral pulses)	
Blood pressure	Demonstrate correct method of measuring blood pressure, including applying cuff, inflating and deflating at right rate, and identifying Korotkov sounds. Identify clearly raised level of blood pressure.
Face	Assess for pallor and malar flush (this is a sign of mitral stenosis)
Eyes 	Xanthelasmata, anaemia, corneal arcus Check fundi for hypertensive or diabetic retinopathy.
Mouth	Examine tongue, for central cyanosis
Neck	Palpate the carotid pulse Assess the jugular venous pressure (JVP)
Chest	Inspection: particularly look for scars such as midline sternotomy scars (below), lateral thoracotomy scars or pacemakers. Chest wall deformity. Palpation Palpate the apex beat (remember that the normal position is the 5th intercostal space in the midclavicular line). If it

	is difficult to feel at first, you can ask the patient to lean to their left side. Feel for thrills and heaves Auscultation Try to identify the first and second heart sounds. Listening to the heart takes practice and is a difficult skill to master. You will need to listen to lots of 'healthy' hearts first to work out what normal heart sounds should be.
Auscultation  The first heart sound, or lub, S1 is produced when the tricuspid and mitral valves simultaneously close. This marks the onset of systole, or ventricular contraction. The simultaneous closing of the pulmonary and aortic valves produces S2 or dub. S2 marks the end of systole. The brief silent period between S2 and S1 represents diastole, or ventricular relaxation. During diastole the ventricles fill with blood coming from the atria.	Compare heart sounds to pulse. See if you can hear the heart sounds, then if you can hear any added sounds, if so, are they systolic or diastolic? Detect clear cardiac murmur and classify as systolic or diastolic • Mitral: 5th ICS Mid-Clavicular Line • Aortic: 2nd ICS R parasternal border • Tricuspid: 4th ICS L parasternal border • Pulmonary: 2nd ICS L parasternal border • Carotid arteries (both sides for bruit) listen with the patient holding their breath. • Once you've listened in all areas with the diaphragm, roll patient to the left lateral position, use the bell of stethoscope at apex (for mitral stenosis) • Help the patient sit upright. Ask the patient to hold their breath and listen over the carotids for bruits and radiation of aortic stenosis. • Ask the patient to breathe all the way out and then hold their breath. Listen over the left sternal edge for the blowing diastolic sound of aortic regurgitation.
Sacrum	Feel at the base of the spine for sacral oedema.
Lungs	Listen at the bases of the lungs for any crackles (this can be a sign of pulmonary oedema). Crackles are usually an inspiratory sound and may be coarse or fine.
Abdominal examination	Bruits: a bruit represents turbulent blood flow. Listen inferior to the umbilicus and to either side for renal artery bruits. Also listen for over the femoral arteries and aorta for bruits.
Lower limb	With the patient sitting back again, examine the feet and ankles for: Signs of ischaemia: blue toes and feet, loss of hairs on the front of the legs, ulcers. Venous disease: brown pigmentation from haemosiderin, dilated large and small veins, ulcers. - Peripheral oedema. This can be uncomfortable so warn the patient and be gentle. Use your index +/- middle finger and press where there is swelling and see if there is an impression of pressure when you lift your fingers up. Palpate the dorsalis pedis and posterior tibial pulses.

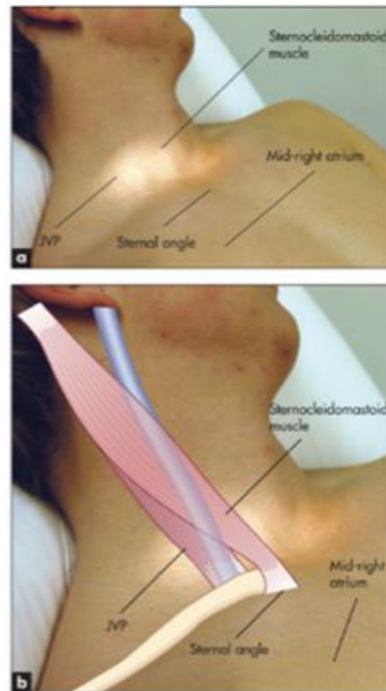
Closing

Thank the patient and help them to get dressed. As the patient if there is anything you can do for them before you leave. Remember to wash your hands.

Blood pressure measurement general tips:

1. The patient must be rested for at least 5 minutes before having their blood pressure taken
2. Ensure that the arm is supported at the level of the heart
3. The bladder or the sphygmomanometer should be over the brachial artery (there is usually a marker for the artery) and it covers about 80% of the arm circumference
4. Put the *right-sized cuff* on tightly enough so it does not slip off
5. Palpate the brachial artery
6. Pump up the cuff while keeping your finger on the pulse. When you can no longer feel pulsation go up another 30 mmHg
7. Then put your stethoscope over the artery
8. Slowly lower the pressure 2-3 mm/second listening for when the first noise appears (1st Korotkoff sound)
9. This is the **systolic pressure**. Record to the nearest 2mm/Hg
10. Let the pressure drop again
11. Keep going down until the sounds disappear altogether (5th Korotkoff sound). This is the **diastolic pressure**

Assessing the Jugular venous pressure (JVP)

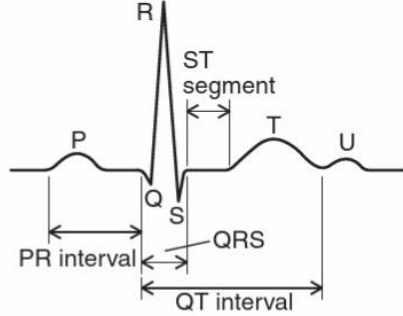
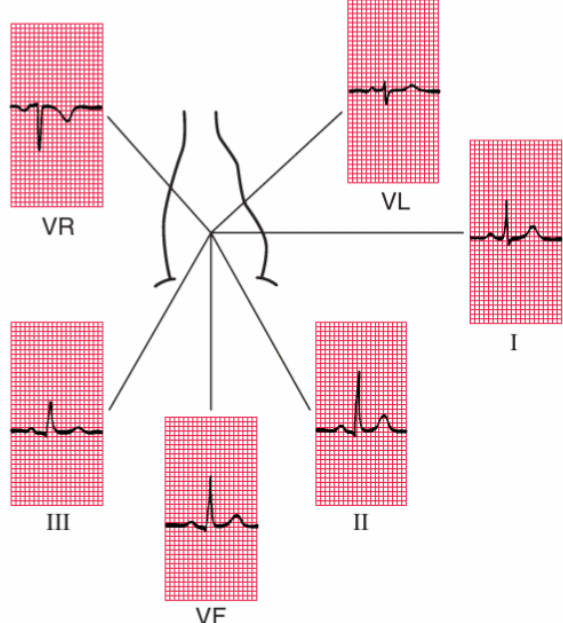


The JVP can be a difficult sign to elicit.

- Recline the patient is at an angle of 45 degrees. Ask them to relax their head back on the pillow and turn towards you and check they are comfortable.
- Look at the left side of their neck for the internal jugular which has a pulsation visible behind the sternocleidomastoid muscle.
- The JVP gives a proxy measure of right atrial pressure, and the most common cause of an elevated JVP is heart failure.
- The JVP is measured vertically from the sternal angle and should be less than 4cm high.

Reading an ECG

One large square = 0.2s; one small square = 0.04s

ECG complex: • P: atria contraction • QRS: ventricular contraction • T: repolarisation • U: origin uncertain (not often seen, may be pathological if it follows a flattened T wave)	
Leads "view" of the heart: • I, II and VL: left lateral surface • III aVF: inferior surface • VR: right atrium • V1-V6: horizontal plane, from front and left-hand side	

General approach to assessing:

- Rate, rhythm and axis
- P wave
- PR interval
- QRS wave
- QT interval
- ST segment
- T wave
- Escape rhythm

Resources

Chest pain

Clinical Knowledge Summary:

- Chest pain <https://cks.nice.org.uk/topics/chest-pain/>

NICE Clinical Guideline 95 (2016): Recent-onset chest pain of suspected cardiac origin: assessment and diagnosis. <https://www.nice.org.uk/guidance/cg95>

Cardiovascular examination:

[Cardiovascular Examination - OSCE Guide | Geeky Medics](#)

ECGs

[How to Read an ECG | ECG Interpretation | EKG | Geeky Medics](#)

eBooks (available via www.bristol.ac.uk/library):

- J R Hampton & J Hampton. The ECG made Easy. Ninth edition, Elsevier, 2019.