

Cardiology SBA Questions

Questions were made by students on behalf of The Peer Teaching Society. We hope there are no mistakes but are not liable for any false or misleading information.

1. A 59-year-old male presents in A&E with a crushing chest pain that radiates to the jaw or shoulder for the past 30 minutes. He also feels short of breath and nauseous. O₂ is 96% and you carry out an ECG and note that there is ST elevation in leads V3, V4.

What part of the heart is likely to be affected by this MI?

- a) Superior
- b) Anterior
- c) Inferior
- d) Left lateral
- e) Right lateral

2. An ECG is taken on someone suspected of suffering a myocardial infarction. They show abnormalities in leads II, III, and aVF.

Which coronary artery is most likely to be implicated?

- a) Septal branches only of the LAD
- b) Left anterior descending
- c) Left coronary artery
- d) Right coronary artery
- e) Circumflex artery

3. A 59-year-old male presents in A&E with a crushing chest pain that radiates to the jaw or shoulder for the past 30 minutes. He also feels short of breath and nauseous. O₂ is 96% and you carry out an ECG and note that there is ST elevation in leads V3, V4.

Which would not be involved in your acute management of this STEMI?

- a) Aspirin
- b) Morphine
- c) Nitrates
- d) Oxygen
- e) All of the above options would be indicated

4. A 59-year-old male has recently suffered a myocardial infarction. The junior doctor looking over the medications in his discharge summary and notices a mistake.

Which of the following would not be involved in the management of a previous MI if there was no contraindications?

- a) Aspirin
- b) Verapamil
- c) Atorvastatin
- d) Propranolol
- e) Ramipril

5. Which of the following is not a chest x-ray finding in chronic heart failure?

- a) Pleural effusions
- b) Kerley B lines
- c) Cardiomegaly
- d) Alveolar oedema
- e) Dilation prominent in lower lobe vessels

6. Which of the following may show ST-segment elevation on an ECG?

- a) Unstable angina
- b) Prinzmetal angina
- c) Cardiomyopathy
- d) Stable angina
- e) NSTEMI

7. A 70-year-old female presents to her GP with a history of progressive shortness of breath with exertion over a period of 4 months with no associated chest pain. She has a past medical history of type 1 diabetes mellitus which is well controlled and currently takes amlodipine 10mg once daily for hypertension. On further questioning, the patient has also mentioned that she is often breathless whilst lying in her bed at night. On physical examination there is mild hepatomegaly and pitting oedema. Which of the following blood investigations is most appropriate at this stage?

- a) Urea and electrolytes
- b) HbA1c
- c) B-type natriuretic peptide
- d) Blood Cultures
- e) Atrial natriuretic peptide

8. A 25-year-old male attended to A&E due to sudden onset of palpitations in his chest. He described this as his heart was skipping a beat. On examination it was found that the patient had a SVT.

Which of the following would be the most appropriate in the acute management of this patient to return to normal sinus rhythm?

- a) Valsalva manoeuvre
- b) Amiodarone
- c) Atropine
- d) DC cardioversion
- e) Adrenaline

9. A 70-year-old man has a routine check-up at his local GP. He is found to have a new diagnosis of atrial fibrillation after an ECG.

Which of these is a tool that assesses starting anticoagulation in patients with stroke risk due to atrial fibrillation?

- a) ABCD2
- b) HAS-BLED
- c) CHA2DS2-VASc
- d) QRISK3
- e) Well's Criteria

10. A 76-year-old woman present to her GP with shortness of breath on exertion. She felt it has been gradually worsening over the past 6-months. She denies any chest pain but says that she wakes up in the middle of the night gasping for breath. Her legs are oedematous on examination.

Which of these investigations is first line for her diagnosis?

- a) CT Chest
- b) B-Natriuretic peptide
- c) Ankle brachial pressure index (ABPI)
- d) Echocardiogram
- e) ECG

11. A 54-year-old woman presents with shortness of breath on exertion, fatigue, and palpitations. On examination, her jugular venous pressure is elevated, and a pan-systolic, high-pitched “whistling” murmur is heard. The murmur radiates to the left axilla.

What is the likely cause of the murmur?

- a) Mitral regurgitation
- b) Mitral stenosis
- c) Aortic stenosis
- d) Aortic regurgitation
- e) Hypertrophic cardiomyopathy

12. A 63-year-old black man presents for a check-up at his GP. He has no significant past medical history but admits to a poor diet. His blood pressure is 153/95 mmHg and the GP wants to start medical management.

Which of the following medications is most appropriate?

- a) Amlodipine
- b) Ramipril
- c) Bisoprolol
- d) Candesartan
- e) Indapamide

13. What is the most appropriate diagnostic investigation for aortic stenosis?

- a) Chest X-ray
- b) ECG
- c) Echocardiogram
- d) Auscultation
- e) Exercise tolerance test

14. A 82-year-old woman came to clinic to receive her COVID-19 vaccine. Shortly after its administration she felt short of breath and a rash started developing all over her body. She collapsed a minute later.

What is the first medication which should be administered?

- a) Salbutamol
- b) High flow oxygen
- c) Adrenaline
- d) IV fluids
- e) Chlorpheniramine

15. A 45-year-old male recently had a coronary artery bypass graft (CABG) after suffering an myocardial infarction 2 weeks ago. He now has a sharp pain in his chest which is radiating to his left shoulder and is worse when he takes a deep breath in. He says the pain is lessened when he is sat forward compared to when he is lying flat. On examination, his vital signs are normal and there are no murmurs on auscultation. His troponin blood test comes back normal.

What is the most likely diagnosis?

- a) Pericarditis
- b) Interstitial lung disease
- c) Endocarditis
- d) Myocardial infarction
- e) Aortic dissection

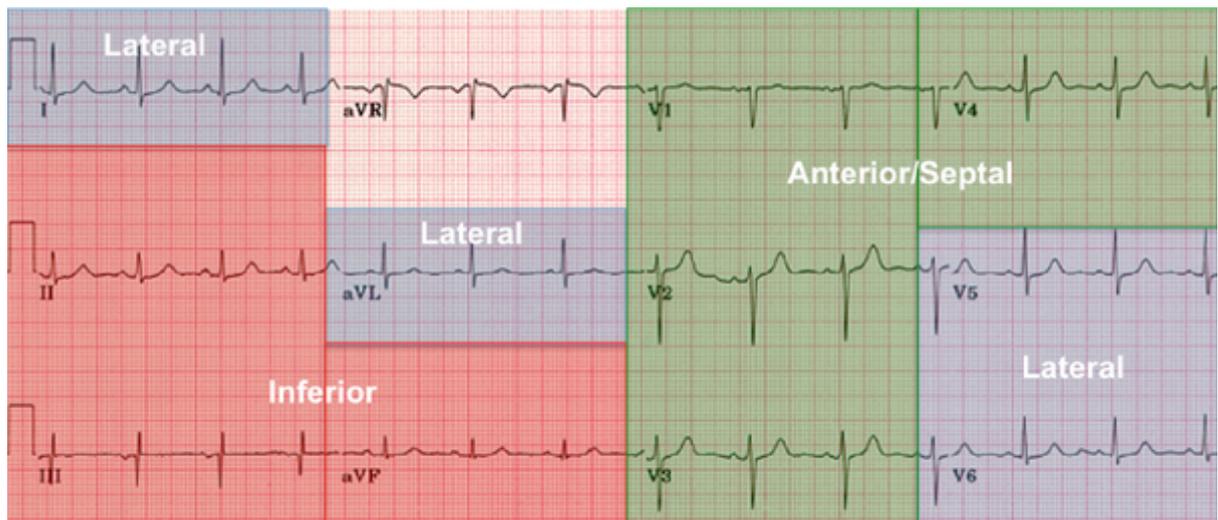
16. A 75-year-old man presents to his GP with recurrent, intermittent, sudden-onset chest pain and shortness of breath. He reports that he often tires easily climbing the stairs in his house. It has now worsened, and he experiences the pain more often even at rest. Past medical history is significant for hypertension and type II diabetes. An ECG demonstrates mild ST-segment depressions in V1-V2. Cardiac troponins are not elevated.

What is the most likely diagnosis?

- a) NSTEMI
- b) STEMI
- c) Prinzmetal angina
- d) Stable angina
- e) Unstable angina

1. B

V1-4 shows the anterior/septal region of the heart. See diagram below.
This typically shows as an infarction in the left anterior descending (LAD) artery

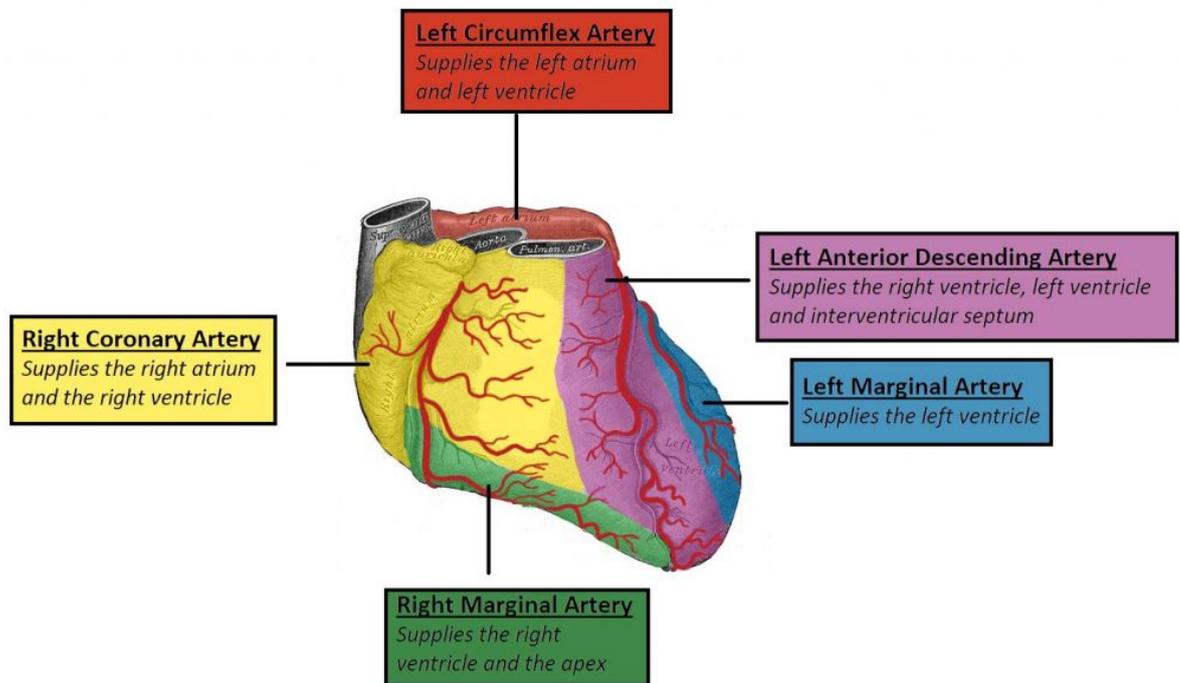


Coronary Anatomy & ECG Leads

Lateral Leads	I, aVL, V5 – V6	LCx or Diagonal of LAD
Inferior Leads	II, III, aVF	RCA and/or LCx
Anterior/Septal Leads	V1 – V4	LAD

2. D

The inferior leads are the ones mentioned in the question.
These stem from the right coronary artery which supplies the right atrium and right ventricle.



3. D

MONA – morphine, O₂, nitrates, aspirin is the easy way to remember the acute management of an MI however O₂ is only indicated if sats are <94%.

4. B

NICE CKS – the following drugs should be offered following an MI (provided no contra-indications) as they have been shown to reduce the risk of further MI and other cardiovascular events.

- ACE inhibitor – ramipril. Or ARB e.g. candesartan
- Dual antiplatelet therapy e.g. clopidogrel and aspirin

	<ul style="list-style-type: none"> • Beta blocker e.g. propranolol • Statin e.g. atorvastatin <p>Calcium channel blockers e.g. verapamil are only given if beta blockers are contra-indicated.</p>
5. E	<p>The way to remember XR findings in HF is ABCDE.</p> <ul style="list-style-type: none"> • A – alveolar oedema • B – Kerley B lines • C – cardiomegaly • D – dilation of UPPER lobe vessels • E – effusions <p>Upper lobe venous diversion (cephalisation) is caused by an increase in left atrial pressure (receives from pulmonary system) which can occur in pulmonary oedema. Produces a stag sign on a frontal CXR which is produced when atrial pressure rises from 5-10mmHg to 10-15mmHg.</p>
6. B	<p>Prinzmetal angina may show ST elevation on an ECG along with STEMI and pericarditis. Unstable angina would often be normal or can show ST depression and flat T waves. Stable angina will show no changes. NSTEMI will show ST depression, deep T wave inversion and pathological Q waves.</p>
7. C	<p>The presentation is typical of heart failure and therefore NT-proBNP would be the most appropriate blood test.</p> <p>BNP is released from the heart (mainly ventricles) in response to stretch, it is a marker for HF. U&E are useful but are not diagnostic in this instance. HbA1c looks at glycated Hb over the last 120 days. Blood cultures would be indicated if infection was suspected. ANP is released mainly from the atria in response to stretch.</p>
8. A	<p>The patient in the question has a supra-ventricular tachycardia. SVT are a form of narrow complex tachycardia and therefore the as the patient is young, the first line in this case would be valsalva manoeuvre which is where the nose and mouth is held during forceful expiration to stimulate the vagus nerve to return the heart into sinus rhythm. Amiodarone would be used in a broad-complex tachycardia. Atropine and adrenaline would be used during an episode of bradycardia to speed the heart up. DC cardioversion would not be first line in this management.</p>
9. C	<p>Screening tools such as ABCD2, QRISK3 and FRAX are common topic to come up in exams. Knowing which tools do what is more important than knowing each factor that is used to calculate a score. The CHA2-DS2-VASc or just CHADS2 score both estimate stroke risk in patients with AF.</p> <p>ABCD2 – estimates risk of stroke after a suspected TIA.</p> <p>HAS-BLED – estimates risk of bleeding on patients on anticoagulation</p> <p>QRISK3 – estimates risk of developing a heart attack or stroke in next 10 years.</p> <p>Well's criteria – estimates risk of Pulmonary Embolism in clinical presentation.</p>
10. B	<p>This patient has a likely diagnosis of with key factors such as shortness of breath on exertion, paroxysmal nocturnal dyspnoea, and peripheral oedema. An ECG, echocardiogram and CXR are all good investigations, but you should remember a BNP or NT- proBNP as the first line investigation, especially in primary care.</p>
11. A	<p>Questions about the different cardiac murmurs are also common. Remember the two most common murmurs are aortic stenosis which causes an ejection-systolic murmur and mitral regurgitation which</p>

causes a pan-systolic murmur. The two less common murmurs are aortic regurgitation which causes an early diastolic murmur and mitral stenosis which causes a mid-diastolic murmur.

I found this diagram the most helpful when trying to memorise murmurs.

CARDIAC VALVE DEFECT MNEMONIC

VALVE DEFECT	MURMUR
AORTIC REGURG.	<u>DI</u> ASTOLIC DECREASENDO
AORTIC STENOSIS	<u>SY</u> STOLIC CRESCENDO/- DECREASENDO
MITRAL STENOSIS	<u>DI</u> ASTOLIC DECREASENDO- PRESYSTOLIC CRESCENDO
MITRAL REGURG.	<u>SY</u> STOLIC HOLO or PAN

12. A

Getting familiar with the NICE guidelines is important for your 2a exams. Hypertension medical management is a common topic, because of how common hypertension is and the slight complexity with two different patient groups. If a patient is under 55 or has type 2 diabetes an ACEi or ARB should be started. If a patient is black or over 55 then a CCB such as amlodipine should be started.

13. C

Aortic stenosis is the obstruction of blood flow across the aortic valve due to aortic calcification; presents with SoB with exertion, angina, or syncope. Characteristic murmur is systolic mid to late peaking with a crescendo-decrescendo pattern, radiation to the carotids. Doppler echo is essential for diagnosis and will show a pressure gradient across the stenotic aortic valve. Valve replacement is the treatment.

CXR is unlikely to reveal much, calcification may be visible in larger arteries. LV hypertrophy may occur due to increased pressure required to pump blood through aortic valve.

ECG is used in the diagnosis of aortic stenosis. Demonstrates LV hypertrophy and absent Q waves, AV block, BBB. In AS patients 90% of the ECGs recorded show some abnormality.

Trans-thoracic echo (including Doppler) is the best test for the initial diagnosis and subsequent evaluation of AS. The sensitivity and specificity of the test are high. Elevated aortic pressure gradient; measurement of valve area and LV ejection fraction.

Exercise tolerance test is and ECG that is recorded whilst you are exercising. Used to test for coronary heart disease and angina.

Auscultation is one method of detecting heart murmurs but is not the most appropriate diagnostic investigation.

<p>14. C</p>	<p>The resuscitation council's algorithm for anaphylaxis says: 1. ABCDE 2. Check for obvious potential diagnosis 3. Call for help 4. Adrenaline 5. Establish airway / high flow O2 / IV fluid challenge / chlorphenamine / hydrocortisone</p> <p>Adrenaline is the first medication to be given, opens airway and blood vessels helping to reverse the effects of anaphylaxis. 500 micrograms (0.5 mL) of 1:1000 IM.</p> <p>Chlorpheniramine is an antihistamine which takes 15-20 mins to work. Histamine release is the cause of anaphylaxis so this helps reverse the effects.</p> <p>Hydrocortisone is a corticosteroid, its benefit in anaphylaxis is still unproven but aims to stop a biphasic reaction, reduce the symptom reoccurrence, and wheezing.</p> <p>Intravenous fluids are given as large volumes of fluid may leak from the patient's circulation. Signs of shock, vasodilation and a low BP.</p> <p>Salbutamol is a beta 2 adrenergic agonist which causes bronchodilation helping the patient to breathe during anaphylaxis.</p>
<p>15. A</p>	<p>Pericarditis – this is inflammation of the membrane that surrounds the heart, movement of the heart causes pain. It causes pleuritic pain which is classically sharp and worse on inspiration. Pericarditis pain is relieved when leaning forward. It can occur after a CABG as the tissue has been damaged, another cause is Dressler Syndrome whereby pericarditis occurs as a complication of an MI 2-3 weeks afterwards. They may have a fever, this is not present in this description.</p> <p>Interstitial lung disease – this is a spectrum of pulmonary diseases that involve all parts of pulmonary bronchovascular units, including alveolar epithelium, capillary endothelium, alveoli, perivascular connective tissue, and peri-lymphatic tissues. It classically presents with cough, fatigue, and SOB.</p> <p>Endocarditis – inflammation of heart valves typically caused by staph or streptococci. History is usually IV drug user or previous dental surgery. The tricuspid valve as this is the first valve blood passes from the systemic circulation so is affected after systemic infection. The patient will have a fever, murmur over the affected valve, numerous signs on examination – roth spots, splinter haemorrhages, Janeway lesions, Osler's nodes.</p> <p>Myocardial infarction – pain wouldn't typically change depending on position, though it does radiate to the left shoulder which is typical. This option can be ruled out as the troponin blood test that detects recent MIs is negative.</p> <p>Aortic dissection – separation of the media lamina resulting in blood entering the wall of the aorta. Presentation is classically acute chest pain radiating to the back between the scapulae. Physical examination will show unequal blood pressure in arms.</p>
<p>16. E</p>	<p>Unstable angina is incomplete coronary artery occlusion usually by a thrombus, atherosclerotic plaque has ruptured which causes a clot to form and occlude the artery. The pain now occurs at rest and worsens on exercise. ST segment depressions and T wave inversions. No elevation of biomarkers.</p> <p>Stable angina is typically secondary to atherosclerosis partially occluding the coronary artery. Pain occurs on exercise when O2 demand is higher. This is relieved with nitrates and rest. May show ST depressions.</p> <p>STEMI – full width infarction of the myocardial tissue caused by occlusion of a coronary artery. ST elevation, peaked T waves, Q waves. Biomarkers are positive.</p> <p>NSTEMI – partial infarction of the myocardial tissue caused by occlusion of a coronary artery. ST depression and T wave inversion. Biomarkers are positive.</p> <p>Prinzmetal angina is a spasm in the coronary artery, it shows a dramatic ST elevation during episodes. Relieved with nitrates. Occurs unrelated to activity levels.</p>