IRFAN SYED and ZISHAN SYED

EMQs in CLINICAL MEDICINE

SECOND EDITION

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Second edition

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Dedication

We would like to dedicate this book to Mum and Dad for their endless support.
(IS & ZS)

I would also like to dedicate this book to my wife Reshma.
(IS)

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Preface

Extended matching questions are still a popular means of assessment in undergraduate and postgraduate examination.

This revised edition updates the material from the previous book and also includes some new chapters to add more value. We have aimed to include detailed explanations for each answer so that the reader can learn some medicine as well as gaining valuable practice at answering questions.

Examination technique is an important consideration in answering extended matching questions. The revision boxes aim to train you to pick up on various symptoms/signs/presentations that will, with any luck, improve your chances of choosing the correct answer.

Irfan and Zishan

Acknowledgements

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INTRODUCTION: EMQ REVISION

The most important skill in answering extended matching questions (EMQs) successfully is picking out important collections of symptoms and/or signs from a question that point to the correct opinion from the list of options available.

Example

Pulses

A	Mitral stenosis	G	Aortic stenosis
B	Atrial flutter	H	Mitral regurgitation
C	Aortic regurgitation	I	Atrial fibrillation
D	Gaucher's disease	J	Mixed aortic valve disease
E	Acute CO_2 retention	K	Coarctation of aorta
F	Mixed mitral valve disease	L	Cardiac tamponade

For each set of clinical signs, give the most likely cause for the presentation below.

1 Slow rising pulse, narrow pulse pressure, heaving apex beat and fourth heart sound.

G Angina, shortness of breath, dizziness and syncope on exertion are common presenting symptoms.

Although a slow rising pulse may not be a pathognomonic feature of aortic stenosis it is a highly suggestive feature and the ability to pick out such phrases allows you to answer questions more quickly and with greater success.

The revision boxes are not intended to act as a crash course in the medical specialities described. The aim is to help the reader to identify some typical presenting features, symptoms, signs, investigation results, etc. that crop up in EMQs and are highly suggestive of a particular option(s) in the question.

Numbers in squared brackets, e.g. [2], cross-reference parts of the revision box with particular EMQs and explanations from the book.

SECTION 1: CARDIOVASCULAR MEDICINE

QUESTIONS

1 Chest pain

A	pulmonary embolus	H	aortic dissection
B	pneumothorax	I	cardiac tamponade
C	lobar pneumonia	J	herpes zoster infection
D	costochondritis	K	tension pneumothorax
E	oesophageal spasm	L	pericarditis
F	atrial fibrillation	M	angina
G	infective endocarditis		

For each clinical presentation below, give the most likely cause for the chest pain. Each option may be used only once.

1 A 63-year-old man with a history of high blood pressure presents in A&E with sudden-onset tearing chest pain radiating to the back.

2 A 40-year-old woman develops sudden-onset dyspnoea at rest following hip replacement surgery. On examination she is tachycardic and her electrocardiogram (ECG) shows right axis deviation.

3 A 60-year-old businessman complains of central crushing chest pain radiating to both arms after running to catch a bus. Pain was relieved by rest and his ECG recording 1 h later was unremarkable.

4 A 21-year-old high-jumper presents with acute-onset dyspnoea and right-sided pleuritic chest pain. Examination reveals increased resonance and reduced expansion on the right side.

5 A 23-year-old woman presents with localized left-sided chest pain that is exacerbated by coughing and is particularly painful on light pressure to that area. Pain is relieved by aspirin. The ECG is unremarkable.

Answers: see page 12.

2 Pulses

A	mitral stenosis	G	aortic stenosis
B	atrial flutter	H	mitral regurgitation
C	aortic regurgitation	I	atrial fibrillation
D	Gaucher's disease	J	mixed aortic valve disease
E	acute CO_2 retention	K	coarctation of aorta
F	mixed mitral valve disease	L	cardiac tamponade

For each set of clinical signs, give the most likely cause for the type of pulse felt.

1 Slow rising pulse, narrow pulse pressure, heaving apex beat and fourth heart sound.

2 Collapsing pulse, wide pulse pressure, 'pistol-shot' sound heard over femoral arteries.

3 Radiofemoral delay in a patient with hypertension.

4 Pulsus paradoxus, jugular venous pressure (JVP) rises on inspiration, heart sounds muffled.

5 Bounding pulse in a patient who is short of breath.

Answers: see page 13.

3 Cardiac murmurs

A	**mitral stenosis**	G	**aortic regurgitation**
B	**atrial flutter**	H	**tetralogy of Fallot**
C	**atrial fibrillation**	I	**atrial septal defect**
D	**aortic stenosis**	J	**aortic incompetence**
E	**friction rub**	K	**mitral regurgitation**
F	**tricuspid regurgitation**	L	**ventricular septal defect**

For the following sets of signs, give the most likely cause for the heart murmur. Each option may be used only once.

1 Tapping apex beat, loud S1, mid-diastolic murmur loudest at the apex in expiration lying on the left side.

2 Heaving undisplaced apex beat, absent A2 with ejection systolic murmur radiating to the carotids.

3 Pansystolic murmur heard best at lower left sternal edge during inspiration in a patient with pulsatile hepatomegaly.

4 Displaced, volume-overloaded apex. Soft S1, pansystolic murmur at apex radiating to axilla.

5 Left parasternal heave and harsh pansystolic murmur at lower left sternal edge that is also audible at apex.

Answers: see page 14.

4 Jugular venous pressure

A	**tricuspid stenosis**	G	**complete heart block**
B	**ventricular fibrillation**	H	**left heart failure**
C	**tricuspid regurgitation**	I	**mitral stenosis**
D	**constrictive pericarditis**	J	**aortic stenosis**
E	**aortic regurgitation**	K	**superior vena cava obstruction**
F	**atrial fibrillation**	L	**normal JVP**

For each set of signs give the most likely cause for the particular JVP observed. Each option may be used only once.

1 Elevated JVP with absent pulsation.

2 Giant systolic 'v' waves.

3 Large 'a' waves and slow 'y' descent in JVP. Patient has ascites.

4 Cannon 'a' waves.

5 Raised JVP that rises on inspiration.

Answers: see page 15.

5 ECG abnormalities

A subendocardial infarction
B pulmonary embolus
C right bundle-branch block
D Mobitz type II second-degree heart block
E hyperkalaemia
F inferior myocardial infarction
G anterolateral myocardial infarction
H left bundle-branch block
I hypokalaemia
J pericarditis
K atrial fibrillation
L mitral regurgitation
M mitral stenosis

For each clinical scenario/ECG finding give the most likely cause. Each option may be used only once.

1 A 26-year-old woman presents acutely unwell with shortness of breath. Her ECG shows sinus tachycardia, deep S waves in I, inverted T waves in III and Q waves in III.

2 Dominant R in V1, inverted T waves in V1–V3, deep wide S waves in V6.

3 Prolonged QT, flattened T waves, prominent U waves.

4 Sinus rhythm, bifid 'p' waves best seen in II, V3 and V4.

5 A 65-year-old man presents with chest pain radiating to the jaw. The ECG shows ST segment elevation in II, III and aVF, with T-wave inversion in V5 and V6.

Answers: see page 16.

6 ECG abnormalities

A	**hyperkalaemia**	H	**atrial fibrillation**
B	**mitral regurgitation**	I	**hypocalcaemia**
C	**left bundle-branch block**	J	**atrial flutter**
D	**normal ECG**	K	**ventricular tachycardia**
E	**first-degree heart block**	L	**right bundle-branch block**
F	**cardiac tamponade**	M	**hypokalaemia**
G	**hypercalcaemia**		

For each clinical scenario/ECG finding, give the most likely cause for the clinical findings. Each option may be used only once.

1 ECG of a 55 year old being treated for hypertension shows tall tented T waves.

2 A 34-year-old man presents to A&E after a road traffic accident. The ECG shows pulseless electrical activity.

3 An 85-year-old man with pneumonia complains of palpitations. ECG shows absent P waves.

4 ECG of a 45-year-old man with sarcoidosis shows an 'M' pattern V5 and inverted T waves in I, aVL and V5–V6.

5 ECG of an 8-year-old girl shows normal P waves and QRS complexes but shows T-wave inversion in V1.

Answers: see page 16.

7 Hypertension

A	**Cushing's syndrome**
B	**systemic sclerosis**
C	**coarctation of the aorta**
D	**Conn's syndrome**
E	**pregnancy**
F	**polycystic kidneys**
G	**malignant hypertension**
H	**hyperparathyroidism**
I	**renal artery stenosis**
J	**portal hypertension**
K	**phaeochromocytoma**

For each clinical scenario below, give the most likely cause for the clinical findings. Each option may be used only once.

1 A 30-year-old woman presenting with hypertension is found to have hypokalaemia and a mild metabolic alkalosis.

2 An anxious 26-year-old woman presents with episodes of chest pain and palpitations precipitated by stress and smoking. Her 24-h urine shows elevated catecholamines.

3 A 45-year-old woman presents with weight gain, muscle weakness and hirsutism. On examination she is hypertensive and has pedal oedema.

4 A 40-year-old man is brought to A&E with severe headache. On examination he has papilloedema and fundal haemorrhages. His BP is 220/145 mmHg.

5 Hypertension in a 75 year old who is a heavy smoker with widespread peripheral vascular disease.

Answers: see page 17.

8 Treatment of heart failure

A	**nifedipine**
B	**metolazone**
C	**lidnocaine (lignocaine)**
D	**100 per cent O_2, intravenous diamorphine, intravenous furosemide (frusemide), sublingual glyceryl trinitrate (GTN)**
E	**intravenous isosorbide mononitrate**
F	**digoxin**
G	**100 per cent O_2, oral diamorphine, oral furosemide (frusemide), intravenous GTN**
H	**intravenous adenosine**
I	**spironolactone**
J	**start cardiopulmonary resuscitation (CPR)**
K	**oral furosemide**

For each clinical scenario below, suggest the most appropriate therapy. Each option may be used only once.

1 A 65-year-old man with heart failure requires rate control to treat coexisting atrial fibrillation.

2 A 65-year-old woman being treated with large doses of loop diuretic requires add-on therapy for oedema refractory to treatment.

3 A 69-year-old woman with asthma being treated with a loop diuretic, ACE inhibitor and long-acting nitrate is prescribed a drug to reduce long-term mortality.

4 A 70-year-old woman with a history of chronic heart failure presents with severe pulmonary oedema.

5 Treatment of mild symptoms of shortness of breath and ankle oedema in a 65-year-old man with left ventricular dysfunction caused by ischaemic heart disease. He is already taking an ACE inhibitor.

Answers: see page 19.

9 Treatment of arrhythmias

A	intravenous adenosine	G	low-molecular-weight (LMW) heparin
B	oral warfarin	H	oral amiodarone + warfarin
C	oral lidocaine (lignocaine)	I	direct current (DC) shock + heparin
D	digoxin + warfarin for a month	J	oral sotalol + warfarin
E	intravenous magnesium + ventricular pacing	K	none of the above
F	intravenous amiodarone		

For each clinical scenario below, suggest the most appropriate therapy. Each option may be used only once.

1 Treatment of a 65-year-old man with atrial fibrillation (AF) of longer than 48 h before DC cardioversion.

2 Initial therapy in a 60-year-old woman presenting severely compromised with acute persistent AF.

3 A 55-year-old man admitted with an acute myocardial infarction develops a short run of symptomatic ventricular tachycardia (VT) despite bisoprolol 10 mg. He requires treatment for prophylaxis against recurrent VT.

4 Drug to aid diagnosis in a 50-year-old man presenting with an unidentifiable, regular, narrow-complex tachycardia.

5 Prophylaxis of ventricular tachycardia in a patient with varying QRS axis and prolonged Q–T interval.

Answers: see page 20.

10 Cardiovascular emergencies

A	**oral dobutamine**
B	**DC shock and adrenaline**
C	**100 per cent O_2, subcutaneous LMW heparin, intravenous fluids**
D	**nifedipine**
E	**atropine**
F	**aspirin, heparin**
G	**DC shock and atropine**
H	**labetalol**
I	**emergency renal dialysis**
J	**aspirin, GTN**
K	**aspirin, streptokinase**

For each clinical scenario below, suggest the most appropriate therapy. Each option may be used only once.

1 A 57-year-old businessman presents with a 4 h history of crushing chest pain. The ECG changes include ST elevation in II, III and aVF.

2 A 65-year-old man presenting with chest pain becomes unresponsive. His ECG shows ventricular fibrillation.

3 A 40-year-old woman collapses after a flight with breathlessness and right-sided pleuritic chest pain.

4 A 45-year-old man with chronic glomerulonephritis presents with a severe headache. On examination he has papilloedema and bilateral retinal haemorrhages. His BP is 240/132 mmHg.

5 A 55-year-old man requires immediate pharmacological management for severe symptomatic sinus bradycardia.

Answers: see page 21.

ANSWERS

1 Chest pain

Answers: H A M B D

A 63-year-old man with a history of high blood pressure presents in A&E with sudden-onset tearing chest pain radiating to the back.

H Pain can also radiate down the arms and into the neck and can be difficult to distinguish from an acute myocardial infarction. Indeed these symptoms are often associated with anterior arch or aortic root dissection. The dissection can interrupt flow to the coronary arteries, resulting in myocardial ischaemia.
The Stanford classification divides dissections into two types: A and B. Type A involves the ascending aorta but type B does not. This system also helps delineate treatment. Usually, type A dissections require surgery, whereas most type B dissections are usually best managed medically by aggressive reduction of blood pressure.

A 40-year-old woman develops sudden-onset dyspnoea at rest following hip replacement surgery. On examination she is tachycardic and her ECG shows right axis deviation.

A Patients can also present with signs of hypoxia, pyrexia and later haemoptysis. Look out for risk factors such as recent surgery and immobility in this patient.

A 60-year-old businessman complains of central crushing chest pain radiating to both arms after running to catch a bus. Pain was relieved by rest and his ECG recording 1 h later was unremarkable.

M This is a classic description of angina. Pain is usually brought on by exertion but other recognized precipitants include cold weather and emotion.

A 21-year-old high-jumper presents with acute-onset dyspnoea and right-sided pleuritic chest pain. Examination reveals increased resonance and reduced expansion on the right side.

B Tall thin young men are especially at risk of having a pneumothorax. The trachea is deviated away from the affected side in a tension pneumothorax. In both simple pneumothorax and tension pneumothorax, expansion is reduced on the affected side. If tension pneumothorax is suspected, do not perform a chest x-ray because it may delay emergency treatment. Patients with chronic obstructive pulmonary disease (COPD) are at risk of pneumothorax as a result of bullae rupturing.

A 23-year-old woman presents with localized left-sided chest pain that is exacerbated by coughing and is particularly painful on light pressure to that area. Pain is relieved by aspirin. The ECG is unremarkable.

D Idiopathic costochondritis is also known as Tietze's syndrome. Localized tenderness to palpation is important for diagnosis. The second rib is frequently affected in this condition.

2 Pulses

Answers: G C K L E

Slow rising pulse, narrow pulse pressure, heaving apex beat and fourth heart sound.

G Angina, shortness of breath, dizziness and syncope on exertion are common presenting symptoms and imply a significant mortality risk

Collapsing pulse, wide pulse pressure, 'pistol-shot' sound heard over femoral arteries.

C Other signs include Corrigan's sign (carotid pulsation), de Musset's sign (head-nodding) and Quincke's sign (capillary pulsations in nail bed). These are all rare and were described at a time when valve replacement was not available.

Radiofemoral delay in a patient with hypertension.

K This condition is twice as common in men and involves a narrowing of the aorta. Look out for the association with Turner's syndrome (45XO). A mid to late systolic murmur caused by turbulent flow can sometimes be heard over the upper part of the praecordium. Narrowing of the aorta can result in the formation of a collateral arterial circulation, including the intercostal arteries. These arteries can erode the undersurfaces of ribs, giving rise to notched ribs on chest x-ray.

Pulsus paradoxus, JVP rises on inspiration, heart sounds muffled.

L The signs of falling blood pressure, rising JVP on inspiration and muffled heart sounds are known as Beck's triad and are an indicator of cardiac tamponade/constrictive pericarditis. Patients who are unstable need emergency treatment.

Bounding pulse in a patient who is short of breath.

E A bounding pulse is a feature of acute rather than chronic CO_2 retention. The mechanism involves reflex vasodilatation to provide adequate tissue perfusion. Hence, a bounding pulse can also be felt in a patient with sepsis (systemic vasodilatation).

3 Cardiac murmurs

Answers: A D F K L

Tapping apex beat, loud S1, mid-diastolic murmur loudest at the apex in expiration lying on the left side.

A Rheumatic heart disease is the most common cause of mitral stenosis. Mitral stenosis causing pulmonary hypertension and pulmonary valve regurgitation can result in an early diastolic murmur (Graham–Steell murmur). Gradual worsening of shortness of breath on exertion over a number of years is a very common feature. Other associations include atrial fibrillation, palpitations, orthopnoea and paroxysmal nocturnal dyspnoea and less commonly malar flush, chest pain and haemoptysis.

Heaving undisplaced apex beat, absent A2 with ejection systolic murmur radiating to the carotids.

D Aortic stenosis is associated with a narrow pulse pressure and a quiet or absent second heart sound. Symptoms include angina, shortness of breath and syncope. Surgical correction by valve replacement is warranted by the patient's symptoms or the pressure gradient against the valve.

Pansystolic murmur heard best at lower left sternal edge during inspiration in a patient with pulsatile hepatomegaly.

F Infective endocarditis of the tricuspid valve is a well-recognized cause of tricuspid regurgitation in intravenous drug users. Giant systolic V waves may be seen in the JVP.

Displaced, volume-overloaded apex. Soft S1, pansystolic murmur at apex radiating to axilla.

K Rheumatic heart disease is still a common cause of mitral regurgitation (MR) in developing countries. Mitral valve prolapse is a more common cause in the USA and western Europe. MR may also develop acutely with myocardial infarction, secondary to papillary muscle rupture, which is often very poorly tolerated. The left ventricle is volume overloaded, increasing left-sided filling pressures and resulting in acute pulmonary oedema and symptoms of dyspnoea.
Rarer causes of MR include the connective tissue diseases, e.g. Marfan's syndrome and Ehlers–Danlos syndrome.

Left parasternal heave and harsh pansystolic murmur at lower left sternal edge that is also audible at apex.

L Prevalence of ventricular septal defect (VSD) is around 2 in 1000 births. With a small VSD (maladie de Roger) the patient is asymptomatic and treatment is not required. NICE guidelines (2008) also no longer

advocate antibiotic prophylaxis against endocarditis for dental work, etc. Spontaneous closure of the VSD is still possible with larger defects and the complications can be managed medically in the short term, e.g. diuretics to treat heart failure. Indications for surgery include failed medical therapy, growth failure and elevated pulmonary artery pressure.

4 Jugular venous pressure

Answers: K C A G D

Elevated JVP with absent pulsation.

K Bronchial carcinoma is a well-recognized cause of this medical emergency. Symptoms include early morning headache (feeling of fullness in the head) and signs include facial congestion and oedema involving the upper limb.
Either radiotherapy or chemotherapy may be useful depending on the sensitivity of the tumour type.

Giant systolic 'v' waves.

C Tricuspid regurgitation is associated with giant systolic 'v' waves. The 'v' wave represents regurgitant blood ejected from the right ventricle at systole.

Large 'a' waves and slow 'y' descent in JVP. Patient has ascites.

A Rheumatic fever is the most common cause of tricuspid stenosis. There is almost always involvement of other valves, most often mitral stenosis. The prominent symptom is fatigue. The presence of shortness of breath suggests concomitant mitral valve disease.
Surgical intervention by tricuspid valve replacement is usually carried out only when there are other defective valves also being operated on.

Cannon 'a' waves.

G Cannon waves occur when there is atrioventricular (AV) dissociation. The classic example is complete heart block but it may also be seen in ventricular tachycardia, and in patients with a single chamber pacemaker and continuing atrial contractions. This is rare nowadays because such patients are invariably given dual-chamber pacemakers. The cannon wave is generated by the atrium contracting in the presence of a closed tricuspid valve resulting from simultaneous ventricular systole.

Raised JVP that rises on inspiration.

D Kussmaul's sign refers to the paradoxical rising of the JVP with inspiration. This sign can also be observed in cardiac tamponade. Usually the JVP falls as a result of the rise in intrathoracic pressure during inspiration.

5 ECG abnormalities

Answers: B C I M F

A 26-year-old woman presents acutely unwell with shortness of breath. Her ECG shows sinus tachycardia, deep S waves in I, inverted T waves in III and Q waves in III.

B This is the S I, Q III, T III pattern frequently quoted in books but it is actually rare in practice. Right axis deviation may be present but the ECG is often normal in small/medium pulmonary emboli. The most common ECG observation is a tachycardia.

Dominant R in V1, inverted T waves in V1–V3, deep wide S waves in V6.

C The 'MARROW' pattern, e.g. 'RSR' pattern in V1 (M) with deep wide S wave in V6 (W). Causes include atrial septal defect (ASD) and pulmonary embolus. Watch out for the patient presenting with recurrent falls, first-degree heart block, left axis deviation and right bundle-branch block as they are likely to require an implantable pacemaker.

Prolonged QT, flattened T waves, prominent U waves.

I Look out for loop/thiazide diuretics as a cause of hypokalaemia.

Sinus rhythm, bifid 'p' waves best seen in II, V3 and V4.

M Known as P mitrale, this bifid P wave suggests left atrial hypertrophy. A peaked P wave is called P pulmonale and suggests right atrial hypertrophy.

A 65-year-old man presents with chest pain radiating to the jaw. The ECG shows ST segment elevation in II, III and aVF, with T-wave inversion in V5 and V6.

F This patient requires urgent assessment for revascularization therapy (i.e. primary percutaneous coronary intervention or thrombolysis). Anterolateral MI would involve leads related to that portion of the heart, e.g. V4–V6, I, aVL.

6 ECG abnormalities

Answers: A F H C D

ECG of a 55 year old being treated for hypertension shows tall tented T waves.

A Look out for potassium-sparing diuretics and angiotensin-converting enzyme (ACE) inhibitors as a cause. Other causes include renal failure and metabolic acidosis.

A 34-year-old man presents to A&E after a road traffic accident. The ECG shows pulseless electrical activity.

F Pulseless electrical activity (PEA) is a clinical condition characterized by loss of a palpable pulse in the presence of recordable cardiac electrical activity. PEA is also referred to as electromechanical dissociation (EMD). Given the history of trauma in this question, cardiac tamponade is the most likely cause.
Management of PEA should follow current advanced life support guidelines while possible reversible causes are sought.

An 85-year-old man with pneumonia complains of palpitations. ECG shows absent P waves.

H Absent P waves is the classic ECG finding of atrial fibrillation. This condition is associated with a significantly increased risk of an embolic event, e.g. stroke. Remember that hyperthyroidism is a cause of atrial fibrillation and thyroid function tests are indicated on first presentation. Uncontrolled atrial fibrillation is associated with an irregularly irregular pulse. An echocardiogram is useful to detect any existing structural abnormalities such as mitral valve disease causing left atrial enlargement.

ECG of a 45-year-old man with sarcoidosis shows an 'M' pattern in V5 and inverted T waves in I, aVL and V5–V6.

C Left bundle-branch block (LBBB) is associated with the 'WILLIAM' pattern, e.g. 'M' pattern in V5. In LBBB, there is conduction of impulse from the right ventricle to the interventricular septum, and then to the anterior and posterior portions of the left ventricle before it finally reaches the left lateral free wall. Delayed left ventricular depolarization is responsible for the ECG findings in LBBB. LBBB is associated with cardiovascular disease.

ECG of an 8-year-old girl shows normal P waves and QRS complexes but shows T-wave inversion in V1.

D T inversion is a normal finding in leads V1–V3 in children.

7 Hypertension

Answers: D K A G I

A 30-year-old woman presenting with hypertension is found to have hypokalaemia and a mild metabolic alkalosis.

D The combination of hypertension, hypokalaemia and metabolic alkalosis is suggestive of primary hyperaldosteronism. This is usually caused by Conn's syndrome (unilateral adrenocortical adenoma) or bilateral adrenal

hyperplasia. This is a rare cause of secondary hypertension but is more common in young people with hypertension.

An anxious 26-year-old woman presents with episodes of chest pain and palpitations precipitated by stress and smoking. Her 24-h urine shows elevated catecholamines.

K Phaeochromocytoma is a catecholamine-secreting tumour and is very rare. Symptoms, including palpitations, tachycardia, anxiety and blanching, are non-specific and may be misdiagnosed. A patient may present as a medical emergency with a hypertensive crisis. The ECG usually reveals left ventricular hypertrophy.
Rarely, phaeochromocytoma can be inherited in an autosomal dominant fashion as multiple endocrine neoplasia (MEN) type IIa (includes medullary thyroid carcinoma, parathyroid hyperplasia).

A 45-year-old woman presents with weight gain, muscle weakness and hirsutism. On examination she is hypertensive and has pedal oedema.

A These are symptoms of chronic glucocorticoid excess. Other symptoms include menstrual irregularities and mood disturbance. Causes of Cushing's syndrome include administration of exogenous steroids, ACTH-secreting pituitary tumours and adrenal adenomas (see Question 78, p. 206).

A 40-year-old man is brought to A&E with severe headache. On examination he has papilloedema and fundal haemorrhages. His BP is 220/145 mmHg.

G Malignant hypertension is severe hypertension associated with acute end-organ failure, e.g. encephalopathy, renal failure. By definition there must be grade III–IV hypertensive changes.
Treatment involves careful reduction in blood pressure over several days, usually with oral therapy. Care should be taken to avoid precipitous reductions in blood pressure because this may lead to watershed infarction.

Hypertension in a 75 year old who is a heavy smoker with widespread peripheral vascular disease.

I Renal disease is the most common cause of secondary hypertension. Intrinsic renal disease, e.g. glomerulonephritis, makes up most of these cases. Renal artery stenosis is responsible for around 25 per cent of all cases of renal hypertension. Treatment is directed at reducing blood pressure and preserving renal function. Revascularization may be performed but there is no consensus as to which patients may benefit from this therapy compared with medical treatment.

8 Treatment of heart failure

Answers: F B I D K

A 65-year-old man presenting with acute heart failure requires rate control to treat coexisting atrial fibrillation.

F Digoxin has a narrow therapeutic window and toxicity with normal doses can be precipitated by hypokalaemia, hypomagnesaemia, renal impairment and hypercalcaemia. Signs of digoxin toxicity include confusion, nausea, arrhythmias and visual disturbance.

A 65-year-old woman being treated with large doses of loop diuretic requires add-on therapy for oedema refractory to treatment.

B Thiazides may be added to loop diuretics in resistant oedema because they have a synergistic mechanism of action. Metolazone is often the drug of choice because it remains effective even in the presence of significant renal impairment.

A 69-year-old woman with asthma being treated with a loop diuretic, ACE inhibitor and long-acting nitrate is prescribed a drug to reduce long-term mortality.

I Spironolactone was shown to decrease long-term mortality when added to conventional therapy in the RALES (Randomized Aldactone Evaluation Study) trial. This double-masked study enrolled patients with severe heart failure (no more than 35 per cent ejection fraction), randomizing them to daily spironolactone/placebo. The trial was discontinued early as a result of the finding of a 30 per cent reduction in the risk of death in the spironolactone group. If this lady did not suffer with asthma then a beta-blocker (e.g. carvedilol) should also be added to her treatment.

A 70-year-old woman with a history of chronic heart failure presents with severe pulmonary oedema.

D Acute pulmonary oedema is a life-threatening medical emergency and the diuretic should be given intravenously. Elderly patients may suffer from COPD/asthma or have a coexisting chest infection and should therefore be given antibiotics and nebulized bronchodilators as required.

Treatment of mild symptoms of shortness of breath and ankle oedema in a 65-year-old man with left ventricular dysfunction caused by ischaemic heart disease. He is already taking an ACE inhibitor.

K Patients with mild left ventricular dysfunction may be satisfactorily controlled on an ACE inhibitor. If, however, shortness of breath and

ankle oedema are not sufficiently controlled, oral diuretics are added. The drug of choice is a loop diuretic.

9 Treatment of arrhythmias

Answers: D I F A E

Treatment of a 65-year-old man with AF of longer than 48 h before DC cardioversion.

D A patient with AF of longer than 48 h duration is at risk of thromboembolism after cardioversion. Unless the patient is severely compromised, it is standard practice to anticoagulate the patient with warfarin for a month before attempting elective cardioversion. Even if this is successful warfarin should be continued for a further month. Unless contraindicated, rate control is best with a beta-blocker (e.g. bisoprolol, metoprolol, atenolol) or a calcium channel blocker (e.g. verapamil, diltiazem).

Initial therapy in a 60-year-old woman presenting severely compromised with acute persistent AF.

I In this case immediate DC shock is indicated because the patient is severely compromised. The administration of heparin decreases but does not abolish the risk of thromboembolism after cardioversion.

A 55-year-old man admitted with an acute myocardial infarction develops a short run of symptomatic VT despite 10 mg bisoprolol. He requires treatment for prophylaxis against recurrent VT.

F Amiodarone has class I, II, III and IV actions but is used clinically for its class III actions. Class III drugs prolong the plateau phase of the cardiac action potential and increase the absolute refractory period. As a consequence they also prolong the Q–T interval.
Amiodarone is the drug of choice to treat VT. When it is used chronically it has a number of adverse effects but these are not an issue in the acute scenario. These adverse effects include bradycardia, pulmonary fibrosis, hepatic fibrosis, corneal microdeposits (regress if drug is stopped), photosensitive rash and thyroid dysfunction.

Drug to aid diagnosis in a 50-year-old man presenting with an unidentifiable, regular, narrow-complex tachycardia.

A Adenosine causes profound AV block but has a very short half-life. In this way it can be used to terminate tachycardias involving an AV re-entry circuit, but doses must be given quickly. It may also be used in the diagnosis of an unidentified arrhythmia. Adenosine can cause bronchoconstriction and stimulates nociceptive afferent neurons in the