

Department tests

Cardiology

A patient is diagnosed with long QT syndrome and has been commenced on beta-blockers with no symptoms and a QTc of 470 ms. No genetic testing has been performed. She has a 7-year-old daughter and asks about the risks for her child.

What is it appropriate to tell her?

The patient should be considered for genetic testing

The patient's daughter should be considered for genetic testing

An ICD is likely to be the safest option

If her daughter has a normal ECG she can be reassured that she does not have long QT syndrome

No further investigation is necessary

A 61-year-old with a history of a myocardial infarction 2 years ago with a known ejection fraction of 25% presents to A&E with a 2 hour history of mild palpitations. He is otherwise fit and well. His ECG monitoring shows a regular broad complex tachycardia at a rate of 170 bpm which self-terminated before a 12-lead ECG was performed. His U&Es are normal. The patient's blood pressure was 130/90 mmHg during the tachycardia and he was not unduly distressed. He is transferred to CCU where a 12-lead ECG shows LBBB with a QRS duration of 100 ms.

He needs an ICD

He needs an urgent revascularization

He needs an EP study

He tolerated his tachycardia well; therefore it is likely to be an SVT with aberrancy

He should be commenced on flecainide

A patient with previous myocardial infarction, an ejection fraction of 25%, and a QRS duration of 140 ms, but no history of cardiac arrest, is seen in clinic and an ICD is recommended. She is concerned about driving.

What is it appropriate to tell her?

She will need to stop driving for 6 months

She will need to stop driving for 1 month

If she has an appropriate shock she will need to stop driving for 6 months

A and C

B and C

Which one of the following features is least suggestive that a broad complex tachycardia is ventricular in origin (VT)?

P waves seen 'walking through the tachycardia'

The QrS duration shortens as the patient goes from sinus rhythm to tachycardia

Capture beats

A right bundle branch block pattern with a small r wave and a large r' wave (i.e. rsr') in V1

Negative concordance in the chest leads

A 37-year-old man presents to A&E with pneumonia and a temperature of 39°C. He has no chest pain but a routine ECG is performed and is shown in Figure 1.1.

He should be referred for primary angioplasty

His temperature may have exacerbated his ECG changes

He should be treated with ajmaline

He needs an ICD

Beta-blockers are indicated

Which one of the following would not be considered a high-risk marker for sudden cardiac death in hypertrophic cardiomyopathy?

Family history of sudden cardiac death

Non-sustained VT on cardiac monitoring

LV septal thickness of 2.3cm

Drop in blood pressure on ETT

Syncope

A 26-year-old patient presents to A&E with the rhythm strip shown in Figure 1.2. He is complaining of palpitations and chest pain. His blood pressure is 80/60 mmHg. What should the initial management be?

IV adenosine

IV amiodarone

IV beta-blocker

IV calcium-channel blocker

Urgent cardioversion

The ECG shown in Figure 1.2 is diagnostic of which one of the following rhythms?

AF with aberrancy

AF with pre-excitation

VT

AVNT—orthodromic

AVNT—antidromic

A 57-year-old patient with a history of dilated cardiomyopathy and an ejection fraction of 20% is admitted to hospital after a presyncopal episode. His ECG on arrival shows monomorphic VT with a rate of 180 bpm and his BP is 70/50 mmHg. He receives urgent cardioversion and his QRS complexes are narrow on return to sinus rhythm. He is normally NYHA class III and is on maximum medication for HF.

According to NICE criteria he does not qualify for an ICD as his aetiology is not IHD

He should receive a biventricular ICD

He should receive a standard ICD

He should be commenced on oral amiodarone

He should be considered for a VT ablation

An asymptomatic 32-year-old man has the ECG shown in Figure 1.4 performed as part of a routine work medical examination.

This ECG shows right bundle branch block

He is asymptomatic and can be reassured without further investigation

He should have a 5 day monitor and as long as there are no significant arrhythmias or changes in the QrS complexes he can be reassured and discharged

He should have an echocardiogram and if this is normal he can be reassured and discharged. He should proceed to an EP study

A 25-year-old man presents to the ED with a broad complex tachycardia that is irregularly irregular. The patient is haemodynamically uncompromised. An anaesthetist is not available to assist with immediate DC cardioversion.

What is the best initial treatment option?

IV adenosine

IV verapamil

Oral beta-blocker

IV beta-blocker

IV flecainide

A 60-year-old man attends clinic because of hypertension. His BP in clinic is 170/90 mmHg and his echocardiogram shows mild LVH and mild LA dilatation. He is not diabetic and has no other medical history of note.

Which one of the following medications is most effective in preventing AF?

ACE inhibitors

Beta-blockers

Calcium-channel antagonists

Diuretics

Alpha-blockers

A 62-year-old woman attends clinic following an ED attendance 6 weeks previously with a one-week history of palpitations. She was diagnosed with AF at the time and commenced on aspirin and a beta-blocker. Her echocardiogram showed no significant abnormalities and her ECG in clinic today confirms atrial fibrillation with a ventricular rate of 70 bpm. She continues to get occasional palpitations and would like to be considered for cardioversion.

What do you advise?

She needs to be warfarinized for at least 48 hours pre-cardioversion

Anticoagulation should be continued after successful cardioversion for at least 4 weeks

If a TOE rules out atrial thrombus, no anticoagulation is required post-procedure

Anticoagulation is not required prior to chemical cardioversion

Anticoagulation is not required prior to cardioversion as her CHADS2 score is zero

A 66-year-old woman with a past medical history of hypertension undergoes DC cardioversion for atrial fibrillation. Immediately following the procedure, transient ST elevation is seen. The patient is asymptomatic post-procedure but cardiac enzymes are taken 12 hours later. These show a normal troponin I but a raised CK. The SHO calls you to advise him on the significance of the ECG and blood tests.

What do you advise?

The ST elevation and raised CK are probably not abnormal

A rise in troponin I, but not in troponin T, is sometimes seen following AF cardioversion

A rise in troponin T, but not in troponin I, is sometimes seen following AF cardioversion

Both troponin I and T are usually raised post-cardioversion

The raised CK suggests likely myocardial damage

A 40-year-old man presents to A&E with a 12-hour history of sudden-onset palpitations. He has no previous medical history of note and the clinical examination is unremarkable. His troponin is negative. His ECG shows atrial fibrillation with a ventricular rate of 130 bpm, his BP is 110/70 mmHg, and his oxygen saturation is 98%. He has no symptoms associated with his palpitations.

What is the best management?

Amiodarone 300 mg IV loading followed by 900 mg over 24 hours

Flecainide 2 mg/kg over 10 minutes followed by oral dose

Digoxin 500 micrograms IV followed by 500 micrograms after 6 hours

Anticoagulate, rate control, and perform DC cardioversion in 6 weeks

Aspirin, atenolol 50 mg od, and review in clinic in 6 weeks

A 72-year-old man with symptomatic persistent atrial fibrillation is admitted for pulmonary vein isolation.

Which one of the following statements is most likely to be true?

The risk of stroke is around 5%

The chance of successful ablation of the arrhythmia is around 90% at 1 year

The chance of successful ablation is higher for persistent AF than for paroxysmal AF

The risk of cardiac tamponade is around 5%

The risk of pulmonary vein stenosis is around 5%

A patient is admitted for a DC cardioversion for their persistent atrial fibrillation. Which one of the following statements is true?

monophasic waveforms are more effective than biphasic waveforms at cardioverting patients

IV flecainide pre-procedure does not increase the chances of electrical cardioversion

The initial success rate is around 50%

Patients do not require anticoagulation prior to cardioversion if their CHADS2 score is ≤ 1

Increased left atrial size is associated with an increased risk of AF recurrence

A 75-year-old man with a previous history of persistent AF, peptic ulceration, and renal failure (creatinine 220 $\mu\text{mol/L}$) undergoes elective PCI to his LAD with a bare metal stent (BMS). He was on warfarin for AF prior to his PCI.

What is the best combination of drugs immediately following the procedure?

Aspirin, clopidogrel, and warfarin

Aspirin and clopidogrel

Aspirin and warfarin

Clopidogrel and warfarin

Warfarin alone

A 35-year-old man with no past medical history of note and on no regular medication presents to clinic with palpitations. Holter monitoring reveals short-lasting episodes of atrial fibrillation during which he has noted ‘a fluttering sensation’ in his patient diary.

What is the best initial management plan?

Warfarin and atenolol

Amiodarone and aspirin

refer for pulmonary vein isolation

Flecainide and atenolol

Disopyramide and aspirin

An 80-year-old woman with permanent atrial fibrillation and palpitations attends clinic. She has been in AF for over 10 years and has a left atrial diameter of 5.5 cm. She has high ventricular rates despite being on digoxin 125 micrograms od and atenolol 50 mg od. She has dizzy episodes when she has high ventricular rates and had a pre-syncopal episode 1 month ago. She is keen to consider an AV node ablation.

What do you advise?

There is no evidence that this will improve her symptoms

The mortality of the procedure is about the same as for medical treatment of AF

The procedure is contraindicated in patients with heart failure

PVI ablation should be attempted first

A 50-year-old man with a history of hypertension, diabetes, and persistent atrial fibrillation, for which he is warfarinized, is admitted with an NSTEMI. He undergoes PCI to his proximal LAD with a drug-eluting stent (DES).

What is the best combination of drugs following his intervention?

Aspirin, clopidogrel, and warfarin for 1 month; then warfarin alone thereafter

Aspirin, clopidogrel and warfarin for 1 month; then warfarin and clopidogrel for 12 months followed by warfarin alone

Aspirin, clopidogrel, and warfarin for 6 months; then warfarin and clopidogrel for 6 months followed by warfarin alone

Aspirin, clopidogrel and warfarin for 12 months; then warfarin alone

Aspirin and warfarin for 12 months; then clopidogrel alone

An 85-year-old woman is referred to your cardiology clinic because of an incidental finding of atrial fibrillation at a routine check-up. The patient is asymptomatic from a cardiovascular perspective, but a 24-hour tape organized by the GP shows atrial fibrillation throughout with rates varying between 60 and 110 bpm. The patient has a history of hypertension and stable angina. Coronary angiography performed several years ago showed minor atheroma in the LAD, circumflex, and RCA. Echocardiography shows good biventricular systolic function with a left atrial diameter of 5.2 cm. The patient is on aspirin 75 mg od, ramipril 10 mg od, simvastatin 20 mg od, and atenolol 50 mg od.

What thromboprophylactic treatment do you recommend?

Warfarinization with a target INr of 2.0–3.0

Warfarinization with a target INr of 1.8–2.5

Continue with aspirin 75 mg od

Aspirin and warfarin with a target INr of 2.0–3.0

Aspirin and warfarin with a target INr of 1.8–2.5

An 18-year-old woman attends the ED with palpitations and dizziness. An ECG shows a broad complex tachycardia with an irregularly irregular rhythm and a ventricular rate of 160 bpm. Her BP is 88/60 mmHg but she has no chest pain or dyspnoea. She had been told several years earlier that she had a ‘Wolff– Parkinson–White ECG’ and offered ‘a procedure’ for this but declined. She has had no previous admissions to hospital and is on no regular medication.

What is the best treatment?

Adenosine IV

Verapamil IV

Amiodarone IV

Flecainide IV

A 60-year-old hypertensive patient presents to the ED with chest pain. The pain came on very suddenly in the left chest whilst he was lifting a heavy plant pot. The pain is difficult to localize. The intensity has been constant and remains persistent. En route to hospital it has changed location to the left side of the lower thoracic back. He has recently had treatment for thoracic back pain from a chiropractor. He is sweating (looks unwell) and anxious but has no shortness

of breath. Blood pressure is 160/90 mmHg, heart rate is 100 bpm and saturations are 99% on room air. The ECG does not show acute ST change. D-dimer is 1700 ng/mL (normal < 500 ng/mL), and troponin is awaited.

Based on the information available, what is the most likely diagnosis?

Acute coronary syndrome

Pulmonary embolism

Acute aortic syndrome

Musculoskeletal painE. Pericarditis

You review a 65-year-old male on the post-take ward round who has been referred by his GP with a 2-week history of exertional chest pain. There have been no episodes at rest and he has improved since the GP started him on bisoprolol 2.5 mg od. His resting ECG shows no ischaemia and troponin tests are negative. He has a family history of ischaemic heart disease but no other risk factors.

Which investigation would you recommend?

CT coronary angiogram

Invasive coronary angiogram

Exercise treadmill test

Stress echo

Nuclear perfusion scan

You review a 55-year-old woman in clinic who has been referred by her GP with recent chest pains. You feel that the nature of the pains is atypical for ischaemia although they are reproduced with exertion. She has no identifiable risk factors for ischaemic heart disease and the resting ECG is normal.

What would you recommend?

CT coronary angiogram

reassure—no further tests required

Invasive coronary angiogram

Exercise treadmill test

Myocardial perfusion scan

You are referred a 40-year-old lady with left arm pain. She had a single episode after running for a bus with shopping, which subsided after 5 minutes. She has never previously had exertional chest discomfort. Resting ECG is normal and 8 hours high-sensitivity troponin is

negative. She has a BMI of 33 and diet-controlled type 2 diabetes mellitus but is not hypertensive.

What do you recommend?

reassure and discharge

Inpatient invasive coronary angiogram

Outpatient stress echo

Discharge-dependent exercise treadmill test

CT coronary angiogram

A 25-year-old male developed sharp central chest pain and palpitations after drinking three cans of energy drink whilst revising for exams. The symptoms were ongoing when he initially attended the ED, and an ECG showed a sinus tachycardia with no ST change. The pain subsided shortly afterwards. He is normally fit and well. His father recently had a myocardial infarction at the age of 62. All observations and examination are normal. Troponin and D-dimer tests were negative.

What would you recommend?

Admit for observations

Exercise treadmill test

Stress echocardiogram

CT coronary angiogram

No further investigation

One of your patients has small vessel coronary disease which is not suitable for revascularization. They are still experiencing class 2 angina particularly in the evening despite bisoprolol 10 mg od. Blood pressure is 135/90 mmHg.

What would you recommend next?

Amlodipine

Ivabradine

Nicorandil

Bisoprolol 5 mg bd

ranolazine

One of your patients has discrete angiographically significant lesions in the mid right coronary artery and the mid left anterior descending coronary artery. He is 60 years old and is not

diabetic. He has ongoing class 2 anginal symptoms despite optimal dose of a beta-blocker and a long-acting nitrate.

What do you recommend?

CABG will be associated with a greater mortality benefit compared with PCI

The risk of stroke will be significantly lower with PCI

Add a third oral antianginal and then reconsider revascularization

The likelihood of repeat revascularization is higher with PCI

A 45-year-old diabetic male patient has returned to clinic following a recent angiogram. He has stable class 2 angina and is currently on aspirin 75 mg od, atorvastatin 40 mg nocte, and bisoprolol 2.5 mg as antianginal treatment. His symptoms have improved since starting the beta-blocker. The angiogram showed severe plaque in the proximal left anterior descending artery and discrete simple lesions in the mid circumflex and right coronary arteries. The echocardiogram has shown moderate LV impairment.

What do you recommend?

Titrate the beta-blocker and add a calcium-channel blocker or long-acting nitrate—reassess symptoms

Titrate the beta-blocker and add an ACE inhibitor—reassess symptoms and LV function

CABG for prognostic and symptomatic improvement

PCI guided by ischaemia via a functional imaging test

Multivessel PCI or CABG for symptomatic treatment

Which one of the following is true of atherosclerotic plaque formation?

It is an acute inflammatory disease of the vascular intima

It is characterized by the accumulation and modification of cholesterol esters on the luminal surface of the endothelium

Macrophages bind and phagocytose oxidized LDL to form foam cells

Typically form away from branch points

Endothelial dysfunction as a result of an insult to the endothelium is characterized by increased nitric oxide release

Atherosclerotic plaque rupture is the most common event leading to clinically relevant ischaemia.

Which one of the following statements regarding this process is not true?

Thin-capped fibroatheromas are most prone to cap disruption and thrombus formation

Fracture of the fibrous cap allows platelets, clotting factors, and inflammatory cells to come into contact with the thrombogenic necrotic lipid core, leading to thrombus

Disrupted plaques can be accurately identified by optical coherence tomography

Plaque rupture will always result in some degree of clinical ischaemia (ACS)

Patients presenting with an ACS who have a ruptured plaque identified during angiography can be managed without stenting

Which one of the following statements regarding the new generation of antiplatelet drugs is not true?

Clopidogrel, prasugrel, and ticagrelor all inhibit the same receptor (P2Y₁₂ ADP receptor)

Clopidogrel and prasugrel are irreversible inhibitors, whereas ticagrelor is reversible

Clopidogrel and prasugrel are both prodrugs which are metabolized to the active form, whereas ticagrelor acts directly

Ticagrelor requires twice daily maintenance, whereas clopidogrel and prasugrel are once daily. All are converted to the active metabolite by the hepatic cytochrome enzyme (CYP3A4) pathway

You review a 59-year-old man with long-standing hypertension in clinic. He has no other comorbidities. He complains of some breathlessness, but this does not limit his physical activity. A transthoracic echocardiogram demonstrates aortic root dilatation and severe aortic regurgitation.

Which one of the following is not an indication for surgery?

NYHA class II breathlessness

Aortic root disease with maximal diameter 49 mm

Patients undergoing CABG, valve surgery, or surgery of the ascending aorta

Asymptomatic with resting LVEF $\leq 50\%$

Asymptomatic with end-diastolic dimension > 70 mm

You are asked to review the echocardiogram of a 74-year-old woman with a loud pansystolic murmur (z Video 3.1).

The following statements are all true, except:

The jet of regurgitation is anteriorly directed

The regurgitation is likely to be chronic

Using PISA to assess the severity of the regurgitant jet is more accurate than measuring the vena contracta

The MV inflow E-wave velocity is 1.6 m/s; this suggests severe MR

Systolic pulmonary vein flow reversal is not a sensitive measure of severe MR

Which one of the following statements is correct?

A statin should be prescribed to reduce the rate of AS progression

An antihypertensive drug should be prescribed

The increase in peak velocity of ≥ 0.2 m/s/year suggests that surgery should be considered

An exercise tolerance test (ETT) is unsafe in asymptomatic severe AS

An elevated BNP of 120 pg/ml suggests that surgery should be considered

A 24-year-old iV drug user presents to hospital with a 6-week history of fever, rigors, and general malaise. on admission his temperature is 38°C. His venous pressure is elevated to the angle of the jaw with prominent V waves. You hear a loud systolic murmur at the lower left sternal edge, which is louder on inspiration. There is mild pedal oedema. Blood cultures grow *Staphylococcus aureus* in all six bottles. An initial transthoracic echocardiogram followed by a transoesophageal echocardiogram show no obvious vegetation and severe tricuspid regurgitation (TR). nonetheless, he has 6 weeks of intravenous antibiotics with resolution of his sepsis. There are no embolic complications. He is now asymptomatic.

The following are all appropriate considerations for tricuspid valve surgery except:

Persistent symptoms with reasonable right ventricular dysfunction

No symptoms—TAPSE 12 mm

No symptoms—tricuspid annulus systolic velocity 13 cm/s

No symptoms—RV end-systolic area 30 cm²

All the above are appropriate indications for surgery

Which one of the following transthoracic echocardiographic parameters does not suggest severe aortic regurgitation?

Vena contracta 0.50 cm

Central jet width 70% of LVoT

Holodiastolic aortic flow reversal in descending aorta

Pressure half-time 190 ms

Effective regurgitant orifice area ≥ 0.3 cm²

A 23-year-old man with transposition of the great arteries underwent a Mustard operation during childhood. Three months previously he had a stent for a baffle stenosis. He attends outpatient clinic. He is undergoing a root canal procedure the following week and his dental surgeon has asked whether he needs prophylaxis for infective endocarditis (ie) before the procedure. He has a history of penicillin allergy. What would you recommend?

No antibiotic prophylaxis required

IV oxacillin 2 g 60 minutes before the procedure

oral amoxicillin 1 g 30 minutes before the procedure with steroid and antihistamine

IV cephalexin 2 g 60 minutes before the procedure

IV/oral clindamycin 600 mg 30 minutes before the procedure

A 38-year-old iV drug abuser presents with a 1-week history of malaise, fatigue, and rigors. His temperature on admission was 38.5°C. examination revealed a pan-systolic murmur which was loudest at the left sternal edge. Three sets of blood cultures were taken. Transthoracic echocardiography (TTe) showed vegetation on the tricuspid valve with moderate TR.

Which one of the following organisms is most likely to be positive in blood cultures?

Streptococcus sanguis

Enterococcus faecium

Coxiella burnetii

Staphylococcus aureus

Kingella kingae

A 76-year-old man presents to the eD with a 2-week history of fever, chills, poor appetite, and weight loss. He had a bovine aortic valve replacement 5 years previously for severe aortic stenosis. He was pyrexial. Admission bloods revealed a white cell count of $16.0 \times 10^9/L$ and C-reactive protein (CRP) 120 mg/dL. Toe was performed the next day (see z Video 3.4).

What is the abnormality shown on the echocardiogram?

Vegetation on the aortic valve

Aortic root abscess

Vegetation on the anterior mitral leaflet

Severe central mitral regurgitation

Severe tricuspid regurgitation

A 59-year-old man with a bicuspid aortic valve and a background of benign prostatic hypertrophy presents with a 1-week history of fever and lethargy. He had been treated by his GP with oral antibiotics for a urinary tract infection (uTi) a week prior to admission. on examination, an ejection systolic murmur was audible on auscultation. As part of his initial investigations routine bloods and blood and urine cultures were taken. His urine culture sent by his GP has grown *Escherichia coli*. The admitting team suspects endocarditis.

What is the next step of management?

Treat UTI with different antibiotics than those used previously

Arrange a transthoracic echocardiogram (TTE).

Arrange a transoesophageal echocardiogram (ToE) as aortic valve vegetations are poorly visualized on TTE

Repeat urine culture

Arrange cardiac MRI to rule out endocarditis

Which one of the following is a predictor of poor outcome in patients with infective endocarditis?

Insulin-dependent diabetes mellitus

Renal failure

Echocardiographic evidence of peri-annular complications

Staphylococcus aureus in blood cultures

All the above

An 80-year-old woman with a background of moderate aortic stenosis presents with a 2-week history of fatigue, weight loss, and night sweats. She has a history of nausea and altered bowel habit. Bloods revealed Hb 9.9 g/dL, white cell count $16.0 \times 10^9/L$, and CRP 187 mg/L. Blood cultures were taken on admission and she was commenced on empirical antibiotics. TTE demonstrated an aortic valve vegetation.

The presence of which one of the following organisms would prompt gastrointestinal investigations?

Haemophilus para-influenzae

Cardiobacterium hominis

Streptococcus bovis

Enterococcus faecalis

Coagulase-negative staphylococci

A 51-year-old farmer presents with low-grade fever and a recent history of weight loss. He has been investigated by his GP and general physicians but no cause has been identified for his symptoms. His inflammatory markers are raised and a TTE shows a 0.5×0.3 cm echogenic mass attached to the non-coronary cusp of the aortic valve. Endocarditis is suspected, although multiple blood cultures are negative.

Which one of the following organisms is the most likely cause of persistently negative cultures?

Streptococcus constellatus

Coagulase-negative staphylococci

Cardiobacterium hominis

Streptococcus sanguis

Coxiella burnetii

Which one of the following statements regarding outpatient parenteral antibiotic therapy (oPAT) for infective endocarditis is true?

oPAT can be considered in oral-streptococci-positive endocarditis in stable patients with no complications in the critical phase (0–2 weeks)

Complications are rare in the first 2 weeks

oPAT in patients who have received inpatient therapy for 3 weeks can be considered despite the presence of heart failure

Daily post-discharge evaluation physician review is necessary for oPAT

Neurological features are not a contraindication to oPAT

A 55-year-old man with known heart failure and LVEF of 37% is reviewed in the outpatient clinic with breathlessness. He is NYHA class III with no signs of fluid overload on examination. His BP is 110/60 mmHg, and his heart rate is 55 bpm. He is on bisoprolol 5 mg od and ramipril 10 mg od. His U&E tests reveal Na 137 mmol/L, K 4.5 mmol/L, urea 7 mmol/L, and creatinine 85 µmol/L.

Which one of the following medications will you chose next?

Furosemide 40 mg od

Spirolactone 25 mg od

Digoxin 62.5 micrograms od

Hydralazine 37.5 mg and isosorbide dinitrate 20 mg od

Candesartan 4 mg od

An 80-year-old woman is admitted with acute pulmonary oedema on a background of progressive shortness of breath with exertional chest pain for 6 months. She has a history of renal impairment with an eGFR of 40 mL/min. She is initially commenced on IV furosemide with good effect. An echocardiogram reveals LVEF 40% with severe aortic stenosis (AS) with an estimated valve area of 0.7 cm².

What would you do next?

Add a beta-blocker

Perform angiography with a view to aortic valve replacement (AVR)/transcatheter aortic valve implantation

Add an ACE inhibitor

Implant a CRT-D

A and B

A 35-year-old man presents to the medical take with acute heart failure. He has a 2-week history of progressive breathlessness. Past medical history includes type II diabetes mellitus. An echocardiogram subsequently shows an EF of 25% with anterior, septal, and lateral wall motion defects. He is stabilized on medication with furosemide, spironolactone, bisoprolol, and ramipril.

What would be your next course of investigation?

Endomyocardial biopsy

Angiogram

Viral titres

Exercise tolerance test

lung function tests

A 65-year-old woman with ischaemic cardiomyopathy and LVEF 30% comes for review in the outpatient clinic. She is NYHA class II and has been optimally revascularized. Her current heart failure medications are bisoprolol 10 mg od, ramipril 10 mg od, ivabradine 7.5 mg bd, and spironolactone 25 mg. Her ECG shows sinus rhythm, left bundle branch block (QRS duration 135 ms), left axis deviation, and PR interval 180 ms.

Which one of the following managements would you recommend next?

Refer for transplant assessment

Refer for ICD

Refer for CRT-D

Refer for CRT-P

Perform a dyssynchrony echocardiogram

A 65-year-old man presents to the chest pain clinic with a 2-month history of exertional chest pain. He has no past medical history of note. on examination his BP is 130/70 mmHg and his heart rate is 65 bpm in sinus rhythm with a 3/6 pansystolic murmur. He has a positive ETT with inferolateral ST segment depression at 5 minutes Bruce protocol. Coronary angiography reveals severe distal left main stem disease, severe mid-LAD disease, severe mid-circumflex disease, and severe distal RCA disease. An echocardiogram shows severe mitral regurgitation with moderate LV systolic dysfunction. CMR confirms viability in all territories.

What should you do next?

Refer for multi-vessel angioplasty

Continue medical management

Refer for CABG

Refer for mitral valve repair/replacement

C and D

You get a phone call from the heart failure nurse specialist regarding a patient followed up in clinic for titration of medication. He has dilated cardiomyopathy with an EF of 30%. His most recent BP is 110/60 mmHg with heart rate 60 bpm. He is currently on bisoprolol 7.5 mg od and ramipril 5 mg od. His renal function test results have been phoned through to the specialist nurse: Na 136 mmol/L, K 5.5 mmol/L, urea 13 mmol/L, creatinine 270 µmol/L. (Baseline before titration of ACE inhibitor: Na 138 mmol/L, K 4.8 mmol/L, urea 8 mmol/L, creatinine 180 µmol/L.)

What would be your advice?

Continue current medication and recheck u&E at 1 week

Stop ramipril and recheck u&E at 1 week

Add spironolactone and recheck u&E at 1 week

Halve dose of ramipril and recheck u&E at 1 week

Stop all medication and recheck u&E at 1 week

A 36-year-old woman with known idiopathic dilated cardiomyopathy (confirmed by tTE and angiography) is reviewed in the heart failure clinic. She is NYHA class III. Her current medication is bisoprolol 10 mg od, ramipril 7.5 mg od, spironolactone 25 mg od, digoxin 62.5 micrograms od, furosemide 40 mg bd. She has CRT-D *in situ*. Her heart rate is 70 bpm and her BP is 85/40 mmHg. She has mild peripheral oedema and a raised JVP. What is your next step?

Add candesartan 8 mg od

Perform CMR

Refer for transplant assessment

Increase ramipril

Stop ramipril and furosemide

A 57-year-old woman with known heart failure and EF 42% is reviewed in clinic. She is breathless on walking up one flight of stairs or half a mile on the flat. On examination, her BP is 130/90 mmHg and her heart rate is 75 bpm (SR, ECG QRS < 120 ms). Her chest is clear to auscultation. There are no signs of fluid overload. Her current medication is carvedilol 25 mg bd, furosemide 40 mg od, and digoxin 62.5 micrograms od. Her recent renal function tests are Na 141 mmol/L, K 5.1 mmol/L, urea 13.5 mmol/L, and creatinine 236 µmol/L. She has not previously tolerated an ACE inhibitor or spironolactone because of deteriorating renal function and hyperkalaemia.

What would you do next?

Add hydralazine and isosorbide dinitrate (H-ISDN)

Add candesartan

Add eplerenone

Add furosemide

Add ivabradine

A 30-year-old man had a cardiac transplant 5 years previously because of dilated cardiomyopathy. He initially did very well post-transplant. However, he has noticed that he is progressively short of breath on exertion. His tTE shows mid and apical anterior hypokinesia.

What is the most likely diagnosis?

Acute T-cell rejection

Non-Hodgkin's lymphoma

Coronary vasculopathy

Sarcoidosis

None of the above

Which one of the following best describes the actions of ACE?

Promotes the degradation of angiotensin II

Directly stimulates the synthesis of aldosterone

Stimulates the production of norepinephrine

Converts angiotensin I to angiotensin II

All of the above

Which one of the following is not a contraindication to an ACE inhibitor?

History of angioedema

Known renal artery stenosis

TTE showing AVA 1.2 cm²

Serum creatinine 250 µmol/l

Serum potassium 5.5 mmol/l

A 25-year-old woman is referred with a mid-systolic murmur. Echocardiography demonstrates asymmetric left ventricular hypertrophy with good left ventricular systolic function. the septal thickness is 17 mm with a small left ventricular outflow tract gradient. She is symptom free.

Which one of the following statements is not true?

A blood pressure response of <20 mmHg on standard exercise testing is a risk factor for sudden cardiac death

First-degree relatives who have had normal screening echocardiograms should have repeat studies every 5 years

The patient should be advised that future pregnancy is high risk

She is at higher than normal risk of developing atrial fibrillation

Beta-blocker therapy is not indicated

16. A 53-year-old man presents to the outpatient clinic with symptoms of lethargy and tiredness. Clinical examination reveals him to be pale with a blood pressure of 110/70 mmHg, a JVP of +8 cmH₂O, and oedema to his mid-calf. His 12-lead ECG demonstrates a PR interval of 200 ms, a QRS duration of 145 ms, and poor R-wave progression. A subsequent echocardiogram was technically challenging, but demonstrated a thickened ventricle with a septal thickness of 15 mm. overall systolic function is reported as normal. An E/A ratio was estimated to be 1.4 with tissue Doppler giving an E/E' ratio of 12.

Which one of the following investigations is most likely to help make the diagnosis?

Myocardial biopsy

Contrast-enhanced transthoracic echocardiogram

urine and serum electrophoresis for monoclonal protein

Myocardial perfusion scan

left and right heart catheter

A 73-year-old man well known to the ED with alcohol excess presented with acute pulmonary oedema requiring CPAP. His presenting ECG demonstrated sinus rhythm with a broad left bundle branch block with QRS duration of 173 ms. A subsequent coronary angiogram demonstrates the following:

LMS normal

LAD 50% mid vessel stenosis

LCx 60% distal stenosis

RCA recessive vessel, 75% proximal disease

A 74-year-old patient presents to hospital with a VF arrest. She is successfully resuscitated and a subsequent ECG demonstrates a clear-cut anterior myocardial infarction with >2 mm ST elevation in leads V2–V6. Coronary angiography demonstrates a suboccluded proximal LAD, with a small unobstructed circumflex artery and a 70% stenosis in the proximal RCA. She undergoes successful coronary intervention to her proximal LAD and has an uncomplicated recovery from her infarct. Her echocardiogram demonstrates akinesia of the apex, but an overall EF estimated at 35–40%. She is established on dual anti-platelet therapy, ramipril, bisoprolol, and a statin.

What other therapy should she have?

Spirolactone

Epleronone

ICD insertion

CRT insertion

PCI to her RCA

A 45-year-old patient with a known diagnosis of AL amyloid presents to cardiology outpatient clinic. He is under the haematologists receiving chemotherapy for myeloma.

Which one of the following statements is true when there is cardiac involvement with amyloid?

ACE inhibitor therapy is the cornerstone of treatment with cardiac involvement

In endstage disease, cardiac transplantation in AL amyloid is relatively contraindicated

Beta-blockers are used routinely

With adjunctive chemotherapy, the prognosis for AL amyloid is good

Diuretics should not be used because of profound hypotension

A 50-year-old man with sarcoidosis is referred to the outpatient clinic from the respiratory clinic.

Which one of the following features would suggest cardiac involvement?

First-degree heart block

Dilated cardiomyopathy

Echo features suggestive of ARVC

E/A reversal on mitral inflow Doppler with an elevated E/E' on tissue Doppler imaging E All of the above

Which of the following are the first-, second-, and third-line drugs to use in pregnancy-induced hypertension with no other problems?

Methyldopa, labetalol, nifedipine

Nifedipine, captopril, bendroflumethazide

Metoprolol, methyldopa, bendroflumethazide

Enalapril, labetalol, doxazosin

Enalapril, methyldopa, labetalol

A 24-year-old woman who has a mechanical mitral valve replacement and requires warfarin 4 mg od comes to your clinic, seeking advice about becoming pregnant. She has heard that warfarin is dangerous in pregnancy.

What is the best anticoagulation regime in pregnancy to protect her from valve thrombosis?

Warfarin throughout pregnancy switching to heparin 2–3 weeks before delivery

low molecular weight heparin for weeks 6–12 and warfarin for weeks 12–38, switching to heparin 2 weeks before delivery

low molecular weight heparin throughout with four-weekly monitoring of anti-Xa levels
D. low molecular weight heparin and aspirin throughout with four-weekly monitoring of anti-Xa levels

E. Warfarin throughout pregnancy with switch to heparin once in labour

A 28-year-old woman with Marfan syndrome presents 28 weeks pregnant, having been lost to follow-up, with a 47 mm sinus of Valsalva measurement on her echocardiogram (see Figure 5.3). There is a family history of aortic dissection.

Which one of the following would be the best recommended mode of delivery?

Normal vaginal delivery with analgesia only as required because of the haemodynamic changes induced by epidural anaesthesia

Normal vaginal delivery with surgeon on standby and a low threshold for epidural analgesia
C. Vaginal delivery with elective combined spinal/epidural and completely passive second stage (pushing stage) with lift-out forceps/ventouse

Vaginal delivery with elective combined spinal/epidural and up to 30 minutes of pushing

Elective Caesarean section with cardiothoracic surgeon on standby

A 42-year-old woman presents 38 weeks pregnant with her fourth child with a 1 hour history of severe sudden-onset dull central chest pain associated with sweating and dyspnoea. She is diabetic, obese, and a smoker. The eCG shows 4 mm of ST elevation in the anterior leads.

What is the ideal management?

urgent thrombolysis to avoid the radiation risk of coronary angiography to the baby

primary angioplasty optimally with a drug eluting stent

primary angioplasty optimally avoiding a drug eluting stent

Emergency delivery and subsequent standard primary angioplasty

use morphine, nitrates, aspirin, and heparin, and try to avoid intervention and inducing labour

A 30-year-old woman presents to the clinic 17 weeks pregnant and becoming increasingly breathless. The LVEDD is 6.1 cm and the eF is estimated at 25%.

Which one of the following statements is false?

Termination of pregnancy is justified on medical grounds

An ACE inhibitor and beta-blocker should be started as soon as possible

prescribing a nitrate and hydralazine may cause the symptoms to subside

The patient should rest and be admitted to hospital for this if necessary

premature delivery is likely

A 19-year-old woman was born with transposition of the great arteries and had a Mustard repair. She has been well throughout her pregnancy, but presents at 37 weeks with a week of worsening dull central chest pain on exertion, associated with shortness of breath.

Which one of the following statements is false?

The woman is probably suffering from coronary insufficiency because the hypertrophied right ventricle only has a single-vessel blood supply

This is an acute coronary syndrome in pregnancy, which may be a dissection; the patient should go to the catheterization laboratory

The patient should be treated with bed rest and antianginals

The patient should be induced if the cervix is favourable

The baby should be delivered

A 27-year-old woman presents at 26 weeks gestation in pulmonary oedema. She recently moved to the uK from Pakistan but was previously well. An echocardiogram showed mitral valve disease. The MV area is 1.0 cm², mean gradient is 25 mmHg, and PHT is 220 ms.

What is the most appropriate treatment?

Deliver the baby by Caesarean section and arrange balloon mitral valvuloplasty

Deliver the baby by Caesarean section and arrange mitral valve replacement

Arrange urgent mitral valve replacement surgery

Arrange an urgent balloon mitral valvuloplasty

Bed rest, give diuretics, and treat with a beta-blocker

A 38-year-old woman presents 34 weeks pregnant to the ED in atrial fibrillation. Blood pressure is 110/62 mmHg. echocardiography and blood test results are normal.

Which of the following is not a good first line of action?

iV amiodarone

iV flecainide

DC cardioversion

iV labetalol

iV digoxin

A 40-year-old man is referred to the cardiology outpatient clinic from the ED where he had presented with a cough. A CXR had been performed and had demonstrated a widened mediastinum. A CT thorax was requested which demonstrated a 6.1 cm aneurysm in the ascending aorta. Therefore he was referred to you for further follow-up.

Which one of the following is true regarding the pathophysiology of aortic aneurysms?

The presence of a bicuspid aortic valve doubles the risk of dissection

Bicuspid aortic valves account for 2% of all dissections

Dissection in patients with bicuspid aortic valves is due to post-stenotic dilatation of the ascending aorta

Previous surgery accounts for 2–4% of aortic aneurysms

Kawasaki syndrome tends to affect the coronary arteries of adults

What is the likelihood that the man in question 1, who does not have a known predisposition to dissection, will die within a year as a result of this aneurysm?

4.1%

2%

10.8%

19.5% E. 6.6%

With regard to the pathogenesis of aortic aneurysm, which one of the following is the most important factor?

Smoking

Hypertension

Cystic medial necrosis

Type 2 diabetes mellitus

Presence of FBN 1 gene

In which one of the following conditions does cystic medial necrosis occur?

Marfan syndrome

Ehlers–Danlos syndrome

Bicuspid aortic valve

Familial aortic dissection

All of the above

Which one of the following is true about the genetics of aortopathies?

Marfan syndrome is an X-linked recessive disorder

Turner’s syndrome is associated with congenital heart disease in 25% of cases

All forms of Ehlers–Danlos syndrome have a risk of aortic aneurysm formation

Two spot mutations in the fibrillin gene are known about

The MMP-9 gene has been reported as being associated with thoraco-aortic aneurysms

According to Laplace’s law, a doubling of the radius results in:

Four times the circumferential wall stress

Eight times the circumferential wall stress

Twice the circumferential wall stress

Half the circumferential wall stress

Makes no difference to the circumferential wall stress as long as the pressure reduces by 20 mmHg

A 33-year-old man is seen in the cardiology outpatient clinic. He is being followed up for aortic regurgitation. Which one of the following is true?

if he has Marfan syndrome and his aortic root measures 46 mm, he should be referred for aortic valve and root replacement

if he has a bicuspid aortic valve and his aortic root measures 51 mm, he should be referred for aortic valve and root replacement

if he has neither Marfan syndrome nor a bicuspid valve but his aortic root measures

57 mm, he should be referred for aortic valve and root replacement

if he has neither Marfan syndrome nor a bicuspid aortic valve but his aortic root measures 47 mm and he has moderate Ar with an end-diastolic dimension of 64 mm, he should be referred for an aortic valve and root replacement

Answers A, B, and C correct

You see a 60-year-old musician in the outpatient clinic who discharged himself 2 weeks previously following admission with a confirmed type B dissection of the aorta. He tells you that he doesn't want to take any medication as he prefers natural healing methods. His blood pressure is 180/90 mmHg. He asks you what the future holds for him off medication.

What can you tell him that the data suggest if he has no treatment?

Approximately 1/6 (16%) are dead within a year and 1/5 (20%) die within 5 years

Approximately 1/20 (5%) are dead within a year and 1/10 (10%) die within 5 years

Approximately a third (33%) are dead within a year and half (50%) die within 5 years

The type of tear in his aorta is not as serious as other types of tear and the herbal remedy *Echinacea* has been used successfully for this condition for hundreds of years in the Amazon delta

None of the above are true

A 63-year-old male is admitted to the ED of a district general hospital with a short history of sudden-onset sharp back pain and collapse. on examination he appears unwell, flushed, and diaphoretic. His blood pressure is 85/68 mmHg, his heart rate is 126 bpm, and his JVP is elevated. The emergency doctors suspect an acute dissection of the thoracic aorta which is duly confirmed on CT and extends from the sinuses of Valsalva to the aortic arch.

A moderate pericardial effusion is noted and you are called to 'drain this as the patient has cardiac tamponade'. What should you do?

Drain the effusion under direct ultrasound guidance and then refer the patient to the cardiothoracic unit for emergency surgery

Transfer the patient urgently to the nearest cardiothoracic unit for emergency surgery

Fluid resuscitate the patient on the CCU and re-echo him to assess for echocardiographic signs of tamponade

Perform urgent transoesophageal echocardiography to assess the location of the dissection flap and determine the location of the presumed fistula from the aorta to the pericardium E. Perform a CT coronary angiogram to assess the need for revascularization

How should an individual with blood pressure recordings of 161/97 mmHg be classified?

High normal

Grade 1 hypertension C. Grade 2 hypertension

Grade 3 hypertension

isolated systolic hypertension

An overweight (BMi 35) 45-year old man has been referred for investigation of his high blood pressure (160/95 mmHg). He has no significant past medical or family history, but socially he consumes at least 15 pints of beer per week and smokes five cigarettes per day. A 24-hour urinary cortisol is raised and low-dose dexamethasone test is normal. What is the appropriate management?

Advise lifestyle changes including weight loss, exercise, and reduced alcohol intake

A renal ultrasound

A MiBi scan

refer to an endocrinologist

Commence an ACE inhibitor

A 16-year-old patient has been referred to you for investigation of a murmur. Auscultation reveals a mid-systolic murmur on the anterior chest. There does not appear to be a radiofemoral delay, but the recorded brachial blood pressure is 143/90 mmHg. There is a family history of premature stroke but no family history of kidney problems.

What would the best investigation be?

Echocardiogram

CT aorta

Cardiac Mri

renal ultrasound

Cerebral MrA

A patient is followed up at a 6-week appointment following a primary percutaneous intervention for an anterior sTEMi. An echocardiogram pre-discharge estimated overall LVEF as 40%. He is asymptomatic, compliant with all medications, and has no problems from side effects. His blood pressure is 95/70 mmHg, with no evidence of a postural drop, and his heart rate is 55 bpm. His GP has recently increased his medication to 5 mg bisoprolol and 7.5 mg ramipril.

What are your recommendations?

Continue on the current regime

reduce ramipril to 5 mg

reduce bisoprolol to 2.5 mg

reduce both medications

repeat echocardiogram to assess the left ventricle and then decide the treatment regime

A 65-year-old hypertensive non-diabetic has an eGFR <40.

screening tests showed microalbuminuria and a normal renal ultrasound.

Which class of antihypertensive medication should you instigate?

ACE inhibitor

Beta-blocker

Calcium-channel blocker

Thiazide diuretic

Angiotensin receptor blocker

The side effects of the broad spectrum of calcium-channel blockers (CCBs) include the following, except:

Peripheral oedema

Gum hypertrophy

Dyslipidaemia

Negatively inotropic

Negatively chronotropic

Which one of the following antihypertensive medications might you use to try and prevent new-onset atrial fibrillation?

Atenolol

Amlodopine

Bisoprolol

Digoxin

Losartan

The following is true of hypertension in the elderly, except:

There is an age-associated increase in systolic blood pressure (SBP)

There is decreased variability in blood pressure

Beta-blocker use should be limited to specific indications

There is good evidence for the treatment of hypertension in the very elderly (>80 years)

it is associated with vascular dementia and Alzheimer's disease

The following are risk factors for pre-eclampsia, except:

First pregnancy

Multiple pregnancies

Long-term partner

Pre-existing hypertension

Family history

Guidelines for the use of a statin in hypertension include the following, except:

Following a stroke

Type 2 diabetic diagnosed 11 years previously

Primary prevention with a CVD risk of 25%

Target levels of LDL <2 mmol/L and total cholesterol <4 mmol/L

Primary prevention in an 80-year-old