Passing the FRACP Written Examination

Questions and Answers

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Surjit Tarafdar
Danielle Wu

WILEY Blackwell

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Contents

Introduction

If you want to get out of medicine the fullest enjoyment, be students all your lives.

David Reisman (1867–1940)

Background to the examination

The Royal Australasian College of Physicians (RACP) examination consists of two parts – a written examination and a clinical examination. The written examination has two papers – Paper 1 (70 questions) and Paper 2 (100 questions), which focus on 'Basic Sciences' and 'Clinical Practice', respectively. The primary focus of this book is to help candidates prepare for the written component of the examination. The written examination is important because trainees are required to pass this before proceeding to the clinical examination and commencing advanced training in a subspecialty. Questions in the written examination are based on the curriculum and all candidates should familiarise themselves with the RACP curriculum for Basic Physician training, which is available electronically from the College website (http://www.racp.edu.au/page/curricula/adult-internal-medicine). It is vital to carefully read the most updated examination instructions (https://www.racp.edu.au/page/basic-training/written-exam), and any past questions provided by the RACP (https://www.racp.edu.au/share/page/site/pastexams/documentlibrary).

Although this book is written mainly for trainees in Australia and New Zealand, physician trainees in other programmes should still find these questions provide an opportunity for self-assessment and learning.

Questions are of two styles – multiple choice questions (MCQs) and extended matching questions (EMQs). In the MCQs, one correct answer must be selected from five possible responses to the stem. Commencing in 2013, EMQs will also be included. EMQs are organised into four parts:

1. **Theme.** There is a theme for each EMQ. This can include a symptom, investigation, diagnosis or treatment, e.g. back pain, dyspnoea, diabetes, corticosteroids.
2. **A list of possible answers, also called an option list.** This is a list of eight possible answers marked A–H.
3. **The question, also called the lead in statement.** This tells you what is being asked and clarifies the question being asked. It indicates the relationship between the clinical vignettes and the options.
4. **Clinical problems or vignettes, also called the stems.** This will usually consist of a clinical problem. There may be more than one clinical vignette for each theme.

This book has included a significant number of EMQs to help trainees familiarise themselves with this new and likely expanding format of assessment.

Question answering strategies

In Paper 1, the questions posed are commonly of the type, 'What is the likely mechanism for this disease process or treatment modality?', requiring the candidate to understand the underlying mechanism of disease pathophysiology and/or mechanism of actions for treatments that are used.

The knowledge and evidence gained from textbooks or journal articles and its application to clinical situations is one of the most challenging tasks in medicine. The retention of information, organisation of facts and recall of a myriad of data in relation to a patient is one of the crucial processes in clinical reasoning. One of the purposes of this book is to facilitate this process.

There are typically several steps in patient clinical management – making the diagnosis, assessing the severity of the disease, administering treatment according to the stage of disease and following the patient's response to treatment. Often in the MCQs or EMQs, more focused information is provided and candidates have to look for discriminating features to narrow the differential diagnosis. This is often a challenging but essential step to master as a physician. The question 'What is the next step?' is challenging because the next step may be more diagnostic evaluation, or staging, or therapy.

In general, the questions will assess knowledge of the following:

- Aetiology, epidemiology and genetics
- Anatomy, physiology, pathology and pathogenesis
- Clinical manifestations
- Diagnosis and investigations
- Treatment and prevention of disease
- Complications and outcomes
- Ethical, legal, social, economic, humanistic and historical aspects.

Candidates taking the written examination can sometimes be troubled by the wording of the questions, as when asked which features are *classical*, *characteristic* or *typical* of certain disorders, whether events are *likely*, *frequent*, *common*, *unusual* or *rare* and whether findings are expected in the *majority* or *minority* of cases or in *few* or *many* patients. For this reasons, we prefer, wherever possible, to minimise language problems with stems and responses. However it is not always possible to provide accurate numeric percentages (even approximate ones).

When answering questions and taking the examination we would emphasise the following:

- **Read the question carefully!**
- **Read the possible answers carefully!**
- **Answer all of the questions! (Make an informed guess if you are uncertain)**
- If you are uncertain about the correct response, look at which options you think are definitely incorrect. Think about why the question is being asked; what it

is 'getting at?'; what are the important 'teaching points' that are being tested? If you still are uncertain, move to the other questions and then come back to those you are not certain of.

'Hints and tips' for preparing for the FRACP examination

The best way of preparing for the physician examination, both written and clinical, is to learn from every encounter with a patient and the rest of the treating team (consultant physicians, advanced physician trainees, nurses and other health team members). Then, trainees are encouraged to use information gained from medical books (and increasingly electronic books) and journal articles to complement their education through reflection on their patient encounter. All trainees are encouraged to make the most of their learning encounters with patients; question what a symptom or sign indicates, what the most specific or sensitive diagnostic test to undertake is, what the evidence for the treatment being recommended is, how a complication can be prevented or a patient outcome improved. Even a small amount of reading or thought around a specific patient can be a very powerful learning experience.

Study effectively, do not just randomly read an article from a journal or a few pages in a textbook. Link your study to a question you could not answer or to a patient you saw last night. Cover the RACP curriculum fully, including the less obviously mainstream topics, such as statistics and psychiatry. Make sure you are studying not just reading. Make your own study notes, write down important facts, and practise relevant examination questions. Be disciplined about your study, switch off your phone, disconnect the internet and reward yourself with well-defined and enjoyable breaks.

Many trainees have found getting together as a small group to discuss and learn from each other is a useful way of preparing for this examination. Such small group dynamics are also a helpful way of supporting one another through the intense preparation.

Ensure that you have undertaken practice examinations multiple times under examination conditions and timings. **Make sure you have answered and understood all of the practice questions provided by the RACP.**

Using this book as a learning tool

This book is intended as a tool to direct basic physician trainees in their learning of core knowledge and skills in internal medicine, as well as the development of sound clinical reasoning. The content of this book sets out factual information, but also translates knowledge to clinical practice. Preparing for the physician examination is part of a lifelong process of learning, which should expand the trainee's attitude, skills and knowledge. It is this process of learning that enables a physician to cope with the ever-changing context in the practice of internal medicine. The trainee or groups of trainees can use this book in their personal

studies or as part of their study group discussion. This book is not intended to cover the entire internal medicine curriculum comprehensively, but we have attempted to cover in particular topics that are rapidly evolving. For example, we have given attention to issues related to healthcare in an ageing population, disparity in indigenous health outcomes, advances in molecular science and genetics, and the complexity of care arising from multiple chronic illnesses in individual patients.

Whist we hope that many of the questions are similar to those in the actual examination, some are designed to 'teach' particularly important issues or to draw attention to contemporary topics. The commentaries explain the correct and incorrect responses. These commentaries have been prepared by the authors with input from experienced specialist physicians. For many subjects we have provided a reference, usually the best and most contemporary review we could identify at the time of writing. Reference texts are listed for further reading and as additional guides to study.

Some of the electronic or written resources on general internal medicine we recommend for use in the examination preparation are:
Up-to-date (www.uptodate.com)
New England Journal of Medicine (www.nejm.org)
Lancet (www.thelancet.com)
British Medical Journal (www.bmj.com)
Internal Medicine Journal (www.racp.edu.au/page/publications/internal-medicine-journal)
Medical Journal of Australia (www.mja.com.au)

Preparation time

In the lead-up to the examinations, it is important to maintain a healthy life of adequate sleep, exercise, food intake and socialization. Trainees are encouraged to set aside time for their clinical work, studies, family, social and recreational activities in a manner that is appropriate to each of them. It is best to study when the trainee's mind is fresh and able to concentrate on learning. As already mentioned, trainees should also make the most of their time in clinical work where experience will enhance the learning process.

Preparing for this examination should not lead to 'burn-out' for trainee-physicians. During the preparation period, the trainee should value the support received from family, peers and friends.

Disclaimer

Clinical practice and basic biomedical sciences are constantly changing and today's incontrovertible facts can quickly become outdated. Therefore, trainees are strongly encouraged to keep up-to-date with their reading and learning, and to check appropriate drug selection, dosage and route of administration. If you have any questions or suggestions, please write to us care of the publisher.

We hope that our contribution will assist you in your preparation for the examination in internal medicine. For every trainee that uses this book for their preparation, we wish you success in the RACP written examination or equivalent.

To all students of medicine who listen, look, touch and reflect;
may they hear, see, feel and comprehend.
Professor John B. Barlow in *Perspectives on the Mitral Valve*

Jonathan Gleadle
Tuck Yong
Jordan Li
Surjit Tarafdar
Danielle Wu

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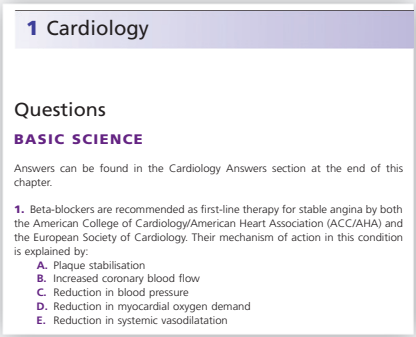
Dr Su Yin Lau, Advanced Trainee in Gastroenterology and Hepatology

Basic physician trainees in the Southern Adelaide Local Health Network who have 'tested' these questions and provided valuable feedback.

Features contained in your study aid

Question and answer sections are clearly indicated for quick reference.

Question sections:



1 Cardiology

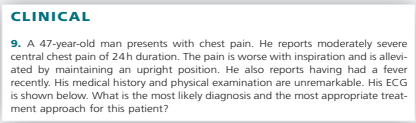
Questions

BASIC SCIENCE

Answers can be found in the Cardiology Answers section at the end of this chapter.

1. Beta-blockers are recommended as first-line therapy for stable angina by both the American College of Cardiology/American Heart Association (ACC/AHA) and the European Society of Cardiology. Their mechanism of action in this condition is explained by:

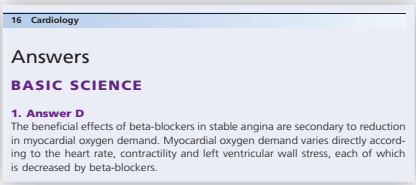
A. Plaque stabilisation
B. Increased coronary blood flow
C. Reduction in blood pressure
D. Reduction in myocardial oxygen demand
E. Reduction in systemic vasodilatation



CLINICAL

9. A 47-year-old man presents with chest pain. He reports moderately severe central chest pain of 24 h duration. The pain is worse with inspiration and is alleviated by maintaining an upright position. He also reports having had a fever recently. His medical history and physical examination are unremarkable. His ECG is shown below. What is the most likely diagnosis and the most appropriate treatment approach for this patient?

Answer sections:

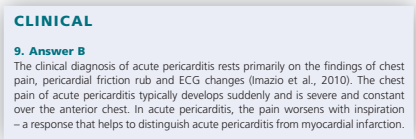


16 Cardiology

Answers

BASIC SCIENCE

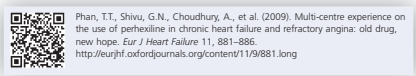
1. Answer D
The beneficial effects of beta-blockers in stable angina are secondary to reduction in myocardial oxygen demand. Myocardial oxygen demand varies directly according to the heart rate, contractility and left ventricular wall stress, each of which is decreased by beta-blockers.



CLINICAL

9. Answer B
The clinical diagnosis of acute pericarditis rests primarily on the findings of chest pain, pericardial friction rub and ECG changes (Imazio et al., 2010). The chest pain of acute pericarditis typically develops suddenly and is severe and constant over the anterior chest. In acute pericarditis, the pain worsens with inspiration – a response that helps to distinguish acute pericarditis from myocardial infarction.

Answers are linked to an authoritative reference to supplement your study. Scan the QR code on your mobile device to be taken directly to the reference.



Phan, T.T., Shivu, G.N., Choudhury, A., et al. (2009). Multi-centre experience on the use of perhexiline in chronic heart failure and refractory angina: old drug, new hope. *Eur J Heart Failure* 11, 881–886. http://eurjhf.oxfordjournals.org/content/11/9/881.long

1 Cardiology

Questions

BASIC SCIENCE

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- **A.** Plaque stabilisation
- **B.** Increased coronary blood flow
- **C.** Reduction in blood pressure
- **D.** Reduction in myocardial oxygen demand
- **E.** Reduction in systemic vasodilatation

2. Which one of the following compensatory mechanisms occurs in heart failure?

- **A.** Decreased ventricular preload
- **B.** Peripheral vasodilatation
- **C.** Increased renal sodium and water excretion
- **D.** Activation of the adrenergic nervous system
- **E.** Myocardial atrophy

3. Which is the most common origin of idiopathic ventricular tachycardia in the absence of structural heart disease?

- **A.** Aortic annulus
- **B.** Aortic sinuses
- **C.** Great cardiac vein
- **D.** Epicardium
- **E.** Right ventricular outflow tract

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4. Which one of the following viral infections is the commonest cause of myocarditis in developed countries?

- **A.** Enterovirus
- **B.** Cytomegalovirus
- **C.** Hepatitis C virus
- **D.** Human immunodeficiency virus (HIV)
- **E.** Influenza virus

5. Which one of the following statements is correct regarding the electrical conduction and contraction of the heart?

- **A.** Electrical conduction is transmitted from the sino-atrial node to the bundle of His to the atrioventricular node to the Purkinje fibres to the myocardium
- **B.** Muscle contraction is associated with release of calcium by the sarcoplasmic reticulum
- **C.** Repolarisation of cardiac muscle is due to flow of potassium into the myocytes
- **D.** On an electrocardiogram the QRS complex corresponds to ventricular repolarisation
- **E.** The perfusion of the coronary arteries increases during systole

6. Perhexiline has been used in patients with chronic heart failure and refractory angina. Which one of the following statements about perhexiline is correct?

- **A.** It is metabolised by cytochrome P450 3A4
- **B.** About 7–10% of Caucasians are slow metabolisers
- **C.** The recommended dose for slow metabolisers is 100 mg on alternate days
- **D.** It can cause hyperglycaemia in diabetic patients
- **E.** It improves 5-year survival

Theme: Beta-blockers (for Questions 7 and 8)

- **A.** Propranolol
- **B.** Metoprolol
- **C.** Nebivolol
- **D.** Atenolol
- **E.** Pindolol
- **F.** Sotalol
- **G.** Bisoprolol
- **H.** Carvedilol

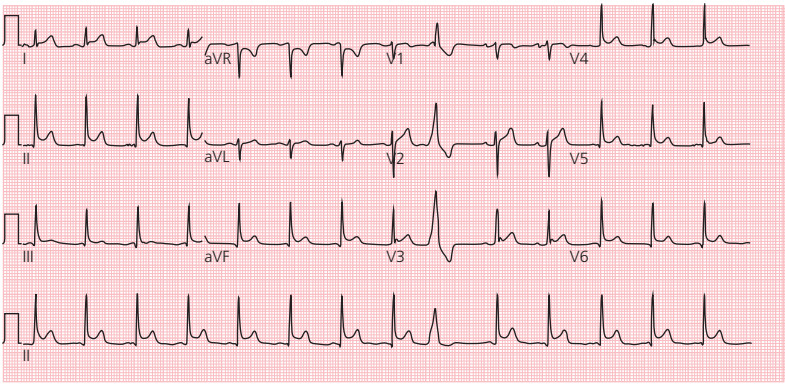
Select the drug that best fits the description in each of the following statements.

7. A non-selective beta-blocker with α_1-adrenoreceptor blocking activity.

8. A selective β1-adrenoreceptor blocker with nitric-oxide potentiating vasodilatory effect.

CLINICAL

9. A 47-year-old man presents with chest pain. He reports moderately severe central chest pain of 24 h duration. The pain is worse with inspiration and is alleviated by maintaining an upright position. He also reports having had a fever recently. His medical history and physical examination are unremarkable. His ECG is shown below. What is the most likely diagnosis and the most appropriate treatment approach for this patient?



A. Acute pericarditis; perform an echocardiogram in 1 week to confirm diagnosis
B. Acute pericarditis; start a non-steroidal anti-inflammatory drug (NSAID)
C. Acute pericarditis; start prednisolone
D. ST elevation myocardial infarction; start thrombolytics
E. Pericardial tamponade; requires pericardiocentesis

10. A 21-year-old Aboriginal woman presents with a sore throat for 2 days. She has fever (38°C) and coryza. On physical examination, the patient appears well but has a markedly infected posterior pharynx and exudates over her tonsils. Streptococcal pharyngitis is suspected. Which one of the following approaches to management is most appropriate?

A. A throat swab is adequate to establish diagnosis in Aboriginal patients
B. Intravenous benzylpenicillin 1.2 g four times a day for 10 days is the treatment of choice in eradicating Group A streptococci from the nasopharynx
C. Treatment should be started within 9 days of the onset of symptoms to prevent acute rheumatic fever
D. Aspirin can prevent rheumatic chorea
E. Asymptomatic family contacts of patients with streptococcal pharyngitis should have throat swabs for streptococcal infection

11. A 50-year-old man presents with a 2-h history of severe chest pain. The pain started suddenly while eating, was constant and radiated to the back and interscapular region. His past medical history includes hypertension and hyperlipidaemia. On examination, his heart rate is 120 beats/min and his blood pressure is 80/40 mmHg. Jugular venous pressure is not visualised. All peripheral pulses are present and equal. While stabilising the patient, which one of the following investigations should be undertaken?

- **A.** Serum lipase
- **B.** Computed tomography (CT) angiography of the chest
- **C.** D-dimer
- **D.** Lung ventilation–perfusion scan
- **E.** Upper gastrointestinal endoscopy

12. Which one of the following best describes the use of plasma brain natriuretic peptide (BNP) in the assessment of congestive heart failure (CHF)?

- **A.** BNP level is more useful in detecting diastolic heart failure than systolic heart failure
- **B.** Measurement of BNP is recommended as routine in the diagnosis of CHF
- **C.** BNP offers additional diagnostic information beyond that provided by echocardiogram
- **D.** BNP levels have been shown to predict all-cause mortality, including sudden death
- **E.** Plasma BNP or N-terminal pro-BNP measurement is not useful in patients presenting with new-onset breathlessness

13. A 46-year-old woman presents with a 2-week history of shortness of breath and ankle swelling. On examination her jugular venous pressure (JVP) is elevated and there are fine crackles at the bases of both lungs on auscultation. She was diagnosed with breast cancer a year ago and has been treated with surgery, doxorubicin, cyclophosphamide and radiotherapy. She has no cardiac risk factors or family history of cardiac disease. Computed tomography pulmonary angiography (CTPA) is normal and chest X-ray shows interstitial pulmonary oedema. What is the most likely cause for this presentation?

- **A.** Anthracycline cardiotoxicity
- **B.** Constrictive pericarditis
- **C.** Pulmonary fibrosis
- **D.** Radiation-induced cardiomyopathy
- **E.** Pulmonary embolism

14. All of the following drugs can be utilised in patients with heart failure. Which one is the most effective in improving systolic function?

- **A.** Spironolactone
- **B.** Angiotensin converting enzyme (ACE) inhibitor
- **C.** Digoxin

D. Frusemide
E. Hydralazine

15. A 72-year-old man describes substernal chest pressure while walking for more than 100 m and this is relieved by rest. His medical history is remarkable for hypertension and a myocardial infarction 3 years ago. His medications include aspirin 150 mg daily; metoprolol 50 mg twice daily; atorvastatin 40 mg daily; perindopril 5 mg daily; and isosorbide mononitrate 120 mg daily. He had a cardiac catheterisation 1 month ago that showed a left main coronary artery stenosis of 85%, a proximal left anterior descending artery stenosis of 70% and a 80% stenosis of the first obtuse marginal branch. His left ventricular ejection fraction (LVEF) was estimated at 45%. Which one of the following therapies would be most beneficial for this patient?

A. Addition of clopidogrel
B. Regular exercise programme
C. Percutaneous transluminal angioplasty (PCTA)
D. Coronary artery bypass grafting (CABG)
E. Transmyocardial revascularisation procedure (TMR)

16. The use of computed tomography coronary angiography (CTCA) is most appropriate in which one of the following patients?

A. An asymptomatic patient who has a strong family history of ischaemic heart disease
B. A patient with coronary stents presenting with chest pain in whom you suspect in-stent restenosis
C. A patient presenting with severe crushing chest pain and an ECG showing ST-elevation myocardial infarction (STEMI)
D. A patient presenting with chest pain and palpitations and an ECG showing rapid atrial fibrillation (heart rate: 125 beats/min)
E. A patient with chest pain with normal serial cardiac enzymes and ECGs who you think has a low-to-intermediate pre-test probability of coronary artery disease

17. An 86-year-old woman with a history of ischaemic heart disease, atrial fibrillation and type 2 diabetes presented to the emergency department with flank pain and symptomatic anaemia with haemoglobin of 69 g/L. After abdominal CT imaging, she was found to have a retroperitoneal haemorrhage. Three weeks prior to the presentation she had been changed from warfarin to dabigatran (taking a standard dose of 150 mg twice a day) for stroke prevention. Prior to this change, her INR has been within the target range for 6 years. What is the most likely explanation for the significant haemorrhagic complication in this patient after commencing dabigatran?

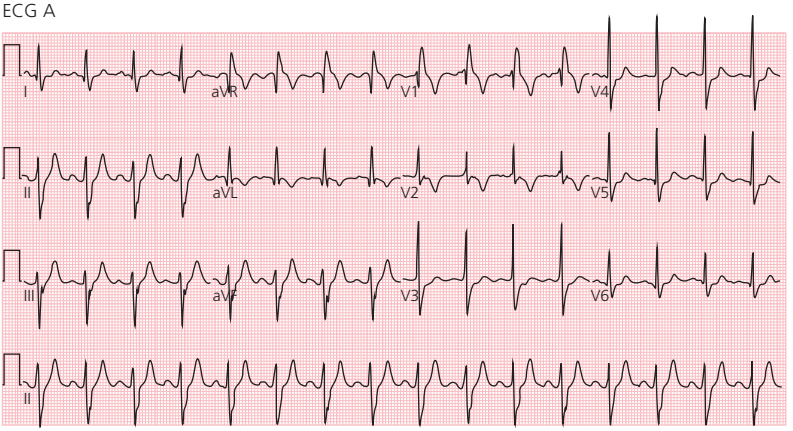
A. She is also taking phenytoin
B. She has impaired renal function

C. Her atrial fibrillation had reverted to sinus rhythm
D. Her INR has not been checked during the 3 weeks on the new medication
E. She is also taking digoxin

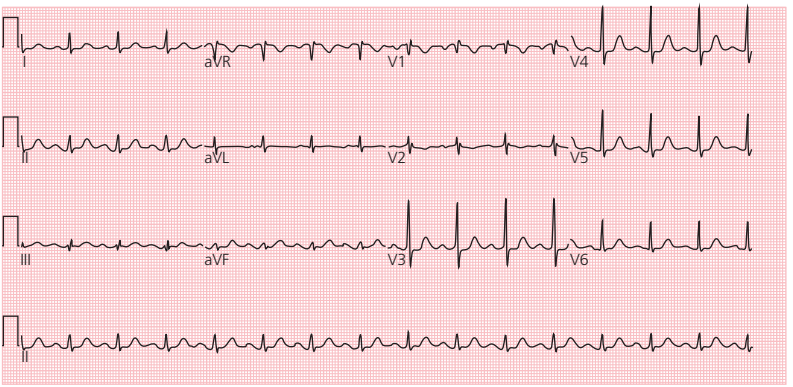
18. A 60-year-old man has had an inferior myocardial infarction 5 days ago. Today he is feeling lightheaded and his pulse rate is 40 beats/min. Blood pressure is 85/65 mmHg. An ECG is done immediately. Which one of the following findings is an indication for temporary pacing?

A. (ECG A)
B. (ECG B)
C. (ECG C)
D. (ECG D)
E. (ECG E)

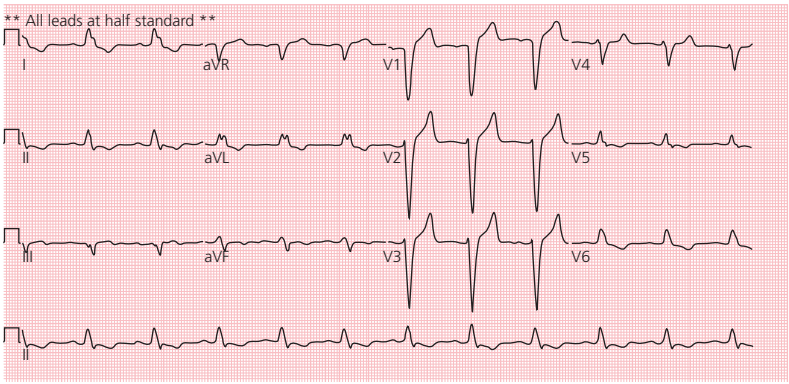
ECG A



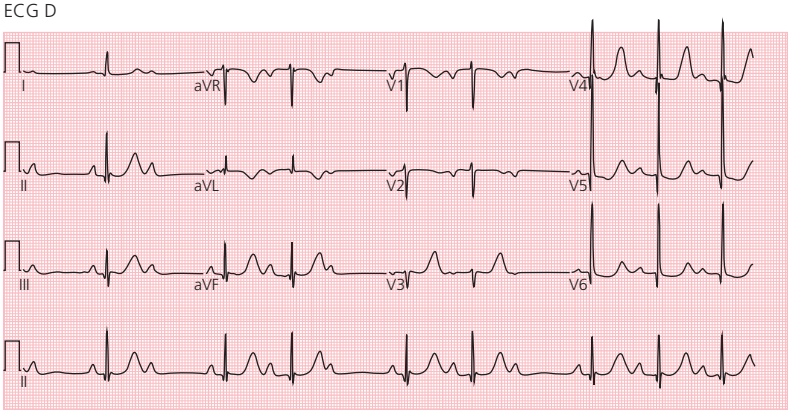
ECG B



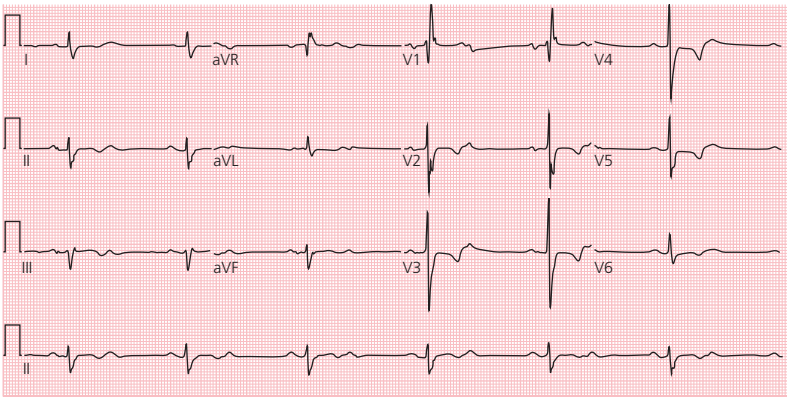
ECG C



ECG D



ECG E



19. During pregnancy, which one of the following heart diseases is associated with the highest maternal mortality?

- **A.** Aortic stenosis
- **B.** Atrial septal defect
- **C.** Coarctation of aorta
- **D.** Eisenmenger syndrome
- **E.** Mitral stenosis

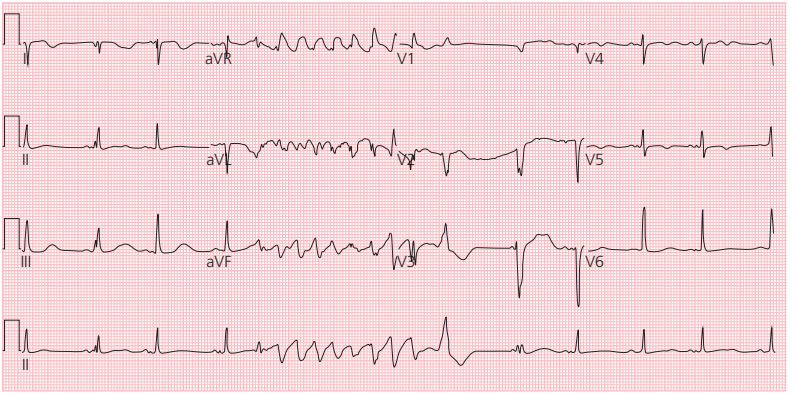
20. A 22-year-old man who is known to have hypertrophic cardiomyopathy undergoes physical and echocardiographic examination. Which one of the following findings is most predictive of this patient's risk of sudden cardiac death?

- **A.** Hypertension
- **B.** Double apex beat
- **C.** Atrial dilatation
- **D.** Intensity of systolic murmur
- **E.** Septal wall thickness of 3 cm or greater

21. Which is the commonest organism causing prosthetic valve infective endocarditis?

- **A.** *Staphylococcus aureus*
- **B.** Coagulase-negative staphylococcus
- **C.** *Streptococcus bovis*
- **D.** Candida
- **E.** *Streptococcus viridans*

22. A 16-year-old girl has a cardiac arrest while visiting her grandmother in hospital and has the ECG shown below. She revives after DC shock and all the subsequent ECGs show a prolonged QT interval. Blood tests rule out any metabolic derangement. Two of her first-degree relatives died suddenly at a young age. She should be treated with:



A. An implantable cardioverter–defibrillator
B. Beta-blocker
C. Quinidine
D. Sotalol
E. Verapamil

23. A 35-year-old man who is from an indigenous community in New Zealand has had mitral stenosis due to rheumatic heart disease. He has experienced some exertional dyspnoea recently. He attends a cardiology clinic with his most recent echocardiography results. Which one of the following features should prompt a referral for him to have a percutaneous balloon mitral valvuloplasty (PBMV)?

A. Mitral orifice area of 1.2 cm^2 with minimal calcification
B. The presence of severe mitral regurgitation
C. Dyspnoea classified as New York Heart Association functional class I
D. Mitral orifice area of 3 cm^2 with fusion of the subvalvular apparatus
E. Large left atrial thrombus

24. A 68-year-old male farmer is transferred from a country hospital following a late presentation with acute myocardial infarction. He suffered severe chest pain 2 days ago but did not seek medical treatment. While you are examining the patient you hear a pericardial rub and make a diagnosis of peri-infarction pericarditis. Which one of the following statements is correct?

A. Aspirin and heparin infusion should be stopped immediately
B. The patient should be commenced on ibuprofen
C. Reperfusion therapies are associated with a reduced incidence of peri-infarction pericarditis
D. The patient should be commenced on high-dose prednisolone
E. The echocardiogram is likely to show preserved ejection fraction

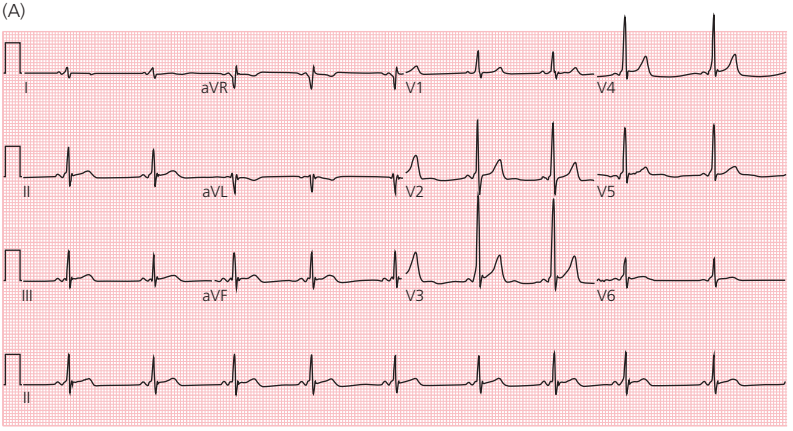
25. A 35-year-old man presents to the emergency department with a 1-h history of feeling his heart racing and slight chest discomfort. He has had two similar episodes previously following alcohol binges. An electrocardiography shows a regular narrow complex tachycardia with a rate of 180 beats/min. He otherwise feels well, his blood pressure is 98/68 mmHg and pulse oximetry on air shows oxygen saturation of 97%. What treatment should be administered?

A. Electrical cardioversion
B. Intravenous lignocaine
C. Intravenous adenosine
D. Intravenous digoxin
E. Intravenous verapamil

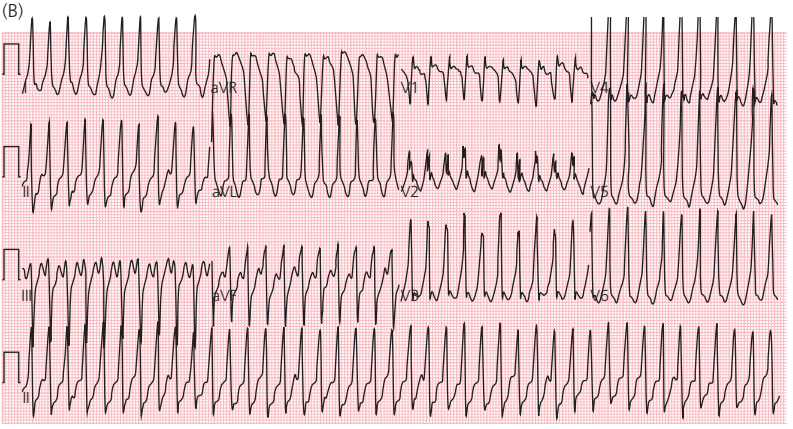
26. A 45-year-man presents with a 24-h history of palpitations and chest discomfort. He had one similar episode 5 years ago. He is known to have asthma since childhood and uses a salbutamol inhaler two to three times a week. His initial examination reveals blood pressure of 110/60 mmHg, pulse rate 152 beats/min

and oxygen saturation on room air of 95%. There is a scattered expiratory wheeze but no cardiac murmur. His ECG taken 5 years ago when he was admitted with an acute asthma attack is shown below (A) and his current ECG (B). His biochemistry results are unremarkable and the troponin T level is normal. Which one of the following medications should be administered to achieve rate control?

(A)



(B)



A. Intravenous adenosine
B. Intravenous atenolol
C. Intravenous loading dose of digoxin
D. Intravenous flecainide
E. Intravenous verapamil

27. A 75-year old man presents to hospital with a 2-week history of malaise and low-grade fever. He also has had chronic diarrhoea for the past 3 months and a 5-kg weight loss. On examination, his blood pressure is 100/70 mmHg, heart rate 110 beats/min and temperature of 38.4° C. A diastolic murmur (3/6) is heard at the left sternal edge. He is mildly anaemic with mean cell volume (MCV) of 76 fL (normal reference range 80–100 fL). Blood cultures grow *Streptococcus bovis* and transoesophageal echocardiography reveals vegetations on the aortic valve. What additional investigations should be undertaken?

A. Cardiac magnetic resonance imaging
B. Computed tomography of the abdomen
C. Orthopantomogram (OPG)
D. Colonoscopy
E. White cell scan

28. Which one of the following disorders does NOT cause high-output heart failure?

A. Hyperthyroidism
B. Paget disease
C. Brachio-cephalic arteriovenous fistula
D. Cirrhosis
E. Amyloidosis

29. A 60-year-old woman is diagnosed with *Streptococcus viridians* endocarditis involving the mitral valve. Which one of the following is a poor prognostic factor?

A. Left ventricular ejection fraction of 50%
B. Perivalvular extension of infection
C. Recent dental extraction
D. Previous adverse drug reaction to penicillin
E. Previous abdominal aortic aneurysm repair

30. A 72-year-old man presents with a 2-day history of pain in his toes. He presented to another hospital with chest pain and received a coronary angiography 7 days ago. His other medical problems include hypertension, type 2 diabetes, chronic kidney disease with a serum creatinine of 156 μmol/L and osteoarthritis. He is taking aspirin, clopidogrel, metformin, atorvastatin and perindopril. On examination, he is afebrile, peripheral pulses are difficult to palpate and toes are painful to touch. His initial blood test results are shown below. Which one of the following diagnoses is most likely?

	Value	Reference range
Haemoglobin	82 g/L	115–155 g/L
White blood cells	13.0×10^9 cells/L	$4.0–11.0 \times 10^9$ cells/L
Platelet count	593×10^9 cells/L	$150–400 \times 10^9$ cells/L
Lactate dehydrogenase	344 U/L	110–230 U/L
Creatinine	287 μmol/L	80–120 μmol/L
Urate	0.69 μmol/L	0.21–0.48 μmol/L

A. Contrast nephropathy
B. Renal embolus
C. Cholesterol emboli
D. Cryoglobulinaemia
E. Metformin-induced renal failure

31. A 72-year-old man who was admitted with an inferior myocardial infarction has a cardiac arrest on the way to the angiogram suite. After three cycles of cardiopulmonary resuscitation (CPR), two boluses of 1 mg epinephrine (adrenaline) and two defibrillator shocks, his electrocardiography remains unchanged and is shown below. What is the next most appropriate step?

A. 3 mg of epinephrine (adrenaline)
B. 40 units of vasopressin
C. 10 ml of 10% calcium chloride
D. 10 ml of magnesium sulphate
E. 300 mg of amiodarone

32. A 66-year-old woman is admitted for fixation of a left hip fracture. She has a history of osteoporosis and hypertension, but is otherwise in good health. She has no history of chest pain, but she says she experiences dyspnoea after walking about 400 m. She has a 30 pack-year smoking history but stopped 5 years ago. She is currently taking an angiotensin converting-enzyme inhibitor for her hypertension. What is the next most appropriate step in her assessment?
A. Transthoracic echocardiography
B. Dobutamine stress echocardiography
C. Coronary angiography
D. No further cardiac investigation
E. Cardiac magnetic resonance imaging

33. Which one of the following is the modality of choice for diagnosing and monitoring transplant coronary artery disease after orthotopic heart transplantation?
A. Clinical history
B. Coronary angiography
C. Exercise electrocardiography (ECG)
D. Myocardial contrast echocardiography
E. Intravascular ultrasound

34. A 53-year-old woman presents with dyspnoea and ankle oedema for 1 month. Her blood pressure is 110/80 mmHg. On examination, her jugular venous pressure rises with inspiration. She has a soft systolic murmur and a third heart sound. Electrocardiography (ECG) shows poor R-wave progression. An echocardiogram shows no pericardial effusion, increased ratio of early diastolic filling-to-atrial filling and systolic function is mildly impaired. Which one of the following is the most likely diagnosis?
A. Restrictive cardiomyopathy
B. Dilated cardiomyopathy
C. Constrictive pericarditis
D. Ischaemic cardiomyopathy
E. Pulmonary embolus

35. A patient with acute fulminant myocarditis is most likely to present with:
A. Dyspnoea
B. Palpitations
C. Hypotension
D. Fever
E. Chest pain

36. A 63-year-old woman is worried because her elder sister has just had a disabling stroke. Her blood pressure is 148/94 mmHg and her BMI is 30 kg/m^2. She wishes to reduce her blood pressure by non-pharmacological means. You should recommend which one of the following evidence-based measures?

- **A.** Weight reduction and a sodium intake of 5 g/day
- **B.** A diet reduced in sodium intake to less than 1 g/day
- **C.** Insist on starting an antihypertensive medication
- **D.** A diet reduced in potassium and sodium intake
- **E.** Weight reduction and the Dietary Approaches to Stop Hypertension (DASH) diet

Theme: Congenital heart disease (for Questions 37–40)

- **A.** Ostium secundum atrial septal defect
- **B.** Ventricular septal defect
- **C.** Patent ductus arteriosus
- **D.** Eisenmenger syndrome
- **E.** Tetralogy of Fallot
- **F.** Pulmonary stenosis
- **G.** Bicuspid aortic valve
- **H.** Coarctation of the aorta

For each of the following patients, select the most likely diagnosis.

37. A 32-year-old man presents to a hospital with fatigue and fever of 2 weeks' duration. He has no chest pain, dyspnoea or orthopnoea. He is known to have a 'heart murmur' since birth. On physical examination the only abnormal findings are a temperature of 38.3°C; a harsh systolic murmur is heard in the left lower sternal border; and the presence of small tender nodules are noted on two fingers. Which cardiac anomaly is most consistent with this patient's clinical presentation?

38. A 21-year-old woman is being evaluated for exertional dyspnoea. She has been having these symptoms for the past 4 months. Her medical history includes one episode of atrial fibrillation 1 month ago. Her physical examination shows fixed splitting of the second heart sound and a systolic murmur in the pulmonic area. An electrocardiogram shows slight right axis deviation and incomplete right bundle-branch block. A chest X-ray reveals an enlarged right atrium and main pulmonary artery. Which cardiac anomaly is the most likely diagnosis for this patient?

39. An 18-year-old man is being evaluated for a murmur and hypertension. He is asymptomatic. On physical examination his blood pressure is 170/100 mmHg in the right arm. The femoral pulses are diminished in amplitude compared to the radial pulses. His cardiac examination reveals a short mid-systolic murmur in the left infrascapular area. Which cardiac anomaly is the most likely diagnosis for this patient?