THE COLLEGES OF MEDICINE OF SOUTH AFRICA

Incorporated Association not for gain
Reg No 1955/000003/08

Examination for the Subspecialty Certificate in Cardiology of the College of Physicians of South Africa

21 February 2019

Paper 1 (3 hours)

All questions are to be answered. Each question to be answered in a separate book (or books if more than one is required for the one answer)

---

1 a) Write notes on the electro-anatomical and electrophysiological mechanisms that lead to atrial fibrillation. (15)

b) Discuss the different components of the conduction system that comprise the PR interval. (10)

c) Write notes on the blood supply of the cardiac conduction system. (8)

d) Discuss the genetic, cellular and ionic mechanisms responsible for the Brugada ECG pattern. (12)

[45]

2 a) Discuss the pathophysiology of functional mitral regurgitation (MR) and the principles behind its treatment. Refer to recent trials that highlight the use of the MitraClip device and their results. (15)

b) Explain platelet activation and aggregation by means of a diagram. Use the diagram to show how anti-platelet drugs exert their mechanism of action. (15)

c) Discuss the role of eicosapentaenoic acid (EPA) in atherosclerosis, with specific reference to mechanisms of action and results of pertinent trials of its use. (15)

[45]

3 a) Answer the following questions regarding cancer therapy causing cardiac damage

i) Describe the mechanisms by which cancer therapy may cause cardiac damage. (10)

ii) Discuss what strategies one could follow to prevent cardiac damage in cancer patients. (5)

b) What are PCSK9 inhibitors? Describe their mechanism of action and discuss the evidence for their use in cardiology. (10)

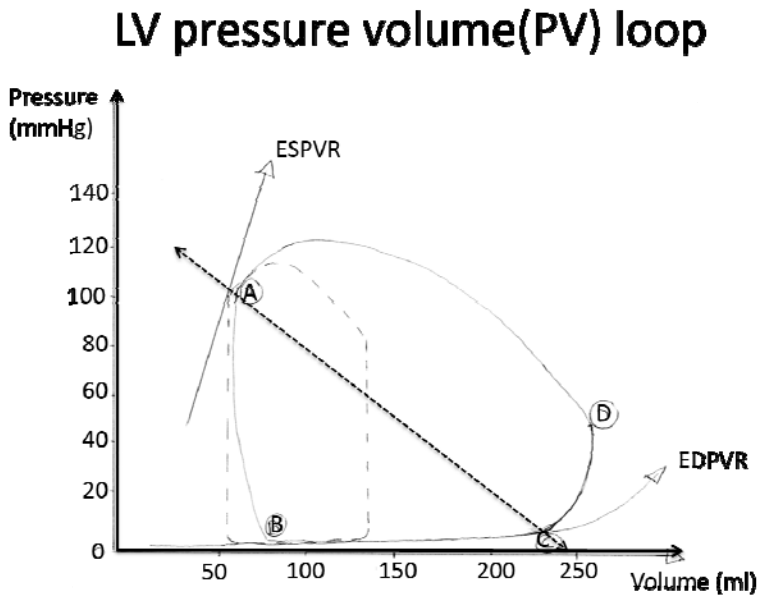
c) Answer the following questions regarding diastolic heart failure (HFpEF).

i) Describe the definition and pathophysiology of diastolic heart failure. (10)

ii) Discuss the modalities and diagnostic criteria to confirm the diagnosis of diastolic heart failure. (10)

[45]

4 a) Consider the following left ventricular pressure volume loop of a young patient with a cardiac murmur



ESPVR: End systolic pressure-volume relationship
EDPVR: End diastolic pressure-volume relationship
Normal PV loop in dashed line as reference

i) Identify the cardiac lesion and explain from the diagram which features you used to define and support this diagnosis. (5)

ii) Is this patient in the compensated or decompensated phase of the disease? Give 2 reasons for your answer. (3)

iii) Define stroke work index (SWI) and explain how you might calculate it with the aid of your pressure –volume loop. (5)

iv) What haemodynamic property is defined by the dotted line through points A and C? (2)

b) Describe the principles and method of how you would perform a PISA (proximal isovelocity surface area) calculation using echocardiography for the assessment of mitral regurgitation severity. Include the parameters you would derive using this methodology and possible caveats inherent in this method. (20)

c) Draw 2 separate haemodynamic pressure tracings to explain the 2 modern physiological principles used to diagnose pericardial constriction and differentiate it haemodynamically from myocardial restriction. Annotate your sketches to explain these 2 principles

i) Dissociation of intra-thoracic and intracardiac pressures. (5)

ii) Enhanced ventricular interaction mediated by respirato-phasic septal shift. (5)

[45]

Cert Cardiology(SA) Phys

THE COLLEGES OF MEDICINE OF SOUTH AFRICA

Incorporated Association not for gain
Reg No 1955/000003/08

Examination for the Subspecialty Certificate in Cardiology of the College of Physicians of South Africa

22 February 2019

Paper 2 (3 hours)

All questions are to be answered. Each question to be answered in a separate book (or books if more than one is required for the one answer)

---

1 a) Write notes on the indications and clinical benefits of catheter ablation as a rhythm control strategy for atrial fibrillation. (13)

b) A 35-year-old man presents with syncope and complete heat block. Discuss your management of this patient. (12)

c) Discuss the role of cardiac pacing for the treatment of vasovagal syncope. (10)

d) A patient with a biventricular pacemaker presents to the device clinic with heart failure symptoms. Interrogation of the device reveals a biventricular pacing percentage of 85%. Discuss your management of this patient. (10)

[45]

2 a) Discuss the following regarding spontaneous coronary artery dissection (SCAD)

i) Classify and discuss the pathophysiology of SCAD. (10)

ii) Discuss the diagnosis and treatment of SCAD. (5)

b) A 72-year-old man with permanent atrial fibrillation on chronic warfarin therapy requires elective PCI and stenting of his right coronary artery. Discuss how you would optimize his oral anticoagulation regimen at discharge from hospital. (15)

c) A 55-year-old Caucasian male is referred to you for a cardiovascular opinion by his general practitioner. He is hypertensive and diabetic for 8 years. He does not get angina. His blood pressure is 148/89mmHg, HbA1c is 8.4% and lipogram is as follows: Triglicerides 2.3mmol/l, HDL 0.7mmol/l and LDL 3.8mmol/l. He uses aspirin, metformin and Ziak 5/6.25mg (bisoprolol / HCTZ) as chronic medication

i) Discuss screening for subclinical coronary atherosclerosis in asymptomatic diabetics. (7)

ii) Discuss how you would optimize his pharmacotherapy. (8)

[45]

3 a) Describe the management of cardiogenic shock post myocardial infraction. (10)

b) What is myocardial strain imaging and discuss how you could incorporate it into your practice? (5)

c) Describe the pathophysiology of coronary artery calcification and discuss the evidence of how it could be used to assess patients with coronary artery disease. (10)

d) A 20-year-old male patient presents with Marfan's syndrome. His aortic root diameter is 40mm. How would you manage this patient? (5)

PTO/Page 2 Question 3e)…

e) A 40-year-old male patient presents with symptomatic severe rheumatic mitral regurgitation. He has concomitant atrial fibrillation

i) Discuss the reasons of why you would recommend valve repair or valve replacement for this patient. (5)

ii) If valve replacement is the strategy chosen, which prosthesis would you recommend and why? (5)

iii) Would you recommend intraoperative therapy for the atrial fibrillation and if so what would you recommend? (5)

[45]

4 a) You are asked to see a 20-year-old female patient with a history of Tetralogy of Fallot. She had a classic repair as a child and although she admits to not being very active of late she has not experienced limiting breathlessness. She also denies palpitations or syncope. Explain what you understand under the term classic repair and discuss your management of this patient including what parameters you might use to decide if she requires re-intervention and what that might be. (15)

b) You are asked to give a second opinion on the management of an asymptomatic, 20yr old man newly diagnosed with a peri-membranous ventricular septal defect (VSD).

i) Discuss the sequence of haemodynamic changes (in terms of the way different cardiac chambers would be affected) that you would expect to occur in a patient with a haemodynamically significant VSD. (6)

ii) Discuss how you would use echocardiography to haemodynamically grade VSDs. (6)

iii) Discuss the complications associated with peri-membranous VSDs that might lead to a decision to close a defect deemed haemodynamically insignificant. (3)

c) Define/explain the following concepts relating to the assessment of aortic stenosis and note its clinical relevance

i) Low flow, low gradient aortic stenosis. (7)

ii) Afterload mismatch. (5)

iii) Pressure recovery. (3)

[45]