



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

25 July 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) Discuss the physiology of Natriuretic Peptides and their role in the diagnosis and management of acute and chronic heart failure. (10)
 - b) Discuss the pathogenesis and diagnosis of rheumatic fever. Highlight the risk factors and evolution into valvular rheumatic heart disease. (10)
 - c) Briefly discuss the hypothesised mechanisms of action of SGLT-2 inhibitors resulting in cardiovascular benefit in patients with type II diabetes and ischaemic heart disease. (10)
 - d) Discuss the pathogenesis of coronary heart disease in the HIV positive patient on treatment. (10)
 - e) Write short notes on the anatomy of the mitral valve. (5)

[45]

- 2
 - a) Briefly discuss the principles of action of inotropic drugs and highlight the mechanism of action of:
 - i) Isoproterenol.
 - ii) Epinephrine.
 - iii) Norepinephrine.
 - iv) Phenylephrine.
 - v) Vasopressin.
 - vi) Dopamine.
 - vii) Dobutamine.
 - viii) Levosimendan.(20)
 - b) Discuss briefly current concepts in
 - i) Cardiorenal syndrome in heart failure with preserved ejection fraction (HFpEF). (10)
 - ii) Pathophysiology of atrial functional mitral regurgitation. (15)

[45]

- 3
 - a) Discuss the mechanisms underlying non-coronary heart failure in a type II diabetic patient. (15)
 - b) Briefly discuss the following
 - i) Scintigraphic and non scintigraphic findings that indicate significant ischemia on sestamibi nuclear scanning. (10)
 - ii) Implications of an irreversible defect obtained during a sestamibi stress test. (5)
 - iii) Limitations of nuclear stress testing in the evaluation of ischemia. (5)
 - c) What are the limitations of conventional right ventricular apical pacing? Discuss the beneficial aspects of newer pacing modalities that may address this problem. (10)

[45]

- 4 a) Illustrate and discuss
- i) The phases of the myocardial action potential. (5)
 - ii) The underlying ionic movements during the action potential. (15)
 - iii) Anti-arrhythmic drugs affecting the various phases of the cardiac action potential. (5)
- b) Discuss the differences between the action potential of sinus node and an ordinary myocardial cells. (10)
- c) Describe the autonomic innervation of the heart. (10)
- [45]



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26 July 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) A 63-year-old male with a history of type II diabetes mellitus, dyslipidemia, hypertension and atrial fibrillation on warfarin, presents to casualty with a four-hour history of atypical remitting chest pain. On examination he is haemodynamically stable. His ECG demonstrates T wave inversion in leads II, III, aVF, V5, V6, aVL and lead I. His hsTroponin T is 437 ng/L. Discuss your assessment and the medical management of this patient. Indicate when you would take this patient to the cardiac catheterisation laboratory and discuss your peri-procedural and post-procedural (long term) anticoagulation strategy. (15)
- b) You have been requested by the anaesthetist to assess a 62-year-old female with a neck of femur fracture who has an ejection systolic murmur at the base of the heart, radiating to the neck. You assess the patient as having a bicuspid aortic valve with an area of 1.1cm^2 and a mean pressure gradient of 28mmHg. The left ventricular ejection fraction is 36% on modified Simpson's method. Discuss your assessment, peri-procedural and long-term management of this patient. In your answer indicate what you will communicate to the anaesthetist and patient. (15)
- c) A 28-year-old, newly married, nulliparous female is diagnosed with severe rheumatic mitral valve regurgitation. She is planned for open heart mitral valve replacement. She has repeatedly indicated to the institutional heart team that she is planning on having children in the near future.
- i) Discuss your approach in deciding which valve (metallic or bio-prosthetic) you would recommend to implant in this patient. In your answer demonstrate your awareness of the pros and cons for each type of valve and justify your choice of valve to be implanted.
- ii) Assuming that a metallic valve is implanted, discuss this patient's anticoagulation management during pregnancy and delivery. (15)
- [45]
- 2 a) Discuss the criteria you would use to implant an AICD device. (15)
- b) Discuss the diagnosis and management of the no-reflow phenomenon. (10)
- c) Discuss in detail the use of aspirin for primary prevention of atherosclerotic cardiovascular disease. (10)
- d) Discuss the pathophysiology and management of coronary artery aneurysms. (10)
- [45]

- 3
- a) Discuss the predisposing factors for the development of *Torsade du Pont*. How would you manage such patients? (5)
 - b) Draw the ventricular pressure tracings in constrictive pericarditis. Show how it differs from restrictive cardiomyopathy. (5)
 - c) What is Bayes Theorem? Describe its significance in determining the pretest probability of coronary heart disease. (5)
 - d) A 30-year-old female with a St Judes prosthetic valve in the mitral position complains of recent onset dyspnoea and the INR is reported as 1.7. (20)
 - i) Discuss the diagnostic approach in evaluating this patient.
 - ii) Indicate what tests would assist in elucidating the aetiology of her symptoms.
 - iii) Describe the findings that indicate prosthetic valve dysfunction.
 - iv) What are the mechanisms underlying prosthetic valve dysfunction?
 - e) Describe the two dimensional features and Echo Doppler parameters that are used in the diagnosis and prognostic evaluation of a patient with pulmonary hypertension. (10)
[45]
- 4
- a) Briefly define and discuss the criteria for cancer therapeutics-related cardiac dysfunction. (5)
 - b) Discuss the class of cancer therapeutic/modalities associated with cardiac dysfunction. (10)
 - c) Describe how you would differentiate between ischaemic and non-ischaemic cardiomyopathy on cardiac MRI. (15)
 - d) Describe and discuss the echocardiographic and CMR findings in an elderly woman with longstanding benign monoclonal gammopathy and cardiac amyloidosis. (15)
[45]