



Faculty of Medicine, University of Ruhuna

Third Examination for Medical Degrees (Part II) March 2022

Pharmacology Paper I

Monday 21st March 2022

Answer all 05 questions

Answer each question in a separate book

(9.00 a.m. - 11.30 a.m.) 2 ½ hours

1.

1.1 An adult patient is given intravenous penicillin to treat infective endocarditis. Just after administering penicillin, the patient becomes pale and faintish. His pulse is not palpable and blood pressure is 70/50 mmHg.

1.1.1 What is the diagnosis? **(05 marks)**

1.1.2 Write the lifesaving drug for the condition stated in 1.1.1 **(05 marks)**

1.1.3 State dilution, route, dose and site of administration of the drug you mentioned in 1.1.2 **(20 marks)**

1.1.4 Write other drugs you would administer this patient to treat the condition stated in 1.1.1, including the dose and route of administration **(10 marks)**

1.2 A 45 year-old farmer admitted to emergency treatment unit following self-ingestion of an agrochemical. On admission he is conscious, pulse rate 40 beats per minute, blood pressure 90/60 mmHg, respiratory rate 36 breaths per minute with diffuse bilateral crepitations on both lung fields.

1.2.1 Write the diagnosis of the condition of this patient **(05 marks)**

1.2.2 Write the lifesaving antidote for this patient **(05 marks)**

1.2.3 Outline the administration of the drug you stated in 1.2.2 including the initial dose and how you would increase the dose to stabilize the patient **(20 marks)**

1.2.4 Write **five (05)** parameters you would monitor with the treatment stated in 1.2.2 **(15 marks)**

1.2.5 Explain briefly how the parameters stated in 1.2.4 would improve with administration of the antidote **(15 marks)**

2.

2.1 Glyceryl trinitrate (GTN) is administered sublingually in the management of stable angina.

2.1.1 Explain the reason for administering GTN sublingually (25 marks)

2.1.2 Write another route of administering GTN (05 marks)

2.1.3 Write **two (02)** clinical indications of administering GTN via the route you mentioned in 2.1.2 (10 marks)

2.2

2.2.1 Define the term "half-life of a drug" (20 marks)

2.2.2 List **four (04)** clinical importance of knowing the half-life of a drug (20 marks)

2.2.3 Explain **two (02)** clinical importance of knowing the half-life of a drug which you mentioned in 2.2.2 (20 marks)

3. A 54 year-old man presents with acute retrosternal chest pain and shortness of breath for four hours. He complains of orthopnoea for two months. Examination reveals elevated jugular venous pressure (JVP) and bilateral lower limb oedema. He is found to have a blood pressure 100/60 mmHg, pulse rate 118 beats per minute (regular), SpO₂ 88%. Pulmonary oedema is evident in auscultating the lung fields.

Investigation findings are as follows.

ECG - ST elevation myocardial infarction

2D Echocardiogram - ejection fraction 35%

3.1 Write a drug class, one example and the route of administration of the drug which is used to treat pulmonary oedema in this patient (15 marks)

3.2 What is the definitive pharmacological treatment used to manage myocardial infarction in this patient? (10 marks)

3.3 Describe the pharmacological basis of the treatment stated in 3.2 (30 marks)

3.4 Write **three (03)** absolute contraindications to the treatment stated in 3.2 (30 marks)

3.5 Write **three (03)** drugs you would prescribe to improve his long term survival (15 marks)

4.

- 4.1 Identify the antidiabetic drug of choice to be prescribed in the following conditions and its route of administration
- 4.1.1 A 45 year-old man is found to have fasting plasma glucose (FPG) of 245 mg/dL during a medical check. Inquiry reveals recent onset polyuria and polydipsia. His body mass index (BMI) is 19 kg/m² (05 marks)
- 4.1.2 A 16 year-old girl presents with vomiting and abdominal pain. She is dyspnoeic on examination. Her random blood glucose is 350 mg/dL (05 marks)
- 4.1.3 A 60 year-old woman with diabetes presents with FPG of 320mg/dL while she is on optimal dosages of metformin, sitagliptin, gliclazide and empagliflozin with good compliance (05 marks)
- 4.1.4 A 55 year-old patient with diabetes recovering from myocardial infarction visits the clinic. He is taking optimal dose of metformin and his recent HbA1c is 6.4% (05 marks)
- 4.2 Describe pharmacodynamics of insulin therapy in patients with diabetes mellitus (25 marks)
- 4.3 State three (03) types of insulin based on the duration of action with an indication for each (30 marks)
- 4.4 State three (03) advices given to a patient who is to be started on insulin therapy (15 marks)
- 4.5 State two (02) novel technical devices used in insulin therapy (10 marks)
5. A 35 year-old previously healthy male presents with fever and productive cough for six days duration. He is thin built (weight 40 kg). On admission he is drowsy but responding, respiratory rate 25 breaths per minute, SpO₂ 92%, pulse rate 110 beats per minute, blood pressure 80/50 mmHg and temperature 39 °C. Respiratory system examination reveals, decreased breaths sounds and dullness to percussion on right side. A patch of bronchial breath sounds is audible over the right middle zone of the lung. Arterial blood gas analysis reveals pH 7.25 (normal range: 7.35 - 7.45) and lactate 4 mmol/L (normal range: 0.5 - 2.2 mmol/L).
- 5.1 State the most possible clinical diagnosis (10 marks)
- 5.2 List Five (05) important steps in managing this patient (20 marks)

5.3 The medical team commenced antibiotics.

5.3.1 State antibiotic/s you would start for this patient (10 marks)

5.4 State how you would control fever in this patient. Write the prescription (15 marks)

5.5 This patient's blood pressure did not improve with fluid resuscitation.

5.5.1 Write the pharmacological agent you would start to improve his blood pressure (10 marks)

5.5.2 What is the mode of action of the agent you have stated in 5.5.1 (20 marks)

5.6 His blood cultures became positive for methicillin-resistant staphylococcus aureus (MRSA).

5.6.1 What is the antibiotic that needs to be added to his drug regimen? (10 marks)

5.6.2 This patient developed a pruritic, erythematous rash that involves the face, neck and upper trunk following administration of the first dose of antibiotic. A reaction specific to the particular antibiotic was suspected.
What is this reaction? (05 marks)

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