



THE COLLEGES OF MEDICINE OF SOUTH AFRICA

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Examination for the Subspecialty Certificate in Critical Care of the
College of Anaesthetists of South Africa



Paper 1

25 July 2019

(3 hours)

All questions 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 Hyponatraemia has been documented to occur in up to 50% of neurosurgical patients.
- a) Do you consider this to be problematic? Indicate the potential complications that may ensue. (4)
 - b) Write short notes on cerebral salt wasting syndrome in the neurosurgical setting indicating the proposed pathophysiology. (6)
 - c) Write short notes on the syndrome of inappropriate anti-diuretic hormone (SIADH) in the neurosurgical setting. Again, indicate the pathophysiology in your discussion. (5)
 - d) How would you differentiate between cerebral salt wasting and SIADH in the clinical arena? (12)
 - e) What are the general principles for the rate of replacement of sodium in severe hyponatraemia? In your answer consider the indications for the use of hypertonic saline. (8)
 - f) What are the risks and consequences of rapid correction of sodium? (5)
 - g) What specific interventions would you employ in each of the two conditions discussed? (8)
 - h) Why is it crucial to differentiate the two conditions? (2)
- [50]
- 2
- a) Define each of the following
 - i) Analgesia. (1)
 - ii) Sedation. (2)
 - iii) Delirium. (5)
 - b) The intravenous benzodiazepines, midazolam and diazepam, are used for sedation in many ICU systems, as well as for other therapeutic effects.
 - i) Explain how benzodiazepines as a class work at their receptor. (3)
 - ii) Outline the various central nervous system- mediated pharmacological effects of the benzodiazepines as a class that are relevant to their use in ICU. (5)
 - iii) Compare selected properties of intravenous midazolam and intravenous diazepam under the following headings:
 - 1. Chemical structure and solubility. (2)
 - 2. Clinical effects. (6)
 - 3. Metabolism and metabolites. (4)
 - c) Discuss the specific advantages and disadvantages of using benzodiazepines as sedative agents for patients in the ICU. (8)
 - d) Discuss the concept of a "daily sedation hold" in ICU patients who are receiving sedation, mentioning advantages, disadvantages, indications and contra-indications. (8)
 - e) Name and briefly explain three major types of pain that may be experienced by ICU patients, and for each suggest the most appropriate class of analgesic. (6)
- [50]

- 3 A 25- year old primigravida is admitted at 32 weeks gestation for management of severe acute respiratory distress syndrome (ARDS) from influenza (H1N1). Post intubation, the ventilator is set at tidal volume of 6ml/kg ideal body weight and records a plateau pressure of 42cmH₂O. She is already on a FiO₂ of 1.0 and PEEP of 10 cmH₂O. The arterial blood gas shows a PaO₂ of 50mmHg (6.6kPa) and a PaCO₂ of 55mmHg (7.3kPa).
- a) Describe the physical and physiological adaptations that need consideration in ventilation of the pregnant patient. (10)
 - b) Critique the different ventilatory strategies available to optimise this patient's condition with reference to appropriate clinical goals (Assume Extra-corporeal strategies are unavailable). (30)
 - c) Describe the mechanism of injury due to spontaneous mechanical ventilation and why it may be especially harmful in ARDS during advanced pregnancy. (10)
- [50]
- 4 a) With respect to the pharmacological management of **chronic atrial fibrillation**
- i) List 4 classes of oral anti-coagulants available and provide an example for each. (8)
 - ii) Compare and contrast these classes with respect to:
 1. The relative advantages and disadvantages. (8)
 2. The appropriate laboratory tests to assess coagulation status. (4)
 3. Management of life-threatening bleeding. (5)
- b) With respect to the management of **acute right ventricular failure** in an ICU patient with moderate to severe pulmonary hypertension, outline the key issues, paying particular attention to
- i) Triggering factors. (3)
 - ii) Oxygenation goals. (3)
 - iii) Principles of monitoring. (5)
 - iv) Supportive goals of therapy. (3)
 - v) Specific therapeutic interventions. (8)
 - vi) Salvage therapy. (3)
- [50]