The Hong Kong College of Anaesthesiologists

Intermediate Fellowship Examination

Written Paper in Pharmacology

11 July 2024 (Thursday)

14:00 - 16:00 hours

Instructions:

a. There are twelve pre-labelled answer books. Please make sure you answer the questions in the respective answer book.
b. Write your candidate number on the cover of each answer book.
c. Use ink or ball-point pen.
d. Answer ALL questions. They are worth equal marks and you should spend approximately **ten minutes** for each question. For questions with multiple parts, allocation of marks is indicated in the brackets.

1. **Describe the mechanisms on how non-steroidal anti-inflammatory drugs exert their therapeutic and adverse effects (75%). Outline the advantages and disadvantages of using COX-2 selective agents (25%).**

2. **Describe the pharmacokinetic and pharmacodynamic properties of ketamine (75%). Outline the advantage of using ketamine as a sedative agent for change of dressing in burned patients (25%).**

3. **What are the differences between addiction, physical dependence and tolerance (60%)? Explain why methadone has a low addictive potential (40%).**

4. **Write short notes on the potential effects of epidural administration with 6ml of 0.25% levobupivacaine and 50mcg of fentanyl at the T6/7 level.**

5. **Describe the factors determining the speed of onset of non-depolarizing neuromuscular blocking drugs.**

6. **Outline the mechanisms of action, side effects, and indications, of 1) ACE inhibitors, 2) beta-blockers and 3) calcium channel blocker (70%). Compare their specific benefits in patients with ischaemic heart disease (30%).**

7. **Define saturated vapor pressure (SVP) and boiling point of a volatile anaesthetic agent (50%). Explain why contemporary variable bypass vaporizers are unsuitable for delivering desflurane (50%).**

8. **Define minimum alveolar concentration (MAC) of an inhaled anaesthetic agent (20%). What are the physiological, pharmacological and pathological factors that may affect MAC (80%)?**

9. **Define randomization in clinical trials (5%).**
   Explain the purpose of randomization in clinical trials (15%).
   Describe the following types of randomization, and outline their advantages and limitations (80%).
   A. Simple randomization
   B. Block randomization
   C. Stratified randomization

10. **Outline the mechanisms of action of sodium-glucose co-transporter 2 (SGLT-2) receptor inhibitor (40%). Describe the mechanisms where SGLT-2 blockers may induce perioperative euglycemic diabetic ketoacidosis (60%).**

11. **Outline the mechanisms of action and clinical indications of different classes of drugs that are useful in inducing diuresis clinically.**

12. **Define "volume of distribution" (25%).**
    What factors influence the size of the volume of distribution (50%)?
    How may it be used in the calculation of a loading dose (25%)?

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