THE HONG KONG COLLEGE OF ANAESTHESIOLOGISTS

FINAL FELLOWSHIP EXAMINATION (INTENSIVE CARE)
LONG ANSWER PAPER

2 Questions

Monday 15 July 2024 (1:30 pm - 3:30 pm)

NOTICE

(A) Write your answers to the two questions in separate books.

(B) Read the questions carefully, and in view of the time available, balance your answers to encompass points of great importance without going into needless detail.

(C) Record your number on the cover of each book and hand in all books.

(D) Use ink or ball-point pen.

QUESTION 1

You receive a 60 year old lady who underwent a oesophagectomy from the operating theatre 10:00PM. The handover from the anaesthestist is as follows:

This patient had an advanced squamous cell carcinoma in the distal oesophagus and completed neoadjuvant chemotherapy and immunotherapy. She was not a smoker and did not drink alcohol. She underwent a 12-hour general anaesthesia for minimally invasive oesophagectomy with feeding jejunostomy. There was 600ml of blood loss, but no blood transfusion was required. A T7 thoracic epidural was inserted but was not used intraoperatively due to hypotension. Her current vital signs and observations are:

Weight: 70kg

Height: 156cm

BMI: 28.8kg/m²

Glasgow Coma Scale: 3/15 and sedated with Propofol 100mg/hour

Temperature: 34ºC

Heart Rate: 105/min

Blood pressure: 80/56 mmHg

Urine output: 20mL/hour

ABG in ICU: pH 7.34, pCO2 5kPa, pO2 15.3kPa, Hb 10.2 g/dL, Lactate 3.4 mmol/L

Airway: 7.0 portex oral endotracheal tube

Ventilation: FiO2 0.4, PEEP 8, Pressure Regulated Volume Control ventilation with respiratory rate 20, tidal volume 350

Epidural: thoracic epidural morphine infusion on hold

Drains: 36Fr Right chest drain with swing but no air leak, neck drain, abdominal drain, feeding jejunostomy

1) What are the patient's current problems? (2 marks)
2) What would you like the anaesthetist to clarify? (2 marks)
3) What would be your management priorities for this patient tonight? (6 marks)

She was extubated on post operative day (POD) 1, feeding was commenced via jejunostomy tube and transferred out to the general ward on POD 3. You are consulted on POD 6. Patient complained of severe right sided lower chest pain, desaturated and in severe distress. All the drains are in situ. She had persistent tachycardia. She complained of dyspnea and required 6L O2 via nasal canula.

She had developed a fever from POD 4. Her Hb dropped and required 2 units of packed cell transfusion.

She is taken over to ICU. Her status is as follows.

She is very distressed with pain

Respiratory: audible wheezes, respiratory rate of 35/minute, shallow respiration on 15L O2 via non rebreathing mask.

Cardiovascular: tachycardia up to 150/min, BP 113/77mmHg without vasopressors.

pH 7.37, pCO2 5,5kPa, pO2 10kPa, HCO3 23.7, Na 138mmol/L, K 3.9mmol/L, lactate 1.8mmol/L, glucose 5.3mmol/L, Hb 10.9g/dL

4) What are your differential diagnoses? (3 marks)
5) How would you proceed with your management? (7 marks)

She was diagnosed with anastomotic leak. She underwent upper endoscopy, thoracoscopic decortication and lavage and placement of a second chest drain. Gastric conduit was noted to be oedematous but viable. A nasogastric tube was re-inserted for drainage of the stomach. A pan-sensitive Alpha haemolytic streptococcus was isolated from swab of the neck wound and from pleural fluid taken from chest drain.

Due to the poor lung function and oxygenation, she was kept intubated and ventilated post operation. Nasogastric drainage was high and largely bile stained. She has a feeding jejunostomy tube. Attempts at feeding enterally were hindered by onset of watery diarrhoea.

Regarding optimizing her nutrition in the immediate phase

6) Discuss your plan for providing nutrition to this patient. (5 marks)
7) How will you manage her ongoing diarrhoea? (5 marks)

Despite being on piperacillin/tazobactam, the patient had persistent fever, shock and high minute ventilation, with elevated WCC, procalcitonin and CRP. She is now 2 weeks on the ventilator after the 2nd surgery.

8) List the possible reasons for ongoing sepsis (4 marks) and discuss your approach to diagnosis and treatment. (6 marks)

9) Bronchoalveolar lavage grew Enterobacter Cloacae (Isolate 1) and Acinetobacter Baumanii (Isolate 2). Sensitivity pattern shown below.
Discuss your antibiotic choices for each of the 2 organisms (6 marks) and clinical implications (4 marks)

Susceptibility	**Isolate 1**	**Isolate 2**
	MIC (µg/ml)	**MIC (µg/ml)**
Ampicillin	**>=32.0 R**	
Aztreonam	**>=64.0 R**	
Ceftazidime/Avibactam	**1.0 S**	**R**
Cefuroxime IV /oral	**>=64.0 R**	
Colistin	**>=16.0 R**	
Extended Spectrum B-lactamase	**neg**	
Gentamicin	**>=16.0 R**	
Septrin/Bactrim	**>=32.0 R**	**<=20 S**
Ertapenem	**R**	**R**
Imipenem	**4.0 R**	**<=25.0 S**
Meropenem	**>=16.0 R**	**<=25.0 S**
Cefepime	**>=64.0 R**	
Cefoperazone	**>=64.0 R**	
Cefotaxime	**>=64.0 R**	**16 S**
Ceftriaxone	**>=64.0 R**	**16 S**
Amoxicillin/Clavulanic acid	**>=32.0 R**	
Ampicillin/Sulbactam	**>=32.0 R**	**<= 2.0 S**
Piperacillin/Tazobactam	**>=128.0 R**	**<= 4.0 S**
Ciprofloxacin	**>= 4.0 R**	**<=25.0 S**

QUESTION 2

50-year-old male traveler from Southeast Asia, was complaining of 2 day history of fever, headache, vomiting and diarrhoea. His assessment was as follows.

- Tired looking with temp of 39^0C
- GCS was 12 (E3V4V5)
- blood pressure 78/40 mmHg and pulse rate 120/min.
- SpO2 of 95% on 2L/min nasal O_2 and respiratory rate of 26/min.

Initial point of care test at Accident and Emergency Department (AED) revealed metabolic acidosis. The patient was directly admitted from AED to ICU for further management.

Subsequent blood result taken at AED was as follow:

Investigation	**Patient value**	**Reference range**
White Cell Count((WCC)	**11.4***	4-11 x10^9/L
Haemoglobin (Hb)	**11.8 ***	14-18 g/dL
Platelet	**13 ***	150-400 x10^9/L
Prothrombin time (PT)	**20 ***	9.1-12.1 seconds
International Normalized Ratio (INR)	**1.61***	0.8-1.2
Na	137	136-145mmol/L
K	4.2	3.5-5.1mmol/L
Urea	**25 ***	2.76-8.07mmol/L
Creatinine	**300** *	59-104 µmol/L
Albumin	**30 g/L***	35-52g/L
Total bilirubin	**222 ***	0-21 µmol/L
Direct bilirubin	**108 ***	0–5 µmol/L
ALT(SGPT)	**60 ***	0-41 U/L
AST(SGOT)	**100 ***	5-40 U/L
Gamma glutamyl transferase (GGT)	**150 ***	8-61 U/L
Alkaline phosphatase	**138 ***	40-129 U/L
LDH	**674 ***	118-221 U/L
Amylase	57	27-130 U/L
pH	7.4	7.35-7.45
PCO2	**2.1***	4.7-6.0 kPa
PO2	10.9	10.0-13.3 kPa
Bicarbonate	**9.4***	22.0-26.0 mmol/L
Base Excess	**-12.2***	-2.0-2.0 mmol/L
Lactate	**7.9 ***	0.5-2.2mmol/L

***Values out of normal range**

1. **Explain the abnormal laboratory results with possible reasons (4 marks) and list 5 differential diagnosis (2 marks)**

2. **What investigations will you order based on your differential diagnosis? (5 marks)**

Now patient's blood pressure remained at 80/50 mmHg after 1L of balanced crystal solution (Ideal body weight 60Kg). GCS was 12/15. SpO2= 95% on 4L/min O2 with respiratory rate of 28/min.

3. **Describe 4 methods of predicting the fluid responsiveness and name 2 limitations of each method. You may include methods used in spontaneous breathing or mechanically ventilated patients in your answer. (12 marks)**

4. **Name 3 basic hemodynamic monitoring tools you will institute at this stage. Explain what information could be obtained from the parameters of the tools. (3 marks)**

5. **Under what circumstances will you use advance hemodynamic monitoring? (1mark)**

6. **What cardiac output monitoring tools (apart from Echocardiography) can be used? State their principle of measurement. (4 marks)**

The patient's respiratory status deteriorated and was intubated. Subsequent blood smear was positive for Plasmodium Falciparum. Parasitaemia up to 15%.

7. **Based on the patient's clinical presentation and lab findings, list out the conditions that he fulfils for the criteria of "severe malaria". (3 marks)**

8. **Two days after the treatment for malaria, patient developed oliguric acute kidney injury (AKI),**
   a) **What are the possible causes of the AKI? (3 marks)**
   b) **When will you consider dialysis for this patient? (1 marks)**
   c) **Give details of the renal replacement regime you will use. (2 marks)**

9. **By day 10, the patient is stabilized. He was noted to be delirious with difficult weaning from ventilator. Describe your approach to managing his delirium. (6 marks)**

10. **By Day 21, patient is tracheostomised and on pressure support mode of ventilation with a pressure support of 10 cmH2O, PEEP of 8 cmH2O and FiO2 of 0.4. He is now calm and can follow simple command. Describe different methods of communication you will use to interact with the patient (4 marks)**

- End -