

THE HONG KONG COLLEGE OF ANAESTHESIOLOGISTS
FINAL FELLOWSHIP EXAMINATION (INTENSIVE CARE)
LONG ANSWER PAPER

2 Questions

Monday 5 August 2019 (1:00 pm - 3:00 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

Mr. Lam is a 72 year old gentleman with Hypertension on Nifedipine long acting 30 mg daily, Diabetes Mellitus on Metformin 1g bd, being followed up in government outpatient clinic. He is a known Hepatitis B carrier without any treatment.

He was admitted for hematemesis with tarry stools for 3 days. He developed further episodes of hematemesis and he was electively intubated prior to an upper endoscopy. The endoscopy revealed two columns of esophageal varices with contact bleeding. Band ligation was performed.

He is currently on morphine and midazolam infusion. Blood pressure is now 130/65mmHg with heart rate of 130 /min. SpO₂ was 98% with FiO₂ of 0.30.

Question A (20 marks)

Mr. Lam was then transferred to your Intensive Care Unit (ICU) for further observation and management.

- i) What would be your initial treatment goals for his acute variceal bleeding? (10 marks)
- ii) What are the pharmacological treatment options to stop rebleeding of his esophageal varices? (5 marks)
- iii) What other endoscopic options are available. (5 marks)

Question B (20 marks)

His variceal bleeding has now stopped after your management.

However his liver function is impaired with elevated α fetoprotein (320 ng/mL). CT scan abdomen is done which revealed portal vein thrombosis of left branch and 3cm X 2.5 cm X 1.7 cm tumour in segment III, with background liver cirrhosis.

- i) What are the predisposing conditions for development of portal vein thrombosis? (5 marks)
- ii) What are the treatment options for his portal vein thrombosis? Please discuss the pros and cons of three pharmacological agents (9 marks) and three non-pharmacological options available. (6 marks)

Question C (20 marks)

Mr. Lam was then discharged to medical ward and treated by hepatologist for his portal vein thrombosis.

6 weeks later, an elective left hepatectomy for his liver tumour has been performed. Total blood loss was 1500ml. Post-operatively Mr. Lam was again admitted to ICU for observation. He was extubated on day 1. However, in the same evening you are informed by the ICU nurse that he is agitated and pulled out his foley catheter. Your resident's assessment is that he has delirium.

- i) Write brief notes on the both non-modifiable and modifiable the risk factors for this condition? (5 marks)
- ii) The patient complained of excessive noise. How can you reduce the noise at night time in your ICU? (10 marks)
- iii) He also complained of difficulty in sleeping. What are the specific pharmacological agents that might be useful? (5 marks)

Question D (30 marks)

The next morning, he is noted to be mildly dyspneic with respiratory rate 25/min and SpO₂ 90% on 4 L/min of oxygen with nasal cannula. Your ICU resident suggests the use of High Flow Nasal Cannula (HFNC) Oxygen Therapy.

- i) What are physiological advantages of HFNC? (10 marks)
- ii) List the components (4 marks) of HFNC system and discuss how you would set up the HFNC oxygen therapy in this patient. (16 marks)

Question E (10 marks)

Patient also developed progressive oliguria despite optimization of haemodynamic parameters and fluid status. Serum creatinine increased to 390 µmol/L and potassium levels 6.5 mmol/L.

Continuous venovenous hemofiltration was started for him without anticoagulation. However, the hemofilter was clotted after 6 hours.

- i) What are your non-pharmacological strategies to optimize the filter life, with reference to vascular access? (5 marks)
- ii) What are your non-pharmacological strategies to optimize the filter life, other than vascular access? (5 marks)

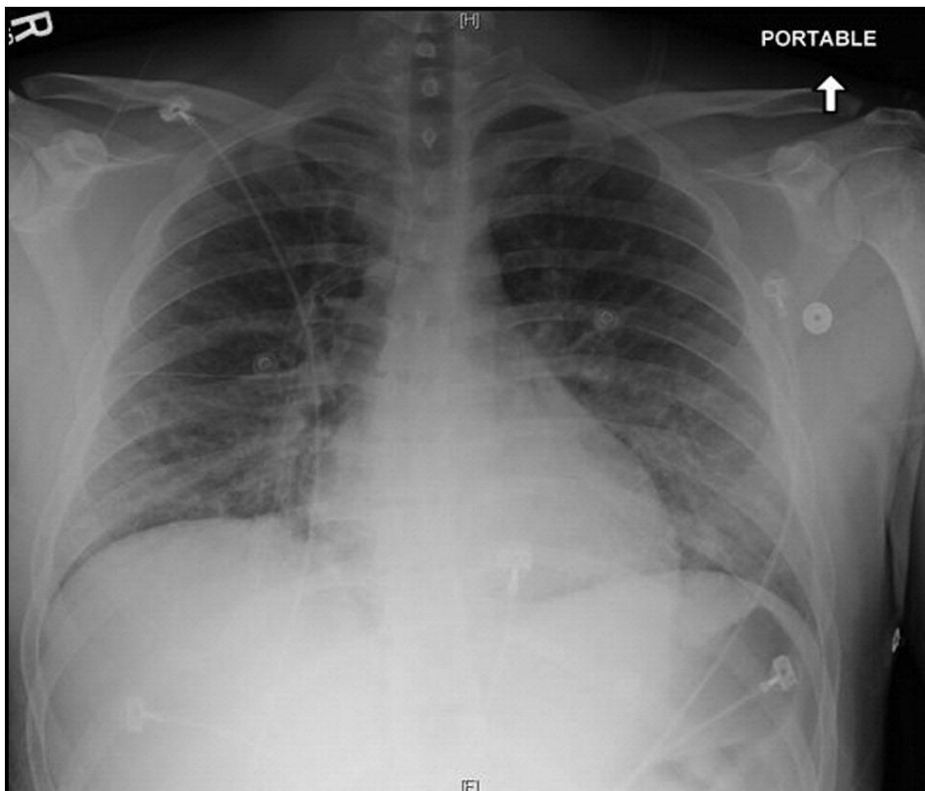
QUESTION 2

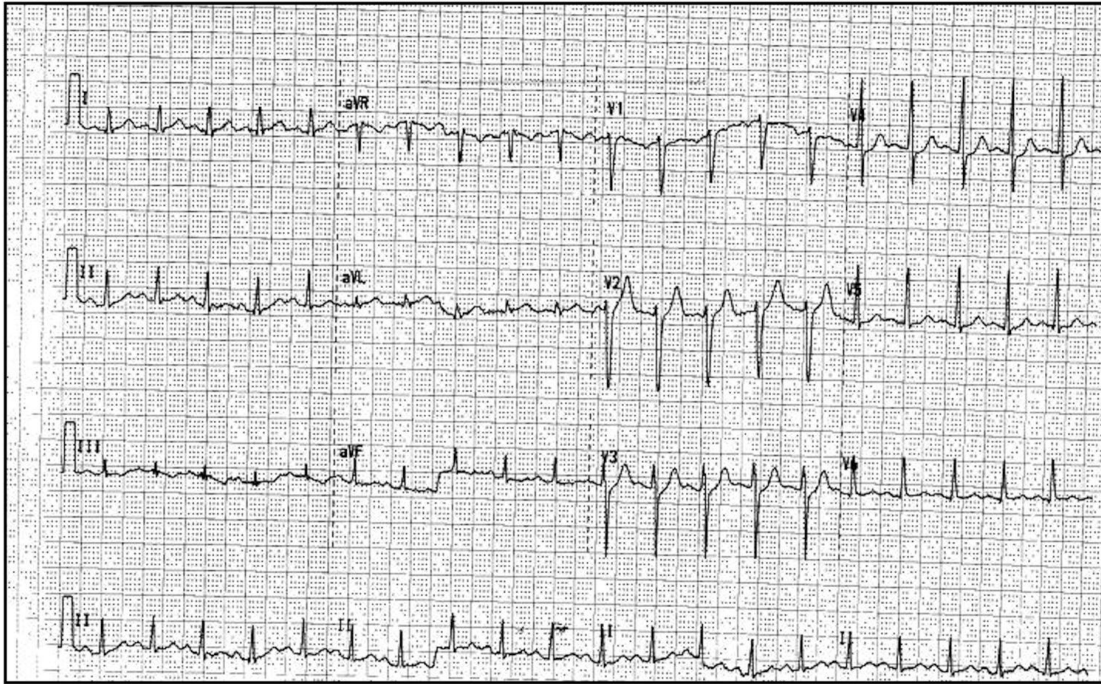
A 45-year-old man presented with left groin abscess and a 5-day history of fever. Computed tomography showed fasciitis. He was treated with intravenous vancomycin, ampicillin-sulbactam, and clindamycin.

On hospital day 2, he developed chest discomfort, dyspnea and episodes of non-sustained ventricular tachycardia. Physical examination showed he had a temperature of 38.2 C, a heart rate of 115 beats per minute, a blood pressure of 88/48 mmHg, a respiratory rate of 45 breaths per minute and an oxygen saturation of 95% on 100% nonrebreathing mask.

He was transferred to the Intensive Care Unit for further management.

Below are his chest X ray and ECG:





Question A (20 marks)

- i) Please outline your initial treatment plan? (10 marks)
- ii) Name 3 differential diagnoses. (3 marks) What investigations would be carried to reach your differential diagnoses? (7 marks)

Question B (20 marks)

An urgent bedside transthoracic echocardiography revealed a left ventricular ejection fraction of 25-30% with global dyskinesia, moderate mitral regurgitation and mild tricuspid regurgitation. The estimated right ventricular systolic pressure was 56 mmHg (normal, <30 mm Hg). Right ventricular size and function were normal. Coronary angiography demonstrated no obstructive coronary artery disease.

- i) What is the diagnosis (2 marks) and briefly outline the postulated pathophysiologic mechanism? (3 marks)
- ii) How would you manage this patient and give reasons for the choice of medications used for circulatory support? (12 marks)
- iii) What is the prognosis of this condition? (3 marks)

Question C (20 marks)

The patient was intubated and mechanically ventilated with SIMV PC+PS mode. He is receiving midazolam at 2mg/hr and propofol at 50mg/hr for sedation.

FiO₂ 0.7%

PC 20 mmHg

PEEP 10 mmHg

PS 15

RR 20 BPM

His urine output was 50ml for the past 4 hours and blood pressure was supported by noradrenaline at 0.8mg/hr IV.

You have decided to put him on cardiac output monitoring.

- i) Discuss 4 clinically available technologies for cardiac output monitoring with regard to the measurement technique and its advantages and disadvantages. You may tabulate your answers (20 marks).

Question D (20 marks)

You have put in a PiCCO (Pulse Contour Cardiac Output Monitoring) with the following parameters:

GEDVI (Global End Diastolic Volume Index)	860 ml/m ²	(680-800 ml/m ²)
EVLWI (Extravascular Lung Water Index)	12ml/kg	(3-7ml/kg)
CI (Cardiac Index)	1.5 L/min/m ²	(3-5L/min/m ²)
PVPI (Pulmonary Vascular Permeability Index)	4	(1-3)
SVRI (Systemic Vascular Resistance index)	3000 (dyn*s*cm ⁻⁵ *m ²)	(1700-2400) (dyn*s*cm ⁻⁵ *m ²)

- i) Please interpret these findings. (5 marks)
- ii) How are you going to optimize this patient with this information? (10 marks)
- iii) What clinical situations or conditions may preclude the proper interpretation of PiCCO? (5 marks)

Question E (20 marks)

You have been informed by the nurse that the trend of his ScvO₂ was on decreasing trend from 70% to 55% in the past 2 hours.

- i) What is your approach to manage this situation? (10 marks)
- ii) What is the consideration when using ScvO₂ as compared to SvO₂ in clinical practice? (5 marks)
- iii) Name three clinical uses of ScvO₂ apart from managing patient with severe sepsis? (5 marks)

- End -