



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

**2 Questions**

**Friday 31 July 2020 (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**

A 60 year old gentleman presented with shortness of breath. He has been having running nose, cough and general malaise for a few days.

He is a vegetable vendor working in a wet market. He has a past medical history of Hypertension, Diabetes mellitus, Hyperlipidemia and Obstructive Sleep Apnea Syndrome(OSAS) on nocturnal home Continuous Positive Airway Pressure (CPAP). There is no travel history for the past few months.

He is admitted to isolation room in your hospital. He has high fever of 39°C, still dyspneic despite on O<sub>2</sub> 4 L/min via nasal cannula. His SpO<sub>2</sub> is 93%, tachypnoeic with respiratory rate of 30/min, pulse 110/min and his blood pressure is 110/90. His chest X ray revealed bilateral diffuse infiltrates. His height is 175cm and body weight 115kg with a body mass index (BMI) of 37.6.

**Question A (5 marks)**

Work up for his chest infection was done.

- i) Name five common viruses which can cause severe respiratory infections apart from Influenza A (2.5 mark)
- ii) What are the possible extra pulmonary complications related to such severe viral infection? (2.5 mark)

**Question B (13.5 marks)**

His naso-pharyngeal aspirate test is positive for Influenza A. Oral Oseltamivir is prescribed. There is no improvement in his clinical condition. Secondary infection is considered.

- i) What are the potential roles and limitations of procalcitonin in the monitoring of this patient? (2.5 mark)
- ii) What are the important principles of antibiotic usage in community acquired pneumonia? (6 mark)
- iii) What are the mechanisms of action of polyclonal intravenous immunoglobulin (IVIG) in severe bacterial infection? (2.5 marks)
- iv) What are their (IVIG) adverse effects? (2.5 marks)

**Question C (8 marks)**

The patient is admitted to your Intensive Care Unit (ICU). His sputum is shown to have gram positive cocci. However, he is rapidly deteriorating with a respiratory rate of 35/min, SpO<sub>2</sub> 88% despite on 50% O<sub>2</sub>, blood pressure 95/40, heart rate 118/min.

- i) What are the important considerations for his intubation? (1.5 marks)
- ii) Briefly describe how you would intubate this patient. (6.5 marks)

**Question D (23.5 marks)**

He is intubated in your ICU and put on mechanical ventilation.

- i) How can you prevent his development or progression of acute respiratory distress syndrome (ARDS)? (2 mark)
- ii) List out the beneficial application of Positive End Expiratory Pressure (PEEP) in Acute Respiratory Distress Syndrome (ARDS) and its potential adverse effects. (3 marks)
- iii) What is your approach in setting your PEEP in this patient? (5 marks)
- iv) How would you set his tidal volume taking driving pressure in to consideration? (3.5 marks)
- v) Describe how you would prone this patient in detail. (8 marks)
- vi) List out the rationales for restrictive fluid administration after initial resuscitation. (2 marks)

## QUESTION 2

You received a consultation from medical ward after morning ward rounds.

A 29 year old lady with good past health presented with fever, epigastric discomfort, nausea and vomiting. She had travelled to Vietnam for vacation 2 weeks ago.

She was empirically started on oral Ciprofloxacin on admission 4 days ago, then changed to intravenous Ceftriaxone 2 days ago by Infectious Disease team after being diagnosed with Salmonella enteric fever.

Typhoid rapid antibody test - Salmonella Typhi IgM/IgG positive

Widal test - Salmonella Typhi H Ag Positive Titre = 160

Blood culture pending

Allergic to celecoxib – rash

### On Examination upon your assessment:-

Temp 40<sup>0</sup> C

Pale looking

Faint macular rash over trunk and both arms and face, not pruritic. Physician had noted appearance of rash 1 day ago and identified them as rose spots.

CNS – GCS 15/15, very tired looking, anxious, mild headache, neck not stiff

RESP - Tachypnea respiratory rate 30-35/min but still coping

SpO<sub>2</sub> 100% on 5L O<sub>2</sub> mask

Reduced air entry over both lung bases, with dullness to percussion

CVS – Sinus tachycardia 110/min, BP 85/50 mmHg

warm peripheries

mild oedematous peripheries

GIT - Abdomen is soft but distended

She is especially tender on the right upper quadrant

There is voluntary guarding all over the abdomen but no rebound tenderness

Renal – urinary catheter in-situ, good urine output, 80-100ml/hr, clear

### Investigation result on the day of hospital admission and the day of ICU admission

	<b>On hospital admission</b>	<b>On day of ICU admission</b>
<b>Complete Blood Count</b>	- <b>Hb</b> 11.1 g/dL (12 – 16)	- <b>Hb</b> 8.1 g/dL (12 – 16)
	o PCV 34% (36-46)	o PCV 24% (36-46)
	o MCV 85 fL (80-100)	o MCV 85 fL (80-100)
	- <b>Total WBC</b>	- <b>Total WBC</b>
	o 2.3 x 10 <sup>9</sup> /L (4.0 – 11.0)	o 2.2 x 10 <sup>9</sup> /L (4.0 – 11.0)
	o Neutrophils 47%	o Neutrophils 67%
	o Lymphocytes 35%	o Lymphocytes 18%
	o Monocytes 17%	o Monocytes 15%
	o Eosinophils 0%	o Eosinophils 0%
	o Basophils 0.8%	o Basophils 0.3%
	- <b>Platelet</b>	- <b>Platelet</b>
	147 x 10 <sup>9</sup> /L (150-400)	28 x 10 <sup>9</sup> /L (150-400)
	<b>Malarial parasite not seen</b>	

	On hospital admission	On day of ICU admission
<b>Renal Function Test</b>	<ul style="list-style-type: none"> <li>○ <b>Na</b> 135 mmol/L (136 – 145)</li> <li>○ <b>K</b> 4.2 mmol/L (3.5 – 5.1)</li> <li>○ <b>Cl</b> 98.1 mmol/L (98 – 107)</li> <li>○ <b>Creatinine</b> 59 umol/L (45 – 84)</li> </ul>	<ul style="list-style-type: none"> <li>○ <b>Na</b> 136 mmol/L (136 – 145)</li> <li>○ <b>K</b> 4.3 mmol/L (3.5 – 5.1)</li> <li>○ <b>Cl</b> 102.8 mmol/L (98 – 107)</li> <li>○ <b>Creatinine</b> 94umol/L (45 – 84)</li> </ul>
<b>Liver Function Test</b>	<ul style="list-style-type: none"> <li>○ <b>Total protein</b> 80 g/L (64 – 83)</li> <li>○ <b>Albumin</b> 41 g/L (35 – 52)</li> <li>○ <b>Globulin</b> 39 g/L (23 – 35)</li> <li>○ <b>Total Bil</b> 38.1 umol/L (0 – 21)</li> <li>- <b>Direct Bil</b> 12.0 umol/L (0 – 5)</li> <li>○ <b>ALP</b> 69 U/L (35 – 104)</li> <li>○ <b>ALT</b> 13 U/L (0 – 33)</li> <li>○ <b>AST</b> 26 U/L (5 – 32)</li> <li>○ <b>GGT</b> 14 U/L (5 – 36)</li> </ul>	<ul style="list-style-type: none"> <li>○ <b>Total protein</b> 52 g/L (64 – 83)</li> <li>○ <b>Albumin</b> 24 g/L (35 – 52)</li> <li>○ <b>Globulin</b> 28 g/L (23 – 35)</li> <li>○ <b>Total Bil</b> 79.8 umol/L (0 – 21)</li> <li>○ <b>Direct Bil</b> 74.0 umol/L (0 – 5)</li> <li>○ <b>ALP</b> 179 U/L (35 – 104)</li> <li>○ <b>ALT</b> 199 U/L (0 – 33)</li> <li>○ <b>AST</b> 445 U/L (5 – 32)</li> <li>○ <b>GGT</b> 109 U/L (5 – 36)</li> </ul>
<b>ABG</b>		(on 5L/min O <sub>2</sub> mask) <ul style="list-style-type: none"> <li>- <b>pH</b> 7.32 (7.35-7.45)</li> <li>- <b>pCO<sub>2</sub></b> 4.2 kPa (4.7-6)</li> <li>- <b>pO<sub>2</sub></b> 13 kPa (10-13)</li> <li>- <b>HCO<sub>3</sub></b> 15 mmol/L (22-26)</li> <li>- <b>BE</b> -9.6 mmol/L (-2-3)</li> <li>- <b>SpO<sub>2</sub></b> 96% (&gt;95)</li> <li>- <b>Lactate</b> 8.2 mmol/L (0.5-2)</li> </ul>
<b>Clotting profile</b>		<b>PT</b> 16.1 sec (9.1 – 12.1) <b>INR</b> 1.56 <b>APTT</b> 59.6 sec (28 – 40) <b>D- Dimer</b> 26089 ng/mL (< 500)
<b>Others</b>		<b>Amylase</b> 47 U/L (28 – 100) <b>Procalcitonin</b> 10.2 ng/mL (< 0.5) <b>CRP</b> 17.76 mg/dL (< 0.5) <b>Blood glucose</b> 7.4 mmol/L <b>12-lead ECG</b> – sinus tachycardia
<b>Urinalysis</b>		<ul style="list-style-type: none"> <li>○ <b>Protein</b> ++</li> <li>○ <b>Ketone</b> negative</li> <li>○ <b>Glucose</b> negative</li> <li>○ <b>Bilirubin</b> +</li> <li>○ <b>pH</b> 5.5</li> <li>○ <b>WBC</b> 2</li> <li>○ <b>RBC</b> 1</li> <li>○ <b>Nitrite</b> negative</li> </ul>
<b>CXR</b>	Unremarkable	Normal heart size. Bilateral pleural effusions

	On hospital admission	On day of ICU admission
<b>USG abdomen</b>		<ul style="list-style-type: none"> <li>○ Hepatomegaly, no focal liver lesions, mild splenomegaly.</li> <li>○ Moderate pleural effusions bilateral.</li> <li>○ Gallbladder wall markedly thickened 12mm.</li> <li>○ Normal common bile duct, pancreas, kidneys. Minimal ascites</li> </ul>

#### Rapid Molecular Influenza

- Influenza A viral RNA - Not Detected
- Influenza B viral RNA - Not Detected

#### Dengue Ig M & Ig G

- NS1 Antigen Not Detected
- Dengue Ig M Not Detected
- Dengue Ig G Not Detected

**Epstein-Barr Virus VCA IgM** Non reactive

**HIV antibody** - Negative

**Rickettsial serology** - Negative

**Leptospira serology** - Negative

You decide to admit her to your Intensive Care Unit.

#### Question A (10 marks)

- i) Why do you think the patient deteriorated despite on 2 days of intra venous ceftriaxone? List 5 possibilities (5 marks)
- ii) What are the possible causes for the hepatosplenomegaly in this patient? Give 3 causes. (3 marks)
- iii) Apart from rose spots, give 2 other possible causes for the rash in this patient. (2 marks)

#### Question B (15 marks)

- i) Discuss in detail how you would manage this patient when she arrives in the ICU. Justify your actions taken to stabilize her. (12 marks)
- ii) Would you make any change to her antimicrobial therapy for salmonella enteric fever and why? (3 marks)

#### Question C (10 marks)

Radiologist had reported that the gallbladder wall was markedly thickened.

- i) What is your next course of action? Discuss. (7 marks)
- ii) Blood culture result came back as “no growth”. Is this result common? Please explain. (1 mark)
- iii) Give 4 other clinical manifestations of salmonella infection distant from the gastrointestinal tract (2 marks)

**Question D (15 marks)**

Her condition is improving but her nasogastric tube feeding is not well tolerated for the past 10 days and the residual gastric aspirate is more than 300ml/day. Examination showed sluggish bowel sounds and abdominal x ray showed dilated bowels.

- i) Discuss how you would manage her condition. (5 marks)
- ii) How would you commence the total parenteral nutrition (TPN) for her? (10 marks)

- End -