



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

2 Questions

Monday 6 August 2018 (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

You have been urgently consulted to assess a 60 year old female, body weight 59kg in the orthopaedic ward. She was admitted one (1) day ago for investigation of increasing low back pain.

Background

She has a background of chronic low back pain due to spondylolisthesis L4/5, L5/S1 since 2015 and currently on Non Steroidal Anti-Inflammatory Drug (NSAID) as required.

Presenting complaint

The patient has a two (2) day history of dizziness, vomiting and fever. She was brought into the hospital with low back pain, lower abdominal pain and was unable to walk.

When seen by the on-call orthopaedic surgeon, she was noted to have low back pain with no focal tenderness on clinical examination. X-ray of her lumbosacral spine revealed chronic changes similar to previous images. Bed rest and physiotherapy was ordered to manage her condition.

Clinical examination

Your clinical findings in the orthopaedic ward are as follows:

Temperature 35.6C, sweating, looks very unwell.

Central Nervous System

Patient is conscious but tired-looking and restless. Full neurological examination was not possible but patient was unable to move her left lower limb. All limb tendon reflexes are intact and bilateral plantar responses were downward.

Respiratory

Dyspneic, Respiratory Rate (RR) - 30/min, SpO₂ 95% on 6L/min O₂ via Hudson mask, air entry reduced bilaterally, with bilateral crepitations in the basal region.

Cardiovascular

Heart Rate (HR) - 115/min sinus rhythm, Blood Pressure (BP) 112/70mmHg, peripheral pulses are all palpable, but with cold peripheries.

Gastrointestinal

Voluntary guarding at the lower abdomen more on left side, there is no abdominal distension, no rebound tenderness.

Indwelling urinary catheter inserted with minimal amount of urine.

Musculoskeletal examination – as per orthopaedic assessment above.

Baseline investigations

Parameters	Patient Value	Normal Adult Range
pH	7.25*	7.35 – 7.45
PCO2	41 mmHg (5.5 KPa)	35 -45 (4.6 – 6.0)
PO2	92 mmHg (KPa)	
Bicarbonate	18.4*	22 - 28
Standard Base Excess	-8.5*	-2.0 - +2.0
Lactate	5.8 mmol/l*	< 2 mmol/l
Haemoglobin	14.8 g/dL*	12 - 16
White blood cell	3.3 x 10⁹/L* 74% Neutrophils*	4.0 – 11.0
Platelets	23 x 10⁹/L*	150 - 350
Prothrombin Time (PT)	12 seconds	9.1 – 12.1
International Normalised Ratio (INR)	1.18	0.8 – 1.2
Activated partial thromboplastin time (APTT)	43 seconds*	28 – 40
Urea	22.9 mmol/L*	3.5 – 7.2
Creatinine	276 µmol/L*	53 - 97
Bilirubin (Direct)	40.1 µmol/L*	0 – 8.6
Bilirubin (Indirect)	13.5 µmol/L	3-23
Alanine aminotransferase (ALT)	94 U/L*	0 -40
Aspartate aminotransferase (AST)	248 U/L*	5 - 34
Gamma glutamyl transferase (GGT)	77 U/L*	9 - 36
Alkaline phosphatase (ALP)	128 U/L*	53 - 128
Amylase	45 U/L	25 - 125

CXR – Bilateral lower zone infiltrates suggestive of atelectasis

QUESTION A (20 marks)

- i) What is her q-SOFA score? Justify your answer. (5 marks)
- ii) Based on the information given in the case scenario up to this stage, what are the possible differential diagnoses? Give five (5) differential diagnoses and justify your reasons for each of them. (5 marks)
- iii) What investigations would you order and why? (5 marks)
- iv) Explain how you would transfer her to ICU. (5 marks)

QUESTION B (20 marks)

Soon upon arrival in ICU, the patient was noted to be more drowsy and confused. She is tachycardic with HR 120/min and still hypotensive despite fluid resuscitation of 1L crystalloid. She is also noted to be anuric. Arterial blood gas shows persistent hyperlactaemia.

She is still maintaining adequate oxygen saturation with O₂ mask now at 10L/min, but remains very tachypneic. The bedside nurse reports that the patient's skin is starting to get mottled and the digits of her hands and feet are getting dusky. You noted that there is a petechiae rash over her abdomen.

- i) Based on the information and clinical examination that has been given so far, discuss in detail how you would manage this patient whilst pending the results of further investigations you have requested. (15 marks)
- ii) At this juncture, would you start empirical antibiotics? If yes, justify your choice of antibiotic (s). (2 marks)

The surgeon requests for a CT abdomen/pelvis without contrast to rule out acute abdomen.

- iii) Would you allow the patient to be transferred to CT? What is your decision and justify your answer. (3 marks)

QUESTION C (20 marks)

Non-contrast CT abdomen and pelvis

- Significant findings include prominent Left psoas muscle with no collection seen. No ascites.

Procalcitonin = 100.10 ng/mL (<0.5)

Blood culture the next day grew heavy growth of Gram Positive Cocci in chains, subsequently identified to be a sensitive *Streptococcus pyogenes*.

- i) What is the pathogenesis of *Streptococcus Toxic Shock Syndrome (STSS)*? (8 marks)
- ii) List 4 clinical conditions that can predispose to STSS. (4 marks)

The Infectious Disease (ID) physician recommends you change the antibiotic regimen to IV penicillin and clindamycin, and suggests intravenous immunoglobulin (IVIG).

- iii) What is the role of penicillin in STSS? What dose would you prescribe? If penicillin is not prescribed, please provide your alternatives / reasons. (2 marks)
- iv) What is the role of clindamycin in STSS? What dose would you prescribe? If clindamycin is not prescribed, please provide your alternatives / reasons. (2 marks)
- v) What is the role of IVIG in STSS? What dose would you prescribe? If IVIG is not prescribed, please provide your reasons. (4 marks)

QUESTION D (20 marks)

The patient is now on multiple organ support.

Her bilateral fingers and toes are progressively getting mottled and look “black” in appearance despite your best efforts. Peripheral pulses are present and strong.

- i) What is the name of this condition? (1 mark)
- ii) Briefly discuss this condition in terms of mechanism (5 marks), predisposing factors (5 marks), treatment / potential treatment options (7 marks) and prognosis (2 marks).

QUESTION E (20 marks)

Discuss the following with relation to this case:-

- i) Role of lactate monitoring (5 marks)
- ii) Role of procalcitonin (5 marks)
- iii) Liberal vs Restrictive fluid resuscitation (10 marks)

Question 2

A bus was travelling from Sha Tin racecourse towards Tai Po. The driver reportedly lost control of the vehicle as he was pulling into a turn near Tai Po Mei, causing the bus to flip over onto its side. Eighteen persons were confirmed dead at the scene, while 63 injured passengers were rushed to a dozen hospitals across the city.

A number of passengers were redirected to your own hospital.

Question A (20 marks)

All these passengers were transferred and taken care by Accident and Emergency Department of your hospital. In relation to the use of a trauma scoring system:

- i) Discuss the applications of a trauma scoring system? (10 marks)
- ii) What are the limitations? (10 marks)

Question B (20 marks)

One of the victims, a 60 year old gentleman was fully conscious and orientated, SpO₂ 100% on 6L O₂/min via nasal cannula, Respiratory Rate (RR) 25/min, Heart Rate (HR) was 110/min regular, Blood Pressure (BP) 92/45 mmHg on arrival. Primary survey was completed. Secondary survey was started. Blood taken was send to laboratory for investigations, as well as type and screen. X rays for cervical spine, chest and pelvis were normal. X ray of right femur showed major fracture.

He complained of increasing abdominal discomfort. His BP was suddenly dropped to 60/25mmHg, HR was 125/min regular.

Focused abdominal ultrasound showed some fluid in left upper abdomen.

He was resuscitated immediately and was transferred to the operating theatre. Laparotomy was performed. Intraoperative findings were severe bleeding from sudden rupture of spleen and < 10% of subscapular hematoma in liver surface was identified. Splenectomy was performed, and other intraabdominal bleeding source was excluded. Liver hematoma and right femur fracture were dealt with during the initial operation. Post-operatively, he was transferred to Intensive Care Unit for further care. In relation to damage control surgery:

- i) Discuss the indications for damage control surgery? (10 marks)
- ii) What are the disadvantages? (10 marks)

Question C (20 marks)

Immediate post-operative blood results showed evidence of coagulopathy

- i) What are pathophysiological factors for coagulopathy in trauma? (10 marks)
- ii) How can you prevent the development of such coagulopathy? (10 marks)

Question D (10 marks)

The patient was noted to have oliguria post operatively

- i) Outline risk factors for renal impairment in this patient. (10 marks)

Question E (10 marks)

Urine output improved after fluid replacement.

- i) How would you prevent the overwhelming post-splenectomy sepsis in this patient in future? (10 marks)

Question F (20 marks)

The orthopedic team has decided NOT to perform intramedullary nail for his fractured femur until his lower limb edema has settled.

- i.) Discuss the available measures regarding deep venous thrombosis (DVT) prophylaxis for this patient? (10 marks)
- ii.) What are the indications and contraindications of the placement of inferior vena cava (IVC) filter in this clinical setting. (10 marks)

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