

The Prince Charles Hospital  
The Royal Brisbane & Women Hospital  
Redcliffe Hospital  
Caboolture Hospital

Facility/hospital/clinical service name

# Metro North Hospitals ACEM Fellowship Trial Examination

2017.1

Short Answer Questions

SAQ Paper

## Model Answers

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# **ACEM Fellowship Trial Examination**

**2017.1**

**Short Answer Questions**

**SAQ Paper**

**Model Answers**

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**SAQ 1 (25 marks) LONG QUESTION**

Passmark = 16/27

**1. What 6 clinical factors must be considered to evaluate this patient's suitability for extubation in the ED? (6 Marks)**

- Resolution of medical condition necessitating intubation
- Time since, and agent given for paralysis; need for reversal agent
- Sedation used – preferably short acting eg fentanyl/propofol – has had adequate time to wear off
- Airway grade – difficult intubation anticipated should it be required
- Oxygenating and ventilating adequately on minimal support (eg FiO2 >40% with PEEP >10 and PS >15)
- Neurologically alert and awake enough to obey commands, resolution of agitation/delirium
- Haemodynamics stable – eg fluid status corrected, no vasoactive support
- Significant medical comorbidities that may make extubation complicated such as asthma, OSA, cardiomyopathy.

**2. List 3 non-clinical factors that must be considered to evaluate this patient's suitability for extubation in the ED? (3 marks)**

- Staff skill set including experience managing extubations
- Workload of resus area of the ED
- Staff available who can safely reintubate the patient if required
- Availability of equipment such as NIV that may be required post-extubation

**3. List 4 complications that may occur with extubation, and for each one list a specific management option in the ED. (8 Marks)**

Complication	Management
Cough sore throat	Analgesia
Increased sympathetic response (Increase in HR, MAP; in patients with CAD up to 40% ê in LVEF)	Analgesia, GTN in CVS disease pts Stop inotropic support

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Laryngospasm	Jaw thrust (Larsen's manourver) Positive pressure ventilation, suction, Low dose Sux but preparing for re-intubation if required
Bronchospasm	Bronchodilators
Aspiration	Antibiotics, Positioning upright, Chest physio
Respiratory failure	NIV, Re-intubation if required

<http://ceaccp.oxfordjournals.org/content/8/6/214.full.pdf+html>

<http://rc.rcjournal.com/content/respcare/59/6/991.full.pdf>

4. You proceed with a successful extubation of this patient in the ED. Your Director is impressed and asks you to write a departmental extubation protocol suitable for use in all ED extubations.

**List 8 features you will include in this protocol.**

**(8 Marks)**

Protocol Component (8)
List of Key Stakeholders
Reason for Protocol
Inclusion Criteria
Exclusion Criteria
Procedure and Monitoring Requirements
Complications and Expected Management
Post Treatment Monitoring
Planned Audit/Review schedule

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## SAQ 2 (11 Marks)

Passmark = 8/11

1. **Describe the 4 key abnormalities shown in this blood gas. Include any calculations performed in your answer. (4 marks)**

Severe metabolic acidaemia. HAGMA. With appropriate respiratory compensation. (need to add calculation for resp compensation)

Severe hyponatraemia however corrected for glucose Na equals  $106 + (82-5)/3 = 132$  which is close to normal range

Severe hyperkalaemia. Expected K given acidaemia  $4 + 2.5 = 6.5$

Extreme Hyperglycaemia at 82 - consistent with DKA or a HHS pattern in a Type 2 diabetic/

2. **What is the likely diagnosis? (2 Marks)**

Given the extremely high glucose it is likely HHS in a T2DM but DKA is also possible.

3. **List 5 immediate management priorities for this patient: (5 Marks)**

1. Fluids- This patient is likely to be severely dehydrated. Aim correction over next 24 hours. Example N/S 500ml/hr for first 2 hours. Then 250ml/hr next 4 hours.
2. Insulin- 0.05-0.1units/kg/hr. No bolus.
3. Electrolytes- Watch K, will need to add extra potassium as pH improves and blood K levels drop.
4. Seek and treat precipitant of current state
5. Anticipate and treat complications eg cerebral oedema.
6. Disposition to ICU as requiring close observation and possibility for deterioration. Other answers at examiners discretion.

### SAQ 3 : (12 marks)

Passmark = 9/12

#### 1. List 4 differential diagnoses other than testicular torsion? (4 Marks)

Torsion appendix testes  
Orchitis/Epididymoorchitis  
Trauma (Haematoma, Testicular rupture)  
Renal colic  
Inguinal hernia

#### 2. After review of the patient you are concerned that he has a testicular torsion. List your 3 most important management priorities for this patient. (3 Marks)

Analgesia – appropriate agent & dose required  
Urgent referral and transportation to centre that will operate on 7yr old for exploration in theatre  
NBM

#### 3. The registrar looking after the patient reports back to you that the surgical registrar at the local receiving hospital is refusing to accept the patient because there are no beds in the hospital. What actions will you take to ensure the patient receives appropriate care? (5 Marks)

Arrange transport to local receiving hospital – private vehicle or ambulance – no delay  
Speak to ED consultant at receiving hospital to advise of time critical emergency & need for immediate transfer  
Speak to Surgical Consultant at receiving hospital and escalate to medical superintendant of both hospitals if necessary  
Documentation of refusal & your escalation of management  
Medical Superintendant informed  
Make appropriate report –PRIME  
Consider using as M&M case  
For review post event to ensure appropriate WUG to avoid unnecessary delays in time critical emergency

**SAQ 4: (16 marks)**

Passmark = 10/16

**1. List 4 major abnormalities shown on his chest X-ray. (4 Marks)**

Widened mediastinum
Opacification both lung fields L > R
L rib #s (2-8)
L subcutaneous emphysema

N.B Intubated is not an acceptable answer as the ETT is adequately positioned.  
Consider accepting L ICC malpositioned or kinked as a possible abnormality.

**2. Whilst in the ED he becomes progressively more difficult to ventilate. List 3 potential causes for this and state the immediate management of each. (6 Marks)**

Cause	Management
ETT blocked	Hand ventilate with BVM, suction ETT, check position of ETT, replace ETT if necessary
Tension Pneumothorax/Haemothorax R ICC- drainage port borderline outside the chest wall (progression of PTx) L ICC- kinked inside pleural cavity (progression of PTx)	Replace R side ICC if no swing noted in canister. Remove and replace ICC on L side.
Pulmonary contusion	Increase PEEP and trial low volume/high rate ventilation
Incorrect position of ETT eg migration into R main bronchus	Check ETT position & pull back to ensure ventilating both lungs
Bronchospasm	Nebulised bronchodilators down ETT

**3. Outline 6 key steps in performing a large bore intercostal catheter placement on an intubated patient who has been adequately sedated & paralysed. (6 Marks)**

Preparation - Assistant required to hold the arm abducted & correctly position patient. Clean and drape area, Full sterile procedure
Skin Incision - Using scalpel, make an incision (approx. 4-5cm) following rib border then blunt dissection down to pleura and using curved forceps puncture into pleural space
Tube Insertion - Insert 32F tube until distal drainage port is within chest cavity
Connect to Underwater seal drain, ensuring swing in catheter tubing
Suture in position and apply dressing
Confirm position with CXR and ensure patient vitals remain stable/unchanged.

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**SAQ 5: (16 marks)**

Passmark = 12/16

**1. List four major abnormalities on the ECG and state their significance in the table below. (8 marks)**

<b>ECG abnormality</b>	<b>Significance</b>
ST elevation lead III	Inf STEMI requiring urgent revascularisation
ST dep/Tw inv leads I, aVL	Reciprocal changes to inf STEMI
ST dep V2-V4	Suggests posterior STEMI
Complete heart block	Rhythm disturbance likely contributing to hypotension, likely caused by ischaemia of AV node – requires urgent management with Isoprenaline or pacing

**2. List 8 measures in this patient's Emergency Department management. (8 marks)**

- Urgent call to Cath lab to arrange emergent PCI
- Aspirin 300mg PO
- Ticagrelor 180 mg PO (or Clopidogrel 600mg PO)
- Fentanyl 25-50 mcg IV cautiously titrated to pain (Fail if give GTN in setting of hypotension)
- Heparin 5000 units IV
- Bolus of 0.9% saline 500mLs IV to SBP >90 mmHg
- Trial of atropine 300-600 mcg IV to HR >60 bpm or Isoprenaline infusion
- Consider transcutaneous pacing until patient is in Cath lab

N.B Fail this part of the question (8 marks) if give GTN in setting of hypotension in an inferior STEMI.



**SAQ 6: (19 marks)**

Passmark = 13/19

1. What issues need to be addressed in your assessment of this patient? (3 marks)

Safety of patient and staff  
Additional resources required – mental health, security  
Capacity of the patient to decline treatment  
Differentiating organic vs psychiatric cause for behavioural disturbance

1. List 5 potential organic mimics of psychiatric conditions that may be present in this patient. (5 marks)

Anticholinergic toxicity  
Serotonin syndrome  
Stimulant toxicity  
Head injury  
Drug withdrawal  
Encephalitis  
Neuroleptic malignant syndrome  
Temporal lobe epilepsy

2. List 5 major features of acute delirium (5 marks)

Acute onset  
Fluctuating course  
Clouded consciousness  
Deranged vitals signs  
Visual hallucinations

3. List the steps you would take in managing this patient's aggression (5 marks)

Appropriate location – resus/dedicated mental health assessment room  
Security presence at the bedside  
Attempt verbal de-escalation  
Offer oral medication/sedatives – diazepam 5-20mg orally, olanzapine wafer 10mg  
If above measures fail – physical restraint followed promptly by chemical sedation with Droperidol 10mg IMI

### SAQ 7: (15 marks)

Passmark = 9/15

1. **What is the diagnosis ?** (1 mark)

Type A THORACIC AORTIC DISSECTION – No mark if Type A not specified.
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2. **List 5 risk factors for this condition.** (5 marks)

Hypertension
Congenital cardiovascular disorders eg Coarctation of aorta
Aortic stenosis
Bicuspid aortic valve
Marfan's syndrome /Ehlers-Danlos syndrome/Turner syndrome
Iatrogenic - recent angioplasty / previous bypass or valve surgery
Arteritis (eg Takayasu's or Giant Cell)
Catecholamine induced Hypertension eg cocaine use

3. **List 5 radiological features on a plain CXR that may be seen with this diagnosis.** (5 marks)

Widening of superior mediastinum
Dilatation of aortic arch
Obliteration of aortic notch
Double density of the aorta /Double Calcium sign >5mm
Localised prominence along aortic contour

Other

Displacement of NG or ETT to the right

Distortion of left main bronchus

Left apical cap

Pleural effusion

Cardiomegaly

4. **List 4 immediate management priorities for this condition.** (4 marks)

Analgesia – appropriate drug, dose & route

Urgent referral for Cardiothoracic surgical management of dissection

Control of shear forces

- HR control with titrated IV b-blockers
- BP Control with titrated IV b-blockers, GTN infusion, SNP, Labetolol

Invasive monitoring with arterial line & central line

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**SAQ 8: (14 marks)**

**Candidate name:**

Passmark = 8/14

**1. List (5) key aspects of the protocol you will develop for the risk management of "Did Not Wait" patients in your ED. (5 marks)**

Early notification of senior medical staff on shift if patient tries to leave before being seen by a doctor.

Daily audit of DNW patients by senior doctor

Identification of high risk patients or presentations

Attempts to contact patient or NOK to ensure appropriate care has been sought

Notification of referring doctor if patient DNW

Documentation of alternate care options provided to patient

**2. List (4) strategies that may be implemented within the ED to minimize the number of "Did Not Wait" patients? (4 marks)**

Reduce waiting times

Ongoing communication with waiting patients by ED staff

Managing expectations of waiting patients

Relatives able to wait with patients

Information provided about alternate ways to seek care

Physical layout of waiting room so that high risk patients can be seen by triage nurse

Comfort of waiting area

Internal waiting areas for high risk patient groups.

**3. List (5) groups of patients who are at high risk for an adverse outcome if they leave without being seen in an Emergency Department? (5 marks)**

Mental health patients

Drug and/or Alcohol intoxication (impaired judgement)

Children

High risk presentations (eg chest pain, head injury, headache, fever)

High triage categories

GP concern

**SAQ 9: (14 marks)**

Passmark = 8/14

**1. Describe the key features of this injury. (2 Marks)**

Penetrating neck injury with device in-situ, to left anterior triangle of zone 2 of the neck.

**2. List 6 signs that would raise concern that this patient's airway is at risk from this injury. (6 marks)**

Expanding haematoma  
Thrill/bruit  
Air or bubbling in wound  
Haemoptysis  
Tracheal deviation  
Stridor  
Hoarse voice  
Significant or rapidly expanding subcutaneous emphysema

**3. The patient develops worsening hypoxia and respiratory distress. List 6 immediate actions you would take to manage this? (6 Marks)**

1. Maintain airway patency through upright positioning in position of comfort.

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2. Optimise oxygenation 15L O2 via NRBM (NOT suitable for NIV or HF nasal O2)

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3. Seek and treat tension pneumothorax or haemothorax

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4. Notification of anaesthetics/surgical team for attendance and assistance re: possible surgical airway/tracheostomy

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5. Prepare for emergent direct/video assisted laryngoscopy for RSI with Ketamine 2mg/kg and Rocuronium 1.2mg/kg

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6. Prepare for difficult airway. Surgical airway kit open, neck prepped and senior clinician scrubbed for surgical airway.

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### SAQ 10: (28 marks) LONG QUESTION

Passmark = 19/28

**1. List 4 priorities in the initial management of this patient. (4 marks)**

Answer:

Immediate assessment with Primary & Secondary Survey looking for other injuries.

(Head, c-spine, thoracic, abdominal, other limb)

Analgesia: Fentanyl 1mcg/kg IV (or equivalent) q5mins until pain controlled

Pressure dressing to wound to minimise ongoing haematoma formation

Assess for neurovascular integrity of the limb

Imaging to exclude underlying bony injury

Following a thorough assessment you determine it to be an isolated injury of the left lower limb.

**2. List and justify 4 investigations would you organise in the ED? (8 marks)**

Answer:

Radiological: Plain Xray (left lower leg)	Possible fracture of tibia or fibula
Haematological: FBC	Quantify current Hb and risk of anaemia
Haematological: INR	Quantify anticoagulation
Haematological: G&H	High risk of needing transfusion.

**3. List 3 short term complications that may occur with this injury? (3 marks)**

Answer:

1. Compartment syndrome
2. Anaemia, hypovolaemia, haemorrhagic shock
3. Wound infection/Cellulitis
4. Osteomyelitis

**5. List 3 long term complications that may occur with this injury? (3 marks)**

- 1) Common or superficial peroneal nerve damage
- 2) Wound ulceration & delayed healing
- 3) Poor mobility/Deconditioning
- 4) DVT

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**5. List 5 steps in your management of this wound?**

**(5 marks)**

1. Pressure dressing & elevation to minimise further haematoma formation
2. Appropriate analgesia to allow cleaning of wound
3. Evacuation of haematoma, given size and anticoagulation this should ideally be done in theatre.
4. Referral to surgeon (Plastics/Orthopaedics) as likely require skin grafting
5. ADT cover

After a review of previous notes & confirmation by the GP, you determine that the patient is has a bio-prosthetic aortic valve replacement, and the Warfarin is for his atrial fibrillation. His INR today is 2.9.

**6. Describe the protocol for reversal of Warfarin in this patient with active ongoing haematoma expansion.**

**(5 marks)**

Answer:

Reference: Warfarin reversal guidelines - MJA 2013

\* Management of patients on warfarin therapy with active bleeding.

- INR  $\geq 2$  AND clinically significant but not life threatening bleeding.
  - Vitamin K 5-10mg IV
  - Prothrombinex-VF 35-50u/kg IV
  - IF Prothrombinex-VF not available then FFP 15ml/kg

**SAQ 11: (16 marks)**

**Passmark = 11/16**

Questions:

**1. Apart from pre-term labour, list 5 other differential diagnoses that needs to be considered in this patient. (5 marks)**

- Placental abruption
- Acute appendicitis
- Ovarian pathology - Cyst rupture, Torsion
- Cystitis/Urinary tract infection/Pyelonephritis
- Renal Colic
- Braxton Hicks contractions
- HELLP syndrome
- Round ligament pain
- Acute Gastroenteritis

**2. List 6 risk factors that would increase her risk of pre-term labour with this pregnancy? (6 marks)**

- Uterine abnormalities - Fibroids, Bicornuate uterus
- Cervical abnormalities - Cervical incompetence, Short cervix
- Premature rupture of membranes
- Infection - Significant infection from any source - Chorioamnionitis, UTI
- Antepartum haemorrhage
- Polyhydramnios
- Smoker
- Stimulant use
- Low socioeconomic status
- Ethnicity - African, Asian, Indigenous

**3. You have diagnosed pre-term labour as a cause for this patient's pain. List 5 key steps in the management of this patient. (5 marks)**

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- Analgesia
- Continuous fetal monitoring - indicated if gestation >25/40
- Tocolytics - effective in delaying delivery by 24-48 hours in 80% of cases
  - NSAIDS - Indomethacin, Ketorolac
  - Salbutamol infusion 10mg/1L NaCl 0.9% - 10mls/hr
  - Nifedipine 20mg TDS PO
  - GTN
  - MgSO<sub>4</sub>
- Glucocorticoids - fetal lung maturity
  - Betamethasone 11.4mg IM x2 doses
- Prepare for delivery/Notify relevant specialties
- Transfer to/Admit under OBGYN



**SAQ 12 : (21 marks)**

**Passmark = 14/21**

**1. What is the most likely diagnosis? (1 mark)**

Acute pulmonary oedema

**2. List 4 radiological features on the CXR that support this diagnosis. (4 marks)**

- Bilateral interstitial infiltrates
- Bilateral small to moderate pleural effusions
- Upper lobe venous diversion
- Cardiomegaly (although AP film)

**3. List 10 potential causes for the above condition. (10 marks)**

- Cardiogenic
  - o Acute valvular dysfunction
  - o Acute arrhythmia, eg Atrial fibrillation
  - o ACS
  - o Fluid overload, eg iatrogenic – fluid overload alone is too vague
  - o Non-compliance with cardiac medications
- Non-cardiogenic
  - o Aspiration
  - o Inhalational injury
  - o SAH
  - o Near drowning
  - o Pancreatitis
  - o Pulmonary embolism
  - o DIC
  - o Sepsis
  - o Renal failure
  - o Hepatic failure

Note: do NOT give headings here. This question is easy, they should be able to come up with 10 answers.

**4. List your two main treatments for this condition in this patient, including any relevant doses where necessary, and one contra-indication for each. (6 marks)**

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<b>Treatment</b>	<b>Dose</b>	<b>Contra-indication</b>
GTN Infusion SNP infusion	5-200 mcg/min 0.5-4 mcg/kg/min	Sildenafil use in prior 24h Hypotension SBP<90
NIV	CPAP or BIPAP Initial settings PEEP 5-8cm, PS 10, FiO2 1.0	ALOC/exhaustion/numerous... Poor resp effort Vomiting, haemoptysis Patient unable to tolerate mask

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**SAQ 13: (17 Marks)**

Passmark = 13/17

**1. List 5 important differential diagnoses to be considered in this patient. (5 marks)**

- Pneumonia – streptococcal and atypicals such as PJP
- Tuberculosis
- Meningitis
- Toxoplasmosis
- Cerebral lymphoma
- Cryptococcosis
- HIV encephalopathy

**2. List and justify 4 specific investigations that will help in differentiating the cause of this patient's illness (4 marks)**

Investigation	Reason
Bloods – viral load/CD4 count	Identifying AIDs defining conditions
CXR	Pneumonia/TB
LP	Meningitis/Cryptococcosis
CT head	Cerebral lymphoma/toxoplasmosis

0.5 mark only if investigation not adequately justified.

Your intern has sustained a needle stick injury whilst trying to obtain bloods for investigations and is understandably worried.

**3. What factors are associated with a higher risk of seroconversion with a needle stick injury from a HIV positive patient? (4 marks)**

- Deep penetrating injury
- Needle – visible blood, hollow bore needle higher risk
- Needle placement in vessel of source patient
- Source patient with late stage HIV/ high viral load/not on anti-retrovirals

**4. List 4 steps in the management of this needle stick incident (4 marks)**

Appropriate first aid – wash wound with soap and water  
Establishing baseline bloods for intern and source patient – HIV viral load,  
Hepatitis B, Hepatitis C  
Counselling intern regarding role of PEP  
Organising follow up with Infectious Diseases/Workplace Health & Safety

## SAQ 14 (10 marks)

Passmark = 7/10

### 1. List 5 strategies that your department could implement to improve the above data. (5 marks)

Immediate notification strategies for Category 1 & 2 patients (Resus buzzers)  
Rapid transfer of Category 1 & 2 patients from triage to clinical areas  
Increase staffing of Resuscitation area (Cat 1 & 2 patients)  
Redistribution of staff from low acuity areas of the department to high acuity areas.  
Streaming of patients to clinical areas (Resus, Acute & Fast Track areas)  
Implementation of a Rapid Assessment Team (RAT) model of care  
Education of staff of the ATS triage categories & recommended maximum waiting times.  
Ensure accurate data collection is occurring regarding time the patients are actually seen.

### 2. List 5 effects of long waiting times in the ED. (5 marks)

ED Overcrowding  
Patient dissatisfaction & complaints  
Increase in DNW patients  
Violence and aggression against staff  
Delays to critical treatments (eg time to antibiotics in sepsis)  
Increase risk of adverse outcomes and higher mortality

### SAQ 15: (23 marks)

Passmark = 16/23

Questions:

1- List 7 likely causes for his jaundice

(7 marks) – 4/7

- Physiological (day 2-3)
- Breastmilk jaundice
- Sepsis
- Haemolysis
- TORCH infections
- Biliary atresia
- Hypothyroidism
- G6PD
- Metabolic disease / storage diseases

2- List 6 red flags during history and examination that warrant admission to the hospital. 6 marks – 5/6

- Prematurity
- Low birth weight or small for gestation
- Previous baby with significant jaundice or kernicterus
- Unwell infant
- Signs of kernicterus
- Parental concerns
- Onset from birth
- Too high (Bili >200 mmol/L) – bilirubin measured above the treatment nomogram
- Conjugated bili >25%

3- List 6 investigations required in ED and justify each one of them. 6 marks – 4/6

- FBC (and film) – hemolysis – Hb- smear – spherocytosis – reticulocyte count – for hemolysis
- ELFT's – liver function and biliary obstruction
- BC, Urine, LP – sepsis screen
- USS of abdomen if conj bili is high – biliary atresia and duct dilation
- Blood group – rule out incompatibility / may need transfusion
- TFT's – thyroid function tests
- Direct Coombs test – evidence of hemolysis

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4- This baby did not require phototherapy and no serious cause was found for his jaundice.

5- List 4 criteria this child needs to meet in order for a safe discharge to occur. (4 marks) 3/4

- Reassuring physical examination, ie well-looking
- Period of observation and feeding
- Bili <200
- Conjugated Bilirubin <25%
- No concerning cause found.
- Adequate follow up arranged – GP or child health nurse / paediatrician

**SAQ 16: (12 marks)**

Pass Mark = 7/12

**1. List the 5 initial steps in your approach to this situation? (5 Marks)**

Apply FiO2 100% to face and tracheostomy

Remove inner cannula or speaking valve and attempt FiO2 100% BVM

If not resolved, attempt to pass suction catheter and oxygenate via tracheostomy

If not able to pass suction catheter: deflate cuff and attempt to allow patient to breathe around or BVM applied around tracheostomy

If unable to do this, remove tracheostomy and attempt replacement

If unable to replace then proceed to RSI with direct laryngoscopy or surgical airway depending on indication for tracheostomy

**2. The patency of the patient's tracheostomy is achieved, however the bleeding from the site has become significantly worse.**

**List 2 possible causes of this bleeding? (2 Marks)**

Tracheo-arterial (innominate) fistula

Infection

Granuloma

**3. List 5 priorities in your ongoing management of this situation? (5 Marks)**

1. Immediate notification of anaesthetics, ENT and vascular for urgent management in theatre

2. Thrombostatic medications: TXA 1g, reversal of anticoagulation

3. Early use of blood products, activation of MTP and use of minimal volume resuscitation technique

**B** 4. Slowly hyper-inflate tracheostomy cuff with 10-35mL air

5. If this fails to stop bleeding, attempt RSI with oral ETT, remove tracheostomy and then manually compress fistula against posterior border of the sternum



## SAQ 17 (12 marks)

Passmark = 8/12

### 1. List 4 other treatment options for this patient. (4 marks)

4 treatment options

- a) IV magnesium 2gm IV over 20 mins
- b) Salbutamol IVI 250mcg bolus followed by an infusion 5 -10 mcg/kg/hour
- c) BIPAP (IPAP 7 -15 cmH<sub>2</sub>O; EPAP 3 – 5 cm H<sub>2</sub>O)
- d) Adrenaline 0.3mg IM or IV infusion  
Aminophylline also acceptable if in discussion with ICU

The patient continues to deteriorate and has become more obtunded with poor respiratory effort. You decide to proceed with intubation.

### 2. List 4 steps you will take to optimise the patient before proceeding with RSI. (4 marks)

Optimise for RSI

- a) Keep upright until last moment
- b) Preoxygenate (BiPaP or 15L NRBM)
- c) High flow oxygen by nasal cannula (15L/min)
- d) Continuous salbutamol nebulisation 10 – 15 mg/hr
- e) Normal Saline 1L IV bolus

The patient's BP drops to 80/ 40 immediately post intubation.

### 3. List 4 immediate measures you will take to manage this. (4 marks)

Post intubation hypotension

- a) Disconnect from ventilator & allow prolonged exhalation
- b) IV fluid bolus 10 – 20 ml/kg
- c) Rule out tension pneumothorax (clinical/ USS) or needle /finger thoracostomies
- d) Vasopressors eg metaraminol 0.5-1mg bolus / adrenaline 10mcg IV bolus

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**SAQ 18: (21 marks)**

Passmark = 15/21

**1. List your top 5 management priorities on arrival of this patient. (5marks)**

Confirm tube placement- ETCO<sub>2</sub>, CXR  
Improve IV access - 2 large bore IV access  
Minimal fluid resuscitation- blood products only. Aim MAP < 60  
Neuroprotective measures - Hyperventilate to aim PCO<sub>2</sub> 35mmHg, 3mls/kg  
Hypertonic 3% saline or Mannitol 1g/kg IV, Head up 30 degrees  
FAST scan for source of haemodynamic instability, OR CT if stabilises with resuscitation measures

Other acceptable options- blood for group X match, control any external haemorrhage, trauma call, neurosurgical call, Ensure C-spine control

You opted to do a FAST scan in the trauma room

**2. Give 4 Pros and Cons of a FAST scan in this patient. (8marks)**

<b>PROS</b>	<b>CONS</b>
Pros- rapid at bedside	Operator dependant
Expediates transfer to theatre	Does not differentiate fluid types
No radiation exposure	Does not look at retroperitoneal space
Non-invasive	Need at least 250mls to be detectable

Other acceptable-

Pros- no contrast, non-invasive, repeatable, highly specific

Cons- false positives, does not look at solid organ injury, unable to grade injuries

During his ongoing resuscitation the massive transfusion protocol has been activated.

**3. Give 8 parameters you will aim for in your ongoing haemodynamic resuscitation of this patient. (8marks)**

VBG- iCa >1.1, Lactate clearance, Ph >7.2

FBC- Hb >80, plts >100

Coags- INR <1.5, FIB >1

Obs- Temp >35mmHg, MAP >60MMhg (preferably higher if closed head injury and no bleeding).

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## SAQ 19 (Long question 26 marks)

Passmark = 16/26

Questions:

- 1. List three serious complications which may arise from this event. (3 marks)**

Seizure

Arrhythmia with cardiovascular collapse

Death

- 2. List the 4 main priorities of managing this situation? (4 marks)**

Maintenance of cuff inflation in the rural ED

Cardiac monitoring – recognition of risk of serious arrhythmia

Organisation of retrieval to tertiary centre with antidote supplies and ICU and anaesthetics expertise

Open disclosure to patient and family

- 3. List two retrieval options for this patient, with 2 advantages and 2 disadvantages of each. (10 marks)**

Retrieval Method	Advantage	Disadvantage
Road Transfer	Rapid departure Cuff pressures maintained	Unpredictable transit time Door to door delivery service
Rotary wing	Transfer time not dependent on traffic	Cuff pressures may be difficult – low flight altitude needed Transport to landing pad likely to be challenge while maintaining cuff

- 4. List 5 steps you will take to prepare your tertiary ED to receive this patient. (5 marks)**

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Resus team

Preparation for intubation

Defibrillation equipment

ALS drugs in anticipation of cardiac arrest

+/- ECMO if available

Source of multiple doses of Intralipid

Notification of ICU and anaesthetics for advice and assistance

Toxicology advice

**5. List 4 medico-legal issues should be addressed in this case? (4 marks)**

- Open disclosure to patient & family
- Apology without admitting liability
- Serious error - malpractice
- Assessment of hospital processes around regional anaesthesia
- Notification of hospital executive & legal team

## SAQ 20: (11 marks)

Passmark = 7/11

Questions:

**1. What is the significant finding on his X-ray? (1 mark)**

Answer: Avulsion fracture of lateral proximal tibia (Segond fracture)

**2. List 2 possible complications from this injury? (2 marks)**

Answer: The Segond fracture has a high association with rupture of the ACL (>75%) and medial or lateral meniscal tear (~70%).

The patient was reviewed by one of the junior registrars. He was discharged with a diagnosis of knee sprain and given a knee splint and crutches. He was provided with an appropriate plan for analgesia. He was advised to organise physiotherapy in the community, and follow-up with his GP if there are ongoing concerns.

Two weeks after the initial presentation a complaint is lodged concerning the diagnosis and management. Your director has asked you to manage this for the department.

**3. List 8 steps would you take to investigate and manage this complaint. (8 marks)**

Answer:

- Acknowledge complaint & apologise (Preferably within 24 hours of receipt of complaint)
- Inform relevant staff, directors (department +/- hospital), and insurance.
- Gather information:
  - Notes
  - Interview staff (medical, nursing, allied health)
  - Review of investigation results.
  - Review of complicating factors: staffing, disease, patient, admin, departmental.
- Review case +/- M&M +/- RCA
- Response and feedback within 72hours.
  - Acknowledge impact, problem, and improvement possibilities.
- Staff feedback:
  - Debrief

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- Education
- +/- Management plan
- Q&A cycle
- Inform management +/- insurance of outcome.
- Follow-up @ 2 weeks.
  - Patient
  - Staff

## SAQ 21 (14 marks)

Passmark = 10/14

Questions:

### 1. List 5 possible differential diagnoses for this man's presentation (5 marks)

Trauma – eg Head injury, C Spine injury with cord involvement, Tension pneumothorax  
Marine envenomation – box jellyfish, Irukandji, sea snake  
Toxicology- drug intoxication or withdrawal  
Drowning  
Medical problem – asthma, SAH, seizure  
Anaphylaxis  
Barotrauma with arterial gas embolism (if patient was scuba diving)

### 2. What is the likely diagnosis & state why? (2 marks)

Box jellyfish (*Chironex fleckeri*) stings with systemic envenomation  
Local exposure characterised by classic pattern of linear welts.  
Sudden collapse at scene suggests systemic envenomation.

### 3. What is your initial management of this condition? (4 marks)

Apply vinegar liberally to visible sting sites and remove tentacles  
Ice also acceptable as a first aid measure  
Titrated analgesia for pain including IV opiates (Drug, dose, route) and Mg sulphate 10mmol  
Cardiac monitoring & ECG to assess for arrhythmias  
Antivenom (1-3 ampoules in 100mL N/Saline over 20 mins) indicated due to signs of systemic envenomation

### 4. List 3 indications for antivenom in this condition? (3 marks)

1. Cardiorespiratory arrest
2. Cardiovascular instability
  1. Collapse
  2. Hypotension
  3. Dysrhythmia
3. Local Pain refractory to Opiate Analgesia
4. Respiratory Depression
  - Hypoventilation
  - Difficulty with breathing, swallowing or speaking

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**SAQ 22: (12 marks)**

Passmark = 8/12

**1. Name this rhythm: (1 Mark)**

Torsades de pointes
---------------------

**2. List 5 drugs that may precipitate this rhythm: (5 Marks)**

Class 1 (1A & 1C) and Class 3 antiarrhythmic drugs
--

Phenothiazines
----------------

Tricyclic antidepressants
---------------------------

Antibiotics eg erythromycin
-----------------------------

Organophosphates
------------------

Accept also:

Antihistamines

Lithium

Antifungals

Anti-retrovirals (eg Amantidine)

**3. List 3 non-pharmacological factors that can put patients at risk for this rhythm. (3 Marks)**

Hypomagnesaemia
-----------------

Hypokalaemia
--------------

Complete heart block or Bradycardia
-------------------------------------

Congenital long QT syndrome

**4. List 3 treatment options for this arrhythmia. (3 Marks)**

Magnesium sulphate IV 2 g
---------------------------

Isoprenaline infusion (increasing the HR decreases the QT interval)
---

Overdrive pacing
------------------

Cardioversion



**SAQ 23: (19 marks)**

**Passmark = 13/19**

- 1. List 8 assessment features that would make this patient high risk for an Acute Coronary Syndrome (ACS). (8 marks)**

On-going or recurrent chest pain despite ED treatment  
Elevated Troponin  
New ischaemic ECG changes (ST depression or T wave inversion)  
Diaphoresis  
Syncope  
Haemodynamic compromise  
New onset Mitral regurgitation  
Ventricular tachycardia  
Known LV failure  
Prior AMI/PCI/CABG

(Any 8 will do, note absence of 'classic' RF's in this list, as per 2016 AHA guidelines)

- 2. List 5 assessment features that would make this patient low risk for ACS (5 marks)**

Age <40 years  
Atypical symptoms  
Absence of known coronary artery disease  
Normal ECG  
Normal Troponin

- 3. List 6 causes of ST elevation other than myocardial infarction. (6 marks)**

Pericarditis  
Benign early repolarization  
LVH  
LBBB  
LV aneurysm  
Brugada  
Raised ICP/SAH

**SAQ 24: (13 marks)**

**Passmark = 8/13**

**1. Name the significant finding on this CT image and any relevant associated features. (4 marks)**

Displaced Chance type fracture of T12 vertebra

- Ventral displacement of distal vertebral column
- 3 column fracture (ie unstable)
- Likely retropulsion into spinal canal
- S3 fracture

**2. List 4 clinical features you would expect to find in neurogenic shock. (4 marks)**

Warm peripheries
Hypotensive
Relative bradycardia
Poikilothermia

**3. List your management priorities for neurogenic shock (5 marks)**

IV fluid resuscitation 20-40 ml/kg of Normal Saline
Early inotropic support with aim of MAP > 85mmHg to ensure adequate organ perfusion Will accept either noradrenaline or adrenaline at 0 – 20 ml/hr
Respiratory support as needed, especially if high C spinal cord injury
Early escalation of surgical decompression of spinal canal within 8 hours of injury (Can also include the definitive surgical management of other traumatic injuries)
Full spinal precautions when managing patient with 30 degrees head up
Other supportive measures <ol style="list-style-type: none"><li>1. Thermal protection</li><li>2. Nasogastric tube</li><li>3. Urinary catheter</li><li>4. Rule out other causes of shock such as hypovolaemia</li></ol>

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**SAQ 25: (16 Marks)**

Passmark = 10/16

**1. Complete the following table in regards to risk stratification of TIA patients with the ABCD2 score. (7 marks)**

Symptom or Risk Factor	Score Weighting
Age > 60	1
Blood Pressure > 140 / 90	1
Clinical Features 1. Unilateral Weakness 2. Speech impairment without weakness	2 1
Duration of symptoms 3. > 60 minutes 4. 10 – 59 minutes	2 1
Diabetes Mellitus	1

(0.5 marks for each part of answer – symptom & score)

**2. Name the finding seen on this CT image. (1 mark)**

Left sided dense middle cerebral artery (MCA) sign or hyperdense MCA sign

**3. List 6 absolute contraindications for thrombolytic therapy for acute stroke. (6 marks)**

1. Uncertainty about time of stroke onset (eg patient awaking from sleep)
2. Coma or severe obtundation with fixed eye deviation and complete hemiplegia
3. Only minor stroke deficit which is rapidly improving
4. Seizures observed or known to have occurred at onset of stroke
5. Hypertension: SBP > 185mmHg or DBP >110mmHg on repeated measures prior to study.
6. Clinical presentation suggestive of subarachnoid haemorrhage even if the CT scan is normal.
7. Presumed septic embolus
8. Patient having received heparin in last 48 hours and has elevated PTT or has a known hereditary or acquired haemorrhagic diathesis (eg PT or APTT greater than normal)
9. INR > 1.5

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- 10. Platelet count < 100 000 uL
- 11. Serum glucose < 2.8mmol/L or >22mmol/L

**4. In 2016 the Australasian College for Emergency Medicine commissioned an independent literature review by researchers from the University of Canberra Health Research Institute. What was the conclusion of this review?  
(2 marks)**

Current evidence shows that IV thrombolysis with rTPA, particularly within 3 hours of symptom onset, increases the odds of a better functional outcome, but also increases the risk of sICH and early death by ICH.

**SAQ 26: (15 Marks)**

Passmark = 9/15

Questions:

**1-What is the most likely diagnosis and list 2 supportive features. (3 marks)**

Most likely diagnosis is Measles.

Supported by: Widespread erythematous, macular skin rash with lips cracks

**2-List 5 other differential diagnoses for the above skin rash: (5 marks)**

Erythema Infectiosum (Parvovirus B19)

Viral exanthum: Adenovirus, Enteroviruses (Coxsackie & Echovirus), RSV, Rhinoviruses, Rotaviruses

EBV, CMV

Kawasaki's Disease

Connective tissue disease - JRA

Drug eruption

**3- List 2 investigations that are required to confirm or exclude the likely diagnosis? (2 marks)**

Measles IgM / IgG serology

Nasal PCR

**4- List 5 possible complications from the above condition. (5 Marks)**

Pneumonitis

Meningitis

Encephalitis

Otitis media

Acute sclerosing panencephalitis

Dehydration

## SAQ 27: (12 marks)

Pass mark = 8/12

Answers:

1. What is the most likely diagnosis and list two findings that support this diagnosis? (3 marks)

Diagnosis: Acute Glaucoma

Findings

1. Mid size pupil
2. Injected sclera, hazy cornea.

Note: Admittedly the appears to have ptosis. This dose not fit with acute eye pain or the rest of the scenario. Image is from a real case. Candidates should be able to discriminate and see this does not fit.

2. How would you confirm the diagnosis? (1 mark)
  - Measure the intraocular pressure with a tonometer. If IOP > 40mmHg likely acute glaucoma.

3. Give three potential drugs than can be used to treat this condition and for each briefly describe its therapeutic effect in this scenario. (4.5 marks 1 for each drug, ½ for mechanism of action)

Drug 1: Timolol (topical beta blockers also acceptable).

Therapeutic effect: Decrease the production of aqueous humour

Drug 2: Acetazolamide (carbonic anhydrase inhibitors)

Therapeutic effect: Decrease production of aqueous humour

Drug 3: Parasympathomemetic agents eg (Pilocarpine 2-4%)

Therapeutic effect: Increasing the outflow of aqueous humour

Drug 4: Mannitol (osmotic diuretic agents) → Decrease the volume of aqueous humour.

1. The subspecialty registrar suggests you manage this case in the emergency department short stay unit. How would you respond? (2 marks)

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- Respond that this is inappropriate. May require definitive surgical management. Needs to be managed in a hospital with ophthalmology service with close monitoring of response to treatment.
- Decreased visual acuity suggests this is severe case at risk of permanent nerve damage and visual loss.
- Seek resolution with Ophthalmology consultant if ongoing resistance from subspecialty registrar.