

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

Metro North Hospitals and SCUH

ACEM Fellowship Trial Examination

2018.2

SAQ Paper

Answers Only

Booklet one

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SAQ 1 (9 Minutes)
(Total 18 marks) Passmark :13/18

You are the Emergency Consultant on call overnight and you receive a phone-call from your ED registrar. There is a 2 year-old boy with severe croup who has been brought in by his parents. Your registrar is concerned that the boy requires intubation. Anaesthetics are not on site overnight.

1. List 4 differentials for stridor in paediatric population (other than croup): (4 Marks)

Bacterial tracheitis
Epiglottitis
Retropharyngeal abscess
Laryngeal FB
Angioneurotic oedema
Subglottic haemangioma
Laryngomalacia

2. State 3 indications for intubation in this scenario. (3 marks)

Exhaustion from increased work of breathing
Hypercapnoeic (type II) respiratory failure
Hypoxaemic (type I) respiratory failure
Decreased level of consciousness and unable to protect airway
Imminent complete airway obstruction

3. What interventions can be used to support this child while preparing for intubation? (3 Marks)

Keep pt calm and upright for as long as possible
Optimise medical management – Adrenaline neb 5mg, Dexamethasone 0.3mg/kg PO/IV
High-flow oxygen (potentially 2L/kg) via nasal prongs
IV access (may delay until last minute)
Explanation to, and/or involvement of parent

4. What equipment and drugs will you select for intubation? (Total 6 marks)

Bag Valve Mask (with size - child)
Laryngoscope with Miller blade (size 2) and Macintosh blade (size 2)
ETT 4.0-4.5 and one size *below* due to anticipated laryngeal oedema
Bougie
Suction
Laryngeal Mask Airway (size 2)
Surgical airway equipment – needle cricothyrotomy

Ketamine 2mg/kg or Fentanyl 2-5 mcg/kg or Propofol 1-2 mg/kg
Suxamethonium 1-2 mg/kg or Rocuronium 1.2 mg/kg

5. Give 4 anatomical airway differences in paediatric population in comparison with adult airway: (2 Marks)

Larger tongue

Larynx more cephalic

Increase compliance of chest wall

Bulging occipital process (Flexed neck)

Smaller mandible

Narrowest part at cricoid cartilage

Smaller diameter at airway, therefore, higher resistance to airflow.

Pass mark: 13/18

SAQ 2 (6 Minutes)
(Total 12 Marks) passmark:7/12

You are a new FACEM and your director has asked you to look into access block and overcrowding in your emergency department.

Questions:

1. State the definition of access block. (2 marks)

Answer:

An admitted patient who remains in the emergency department for > 8 hours because of a delay in accessing an inpatient bed

2. State the difference between access block and ED overcrowding. (2 marks)

Answer:

ED overcrowding refers to the situation where ED function is impeded primarily because the number of patients waiting to be seen, undergoing assessment and treatment or waiting departure exceeds either the physical bed and or staffing capacity of the ED. Access block is the principal cause of ED overcrowding.

3. List 4 markers of ED overcrowding. (4 marks)

Answer:

- Inability to offload ambulance patients and a resultant loss of capacity in the local emergency response in the community
- Inability to place critically unwell patients in an appropriate treatment space when required
- Patients undergoing clinical management in a non-treatment area, where privacy and access to basic clinical resources is reduced or delayed
- Admitted patients receiving a lower standard of care than they would receive in their destination unit
- Obstruction to access and egress routes from the ED in contravention of OH&S requirements

4. List 4 adverse effects of ED overcrowding. (4 marks)

Answer:

1. Increased adverse events
2. Increased violent behavior
3. Increased errors
4. Delayed time to critical care
5. Increased morbidity
6. Excess deaths

Passmark: 7/12

References:

1. www.acem.org.au S57 Statement on overcrowding
2. Cameron 4th Edition, page 89

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**SAQ 3 (6 Minutes)
(Total 12 marks)**

Passmark: 8/12

A 21-year-old male presents to a tertiary Emergency Department after suffering an injury to his right eye at work while hammering metal.

His eye photo is included in the props booklet:

Questions:

1. List 3 abnormalities on the image (3 marks)

- . Lacerated sclera
- **Uveal prolapse**
- **Misshapen pupil**

2. List 2 relevant negative findings (2 mark)

- No hyphema
- No signs of extraocular trauma

3. State what further investigation you would perform and justify your choice. (2 marks)

- Safe modality (CT/USS) to locate FB.
- MRI incorrect and contraindicated.
- Plain film not appropriate as investigation in a tertiary ED.

4. State 5 immediate management steps. (5 marks)

- Immediate ophthalmological referral
- Elevate head of the bed
- Eye shield
- ADT
- IV antibiotics. (broad spectrum IV Pip taz or similar broad spectrum cover with appropriate dose)
- Analgesia (IV with appropriate dose opiate)
- Antiemetics (IV appropriate dose)

Pass mark: 8/12

SAQ 4 (6 Minutes)
(Total 12 Marks) Pass mark 7/12

A 5-day old neonate is brought in to ED by his mother after being discharged from hospital following a normal vaginal delivery.
His mother reports poor feeding for last few hours and she has noticed an increasing yellow discoloration of his skin:

His vital signs are:

HR 160
RR 32
CRT 2 -3 sec
AVPU

The child is jaundiced.

Questions:

Answer:

1. List 5 likely causes for his jaundice

3/5

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

2. List 4 red flags during history and examination that warrant admission to the hospital.

2/4

- 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%

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3. List 3 investigations required in ED and justify each one of them.

2/3 marks

This is an easy question – they must provide a reasonable rationale to get the full mark

- 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

SAQ 5 (6 minutes)
(Total 12 Marks) Pass mark 7/12

A mother brings in her 2-year old son who she suspects may have swallowed a button battery sometime over the last hour whilst visiting at a friend's house.

The child had been playing on the carpet when the mother suddenly noticed he had dismantled a small alarm clock and the battery was nowhere to be found.

The boy looks well and is happy playing in the assessment cubicle.

a. List your immediate management steps (4 marks).

Keep Nil by mouth
X-ray neck AP and lateral + chest + abdomen to confirm presence or absence of battery
Obtain further history to determine whether single or multiple batteries / magnet co-ingestion
Assess patient for any signs of complications from battery ingestion such as airway compromise, haematemesis, abdominal discomfort.

b. Name two indications for immediate endoscopy and battery removal (2 marks).

Battery lodged in oesophagus
Symptomatic patient
Magnet co-ingested

After assessing the patient, you determine that there are no indications for immediate endoscopic removal. You consider managing the patient conservatively at home.

c. Name three other conditions required for conservative management of button battery ingestion (3 marks).

Small battery \leq 12 mm
Only one battery ingested
No pre-existing oesophageal disease
Patient or caregiver is reliable, mentally competent
Able to seek evaluation promptly if symptoms develop

d. State three specific instructions you would give as part of your discharge advice (3 marks)

Seek immediate attention if any symptoms of bowel obstruction or GI bleed
Regular diet, encourage activity
Avoid laxatives
Examine the stools to confirm battery passage
Return for xray if not passed in 10-14 days

Source: button battery ingestion treatment guideline www.poison.org

SAQ 6 (6 Minutes)
(Total 12 Marks) Pass mark :9/12

A 36-year-old male electrician is brought into your ED post electrocution from exposure to a 11000-volt power line. He was thrown against a metal panel 8 meters away and noted to have no signs of life on scene.

Bystander CPR and ambulance resuscitation managed to gain ROSC after a down time of approximately 20 minutes.

His initial cardiac rhythm on scene was ventricular fibrillation.

On arrival to your ED this patient is intubated and ventilated with the following vital signs:

Heart rate	84bpm
Blood Pressure	145/90
Resp Rate	15 breath per min, hand ventilated
O2 Sats	98% on 15L via BVM

Questions:

- 1. Name four factors related to the nature of electrical exposure that can influence the severity of an electrical injury.**

(4 Marks)

Voltage level:	High voltage > 1000 Volts are high risk injuries
Current level :	>2 amps causes burns and > 10 amps causes asystole
Current type:	AC more likely to precipitate VF compared with DC AC is considered 3x more dangerous than DC due to its ability to cause tetanic muscle contractions that prolongs contact of victim with the source.
Pathway of current:	Pathway determines type and severity of injury Vertical pathway most dangerous as all organs are in the line of injury Horizontal pathways usually spares brain but can still be fatal due to heart, respiratory muscle and spinal cord involvemtn
Duration of current:	Longer the duration likely the more severe the injury

- 2. List four types of injuries that can be sustained in this patient and provide an example of each type.**

(4 Marks)

(This is an easy question, so both type *and* example are needed to gain a mark)

Thermal Burns

Burns to skin: varying thickness

Burns to eyes

Compartment syndrome

Blast Trauma

Blunt trauma to head / spinal / chest / abdomen from the blast

Head Trauma

Spinal Trauma

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Chest Trauma: Haemothorax, Pneumothorax, Rib Fractures, Lung Contusions, Cardiac Contusions
Abdominal / Pelvic Trauma: Any type of visceral injuries
Bony Injury: Any type of significant bony injury from the impact of the blast and being thrown.
Tympanic Membrane rupture

Cardiovascular Injury
Cardiac dysrhythmias: Malignant (VF, Systole) to other conduction disorders
Direct myocardial necrosis in high voltage or alternate currents.

Neurological Injury
Hypoxic brain from cardiac arrest
Continuous tetanic contractions
Seizures
Spinal cord injuries

Crush Injury / Acute renal failure / Rhabdomyolysis from ischaemia

3. List 4 indications for the use of telemetry in the Emergency Department for a patient with a suspected electrical injury, without cardiac arrest.

(4 Marks)

High voltage injury (>1000 volts)
Loss of consciousness
Seizures
ECG changes or documented arrhythmias
Previous cardiac disease (especially cardiac arrhythmias)
Burns

Pass Mark is 9/12

SAQ 7: (6 Minutes)
(Total 12 Marks)

An elderly female is referred to your Emergency Department by her GP for review of new onset Atrial Fibrillation:

Observations:

GCS 15/15
BP 110/60
Sat 95% on RA
RR 18 per min

1. List 4 potential causes for Atrial fibrillation.

(4 Marks)

Causes for AF

1. Coronary artery disease
2. Hypertension
3. Rheumatic valvular heart disease
4. Thyrotoxicosis
5. COPD
6. Pericarditis
7. Pulmonary emboli
8. Electrolyte abnormalities (eg hypokalaemia/hypomagnesaemia)
9. Pericarditis
10. Cardiomyopathies
11. Pre-excitation syndromes

2. Your registrar asks you whether to aim for rhythm or rate control .

List 2 factors which would make you consider rhythm control in this lady and 2 factors which would make you consider rate control

(4 Marks)

Rhythm control

Haemodynamic instability
Symptomatic
Reversible cause

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Rate control

(No mortality difference)

Asymptomatic or minimal symptoms

Duration greater than 48 hours

Non-reversible cause

3. Your resident asks you whether she needs to be anticoagulated.

List 4 factors you would consider for the above decision:

(4 Marks)

Factors that increase risk of thromboembolism

Age greater than 65/75

Female

Congestive heart failure

Previous stroke / TIA / thromboembolism

Hypertension

Diabetes mellitus

Vascular disease

Risks of anticoagulation

Falls

Previous bleeds GIT / ICH

Renal failure if using novel anticoagulants

SAQ 8: (6 Minutes)

(Total 12 Marks)

Pass mark: 8/12

A 41 year old male returns from a business trip and a few days later develops a painful left knee.

He is finding it very difficult to walk due to pain.

This is his first episode of joint problems. He is systemically well, there is no history of trauma and no other symptoms.

He is afebrile, with normal vital signs.

A clinical photo of his knee is included in Props booklet:

1. Describe the photo:

(2 Mark)

Unilateral erythematous swollen knee joint. No visible wounds, no rash.

2. List 4 differential diagnosis for the above presentation?

(4 Marks)

- a. Septic joint
- b. Gout
- c. Gonococcal arthritis
- d. Auto-immune arthritis
- e. Haemarthrosis

3. Under an aseptic approach, an USS guided joint aspirate is taken. Complete the following table with the expected pathology findings:

(4 Marks)

Analysis of synovial fluid

One mark for each column completed ie appearance, WCC and %PMN

Analysis of synovial fluid

Diagnosis / fluid type	Findings		
	Macroscopic appearance	WCC ($10^6/L$)	% PMN
normal	clear, viscous, pale yellow	0 to 200	less than 10%
noninflammatory	clear to slightly turbid	200 to 2000	less than 20%
inflammatory	slightly turbid	2000 to 50 000	20% to 70%
septic	turbid to purulent	greater than 50 000	greater than 70%

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4. The synovial fluid result suggests septic arthritis. What antibiotics do you give while awaiting culture results? (2 Mark)

Flucloxacillin 2g IV, 6-hourly, or

If penicillin allergic Cephazolin 2g IV, 8-hourly, or

Vancomycin 1.5g IV, 12-hourly if immediate hypersensitivity

Gonococcal arthritis is considered in sexually active males, but in the absence of rash or urinary symptoms this is less likely, and he is more likely to have a standard gram-positive infection ie Staph Aureus or Strep. If cultures or Gram stain suggest gonococcus then should be treated for disseminated gonococcus with iv ceftriaxone. eTG recommends empiric therapy only with flucloxacillin until cultures come back to direct therapy.

Ref: eTG antibiotic and rheumatology sections

Pass mark: 8/12

SAQ 9: (9 Minutes)
(Total 18 marks) Pass mark 12/18

A 35-year-old man has been intubated in your department overnight after ingestion of an unknown quantity of alcohol and methadone.

The indication for intubation was airway protection secondary to a low GCS. He has a normal BSL, and a CT brain performed shortly after intubation has also been reported as normal.

He has spent the night in the ED as no ICU beds were available. You are considering extubation of the patient in your department.

1-List 6 clinical criteria that must be met to ensure this patient is suitable for extubation in the ED?
(6 marks)

(Any of following options for 1 mark each)

Resolution of underlying issue that caused need for intubation

Spontaneously breathing

Resp parameters: O₂ sats > 95% on FiO₂ < 40%, PEEP < 5, RR < 30, TV > 6mL/kg

Haemodynamic stability without need for inotropic support

Sedation & paralysis worn off

Not a difficult intubation

Obey commands

2-List five non-clinical criteria must be met to ensure safe extubation of this patient in your department.
(5 marks)

Staff skilled in managing extubation (Nursing & Medical)

Staff available who can reintubate if required

Equipment available for reintubation

Rest of department workload suitable

No more suitable place for this to occur (eg no ICU beds)

3- List three pieces of equipment you would have immediately available prior to extubation of this patient in the ED.
(3 marks) 3/4

Suction

O₂ mask & supply

NIV set-up

Intubation drugs & paralysis agents (Suxamethonium 1.5mg/kg drawn up)

Equipment for urgent reintubation

The patient is successfully extubated. He currently has adequate respiratory function and is GCS 15.

4- State your 4 subsequent steps in the management of this patient.
(4 marks)

On-going observation and monitoring of respiratory function

May require admission under appropriate team if any clinical concerns

Complete history and examination of pt to look for other medical conditions and determine if any suicidality to presenting complaint

Arrange review by alcohol and drugs services +/- social worker +/- psych services

Pass mark (12/16)