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

Metro North Hospitals ACEM Fellowship Trial Examination

2018.1

Short Answer Questions

SAQ Paper

Model answer

Booklet Two

Queensland Government

SAQ 10 (9 Minutes) **Candidate name:**
(Total 18 marks)
Pass Mark:12

A 56 year old female presents to your Emergency Department with acute onset dizziness. She has no significant past medical history and does not take any regular medications and has no allergies.
You assessment is consistent with vertigo.

1. list your differential diagnoses. (8 marks)

Central Vertigo

- Cerebellar infraction or haemorrhage
- Vertebrobasilar insufficiency
- Wallengberg Syndrome (lateral medullary infarction of brainstem)
- Vertebral artery dissection
- Multiple scelerosis
- Space occupying lesions

Peripheral Vertigo

- Benign paroxysmal positional vertigo (BPPV)
- Meniere Disease
- Vestibular neuronitis
- Labyrinthitis
- Perilymph fistula
- Vestibular ganglionitis
- Ototoxicity
- Eighth nerve lesion
- Post traumatic vertigo
- Post cochlear implantation vertigo

2. Fill out the following table with regards to differentiating between central and peripheral vertigo.

(6 marks)

0.5 Marks for each box

Symptoms	Peripheral Vertigo	Central Vertigo
Onset	Sudden	Sudden or slow
Severity	Intense spinning	Ill defined, less intense
Pattern	Paroxysmal, intermittent	Constant
Nystagmus	Horizontal	Vertical or Direction Changing
Aggravation by positioning	Yes	Variable or typically not
Fatigue of Symptoms / Signs	Yes	No

3. What are the components of the HINTS exam and its clinical significance of the findings? (6 marks)

Component of exam	Clinical significance of examination finding
Head impulse test	Normal test (no saccade / correction on head provocation) strongly suggests central cause. Abnormal test (with corrective saccade) consistent with peripheral vertigo as it suggests dysfunction to the peripheral nerve.
Nystagmus	Horizontal nystagmus suggest peripheral cause. Vertical nystagmus or those that changes direction suggests central cause.

Test of Skew (Skew Deviation)	Abnormal skew test with quick vertical gaze corrections (ocular tilt) suggests likely central cause.

References
Tintinalli's Emergency Medicine 7th Edition, Section 14, Vertigo and Dizziness, page 1144
Edlow J, Diagnosing patients with acute onset persistent dizziness, Annals of Emergency Medicine, 2017.10.012

SAQ 11: (6 Minutes) **Candidate Name:**
(Total 12 Marks)

Pass mark: 8

A 55 year old man is brought to your ED with sudden onset abdominal pain and vomiting.
His past medical history includes atrial fibrillation with poor compliance with medications.
He has had 10mg of intravenous Morphine with little relief of his symptoms.

His vitals signs are:
HR 110/min (irregular)
BP 110/70mmHg
RR 20/min
SpO2 93% RA

Questions:

1. **List 5 differential diagnoses you would consider for this patient's presentation. (5 marks)**

Ischaemic bowel.
Abdominal Aorta Aneurysm.
Aortic Dissection.
Renal colic.
Perforated viscus e.g. Ruptured Appendix.
Pancreatitis
Bowel obstruction (volvulus, hernia)
Biliary Colic

2. **List & justify 5 investigations would you request in the ED. (5 marks)**

0.5 marks for each box

U&E for AKI, electrolyte disorder such as Hypokalaemia.
FBC for anaemia, leucocytosis.
ABG or VBG for acid-base disturbance.
Lactate for sepsis/marker of gut ischaemia.
ECG for AF and ischaemia (rule out ACS)
AXR for obstruction
Erect CXR for pneumoperitoneum.
USS (Bedside) for dilated aorta/free fluid.
CTA for vascular occlusion/ischaemia/perforation/obstruction/infarction/collection.
(N.B MRI/MRA not a suitable ED test for this pathology

3. **Despite multiple Morphine boluses of 0.1mg/kg/dose given over an hour, he remains in severe pain. List 3 other options for analgesia that could be provided in the ED? (2 marks)**

Ketamine 0.2mg/kg ivi or 10-20mg over 30mins.
Fentanyl boluses 25-50mcg IVI
NSAID (if Renal colic suspected) e.g. Ketorolac 30mg IV/IM, Indomethacin suppository 100mg PR
Paracetamol as adjunct 1g IV/PR

SAQ 12: (6 Min) **Candidate Name:**
(12 Marks)
Passmark: 8

You are a consultant working in a rural emergency department. The local ambulance service alerts you to a critically unwell child being brought to your department. She is a 4 week old girl found by her mother to be grey and floppy. Ambulance states that she is centrally cyanotic, with a capillary refill of 5 seconds.

1. **List 4 immediate steps you would take to prepare for arrival.**

(2 marks)

Clear resuscitation bay

Ensure department handed over (to another consultant or senior registrar)
Medical ED staff (airway, procedures)
Nursing ED staff (scribe, airway, procedures/drugs)
Paediatric medical staff
+/- anaesthetics or ICU
Paediatric resuscitation trolley
Paediatric guidelines and dosing book (Broselow tape, Monash boo, etc.)
IV and IO
Paediatric airway set up

2. On arrival the infant has unrecordable saturations, is mottled, making weak respiratory efforts, and has a capillary return of 5 seconds. The mother reports that the child has congenital heart disease, and is due for surgical repair in the coming weeks.

Complete the following table on duct dependant congenital heart disease.

(3 marks)

Duct dependant systemic circulation	Coarctation of the aorta Aortic stenosis Mitral atresia Hypoplastic left heart syndrome
Duct dependent pulmonary circulation	Pulmonary atresia Severe pulmonary stenosis Tricuspid atresia

Duct dependant systemic and pulmonary circulation	Transposition of the great vessels

3. List three non-duct dependant forms of congenital heart disease.

(3 marks)

- Truncus arteriosis
- Total anomalous pulmonary venous drainage
- Tetralogy of Fallot
- VSD
- ASD

4. List two other cardiac conditions that may present in the neonatal period.

(2 marks)

- Arrhythmias
- Cardiomyopathy (Hypertrophic, dilated, restrictive)

5. List 2 other causes of neonatal collapse related to endocrine system:

(2 Marks)

Endocrine

- Congenital Adrenal hyperplasia
- Addisonian crises
- Electrolyte disturbance

SAQ 13:(6 minutes) **Candidate Name:**
(Total 12 marks)
Pass Mark: 8

A 32 year old woman is referred to your ED with a 2/52 history of initially fatigue and fevers but now has developed a petechial rash.
Her GP has provided full blood count test results as follows:
Hb 90
Platelets 25
WCC 7.7
Her vitals are as follows:
GCS 14/15 (mildly confused)
HR 101 beats/min
BP 130/60 mmHg
O2 Sat 98% on RA
Temp 37.3 deg

1. List 4 possible differential diagnoses in this case. (4 marks)

   Answers = TTP, ITP, Sepsis, haematological malignancy, bone marrow suppression secondary to viruses or drugs, HUS

2. List 4 investigations you would order and state how each would help in differentiating between the possible diagnoses you have listed above (4 marks)

Answers =
TTP/HUS – blood film looking for fragmented red cells/schistocytes,
ITP – film no evidence of haemolysis, platelet bound antibodies is definitive,
Sepsis – coags looking for DIC
Malignancy – film looking for signs of malignancy and then bone marrow HUS – renal function for AKI,
Bone marrow suppression – bone marrow

3. For each of your differentials list above, state the definitive management for each. (4 marks)

Answers = **TTP** – plasma exchange and steroids, avoid platelet transfusion, **ITP** – prednisolone, Ig, platelets, **Sepsis** – antibiotics & source control, **Malignancy** – oncology referral, **HUS** – fluid electrolyte Mx, **Bone marrow suppression**- diagnose and eg cease drug

SAQ 14: (6 minutes) **Candidate Names:**
(Total marks 12)

Passmark: 8

A 30 year old male is referred by his GP for an enlarging anterior neck mass suggestive of a goitre. He is tremulous and tachycardic.

1. What is Pemberton's sign? (2 marks)

Triad of facial congestion, cyanosis and respiratory distress after lifting both arms above the head. Usually caused by SVC obstruction from tumour/mass/substernal goitre.

2. List 5 possible precipitants of thyroid storm (5 marks)

- Infection
- PE
- MI
- Trauma
- DKA
- Other acceptable answers – Iodine administration, withdrawal thyroid medication, CVA, general surgery or any major physical/physiological insult

3. What are the 5 main aims of thyroid storm treatment? Give an example for each (5 marks)

0.5 Marks for each box

Aims	**Example**
Supportive care	Fluids – saline + 5%/10% dextrose Thiamine
Inhibition of thyroid hormone release	Thionamides - Propylthiouracil / Methomazole
Inhibition of new thyroid hormone synthesis	Iodine (lugol solution)
Preventing peripheral conversion T4 → T3	Glucocorticoids – hydrocortisone/dexamethasone
B-adrenergic blockade	Propranolol

SAQ 15 :(6 minutes) **Candidate Name:**
(Total 12 Marks)
Pass Mark: 8

Regarding Burn injuries:

1. **List 2 different methods for estimating burns TBSA%** **(1 Marks)**

- Lund and Browder chart
- Rule of nines
- Palmar surface

2. **What are the 4 different burns depths?** **(2 Marks)**

- Epidermal
- Superficial dermal
- Mid dermal
- Deep dermal
- Full thickness

3. **List 3 scenarios when a patient with burns requires IV fluids?** **(3 Marks)**

- Adult >15-20% TBSA
- Children >10% TBSA
- electrical burns
- coexistent traumatic injuries
- delayed presentation
- inhalation injury

4. **How are initial fluid requirements calculated in burns, describe the details?** **(1 Marks)**

- Modified Parkland Formula
- 3-4mLs x TBSA% Burn X Weight (kg)
- 1/2 Total Fluid Volume to be given in first 8 hours post burn
- 1/2 Total Fluid Volume to be given over next 16 hours

5. **List 5 patient scenarios that would require referral to a burns centre:** **(5 Marks)**

- Burns > 10 % TBSA in an Adult
- Burns > 5 % TBSA in a Child
- Full thickness burns > 5% TBSA
- Burns of face, hands, feet, perineum, genitalia, and major joints
- Circumferential burns

- Chemical or electrical burns
- Burns in the presence of major trauma or significant co-morbidity
- Burns in the very young patient, or the elderly patient
- Burns in a pregnant patient
- Suspicion of Non-Accidental Injury

SAQ 16: (6 Minutes) **Candidate Name:**

(Total marks 12)
Pass Mark: 8

You respond to an emergency alarm activation in a monitored cubicle in your emergency department, in which a Senior House Officer has been administering 30mL of 0.5% bupivacaine for a femoral nerve block to a 50kg 72yr female patient with a fractured neck of femur.
The patient was seen to become unresponsive and is now pulseless. Monitoring shows a wide complex tachycardia at 180bpm.

1. Outline your immediate response to this situation [3 marks]

(Stop any further injection of local anaesthetic)
Commence CPR as per ALS algorithm
Provide airway support and oxygenation to the patient with BVM
Prepare to defibrillate patient 200J synchronised (may be refractory)

2. List specific antidotes you would administer, with doses, to be given in the resuscitation of this patient [2 marks]

Intralipid 20% 1-1.5ml/kg every 3 minutes x 3
Infusion at 0.25ml/kg/min

3. Indicate the safe maximum dose of bupicavaine for this patient, and whether this was exceeded in this instance [2 marks]

2.5mg/kg maximum dose x 50kg = 125mg
Administered dose = 30ml x 5mg/mL solution = 150mg
Exceeded safe maximum dose

4. Following successful resuscitation and transfer of the patient to the ICU, what further administrative responsibilities do you need to address? [4 marks]

Debriefing staff members involved
Discussion with patient's NOK & open disclosure re adverse event
Documentation of events
Incident report for adverse patient event
Notification of ED Director

5. What departmental measures might be taken to minimise the risk of a repeat of this event in future? [1 mark]

Education of staff regarding safe use of local anaesthetic.
Protocol development for femoral nerve blocks including safe local anaesthetic dosing

SAQ 17: (6 Minutes) **Candidate Name:**
(Total Marks 12)

Pass Mark: 7

A 32 year old male is brought to your ED by the ambulance in refractory VF. He has a down time of approximately 35minutes and has received advanced life support in accordance with published guidelines.
His partner states he self discharged yesterday after being diagnosed with myocarditis.

1. The Australian and New Zealand Committee on Resuscitation recommend the use of prospectively validated termination of resuscitation (TOR) rules for out of hospital cardia arrests (OHCA).

   List 4 criteria used by a prospectively validated TOR rule in the setting of OHCA receiving advanced life support:

   (4 Marks)

   (4 marks need bold to get full marks)

- No ROSC has occurred
- **No Shock has been administered**
- The OHCA was not witnessed by EMS
- **No bystander CPR performed**
- The OHCA was not witnessed by bystanders

2. List two (2) pros and two (2) cons with the use of mechanical CPR devices in OHCA

   (4 Marks)

- No mortality benefit
- No ROSC benefit
- No positive neuro outcome benefit
- May be useful were manual CPR is difficult eg moving vehicle, cath lab etc
- Maybe usefule for prolonged CPR
- When ECMO CPR is being performed

3. Which Extra Corporeal Membrane Oxygenation (ECMO) modality would be most appropriate for this patient and why? (2 marks)

- Veno-Arterial ECMO
- Heart failure and needs cardiac support. VV ECMO most suitable for respiratory failure and provides no cardiac support.

4. List two (2) contraindications to commencement of ECMO.

(2 Marks)

- Futile (bridge to nowhere)
- Inappropriate use of resources
- Poor baseline level of function
- Terminal illness

SAQ 18 (9 minutes) **Candidate name:**
(Total 18 Marks)
Pass Mark - 12

You are the duty consultant covering the resuscitation area in a tertiary ED. A 56 year old male has been brought in complaining of chest heaviness, dyspnoea and faintness. He was discharged 3 days ago at Day 9 post-CABG for a myocardial infarction.

His 12-lead ECG has been reproduced below:

His observations are:

- Temperature 36.2 degrees
- HR 92 /min
- BP 85/52 mmHg
- RR 22 /min
- SPO2 96% on 6L Hudson mask
- BSL 5.6 mmol/l

Questions

1. List 5 differential diagnosis for this patient's presentation. (5 marks)

    a. Causes of cardiogenic shock
        i. ACS (Reinfarction)
        ii. Arrhythmia: drop in LVEF/CO if AF new
        iii. Mechanical:
            1. Pericardial tamponade (CABG dehiscence, Dressler's syndrome)
            2. Acute MV prolapse (papillary muscle rupture)
            3. Ventricular septal rupture
            4. LV aneurysm/rupture
            5. Acute AR
        iv. Medication error (e.g B-blocker)

    b. Non cardiogenic causes
        i. Massive PE
        ii. Hypovolaemia/severe anaemia (mediastinal/GIT/retroperitoneal bleeding. Post op and anticoagulated)
        iii. Sepsis/LRTI (hospital/ventilator acquired, surgical complication)
        iv. Tension pneumothorax (although unlikely this late)

2. List and justify 3 investigations that you would perform at the bedside. (6 marks)

- Repeat ECG, looking for dynamic ischaemic changes or arrhythmia
- VBG to exclude severe acidosis (shock/lactate), critically low Hb
- Mobile CXR to exclude LRTI or pneumothorax, define pleural effusion/LVF if present
- POCUS (or formal echo if immediately available), seeking to define:
    i. Presence of significant volume pericardial fluid/RA/RV collapse in diastole (tamponade)
    ii. Global LV and RV function, ?RWMA to suggest ischaemia
    iii. Valvular function (?prolapse/regurg)
    iv. Exclude LV/septal rupture
    v. Evidence of massive PE with dilated RV/RA, bowing of septum into LV
    vi. Evidence of hypovolaemia (collapsing RA and IVC)
    vii. Evidence of sepsis (hyperdynamic cardiac activity)

You have not identified an immediately reversible cause for this patient's presentation. You suspect that his clinical findings may be due to his underlying coronary artery disease.

3. In an escalating manner, state 3 approaches (including route and doses) to haemodynamic resuscitation. (3 marks)

- Careful fluid boluses 5 mls/kg IV NaCl 0.9%
- Inotropes
    i. Dobutamine 5 mcg/kg/min IVI
    ii. Adrenaline 0.04 mcg/kg/min
    iii. Accept other reasonable choices
- Mechanical - IABP via PCI

4. State 2 end points of haemodynamic resuscitation for this patient. (2 marks)

Given known IHD, higher than generic haemodynamic targets to maintain coronary perfusion:

- SBP =/> 100mmHg
- MAP =/> 70mmHg
- Urine output >0.5ml/kg/hr
- Normalisation of mentation if abnormal
- Normalisation of lactate if abnormal

5. State and justify this patient's preferred disposition. (2 marks)

- Provided no surgical intervention immediately indicated, cardiogenic shock should be investigated by PCI in case of acute coronary occlusion
- Initial transfer to **cardiac catheterisation lab** in discussion with senior cardiologist
- IABP decreases mortality in cardiogenic shock. If medical refractory to medical resuscitation, IABP placement is indicated.
- Ultimate disposition is CCU, or ICU if other organ system support required