



Model Answers — Monash Practice SAQ Trial 2022.2

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Question 1 (18 marks)

A 78 year old man (65kg) is brought in by ambulance to your ED in respiratory distress. He has a history of COPD.

His initial observations are:

Temp	37.0 °C
HR	121 bpm
BP	132/76 mmHg
RR	42 /min
SpO ₂	78% (RA)
	92% (4L O ₂ via NP)

His arterial blood gas shows:

pH	7.25
PaCO ₂	68 mmHg
PaO ₂	70 mmHg
HCO ₃ ⁻	30 mmol/L
Lactate	2.0 mmol/L

You have provided burst therapy with bronchodilators and IV hydrocortisone. You elect to commence Bilevel non-invasive ventilation (BIPAP) with an:

- Inspiratory positive airway pressure (IPAP) 10cmH₂O
- Expiratory positive airway pressure (EPAP) 5cmH₂O
- FiO₂ 0.4

Part a (6 marks)

Complete the table below listing two (2) each of the machine parameters and changes in clinical and biochemical markers you will assess to determine the adequacy of response to your initial settings.

Model Answer

Clinical	Machine	Biochemical
Reduction in WOB	TV 6-8ml/kg	Reduction in PaCO ₂
Reduction in RR	Leak <10%	Improvement of pH

Part b (2 marks)

The observations are unchanged, and you are concerned the patient isn't meeting your above parameters.

Complete the table to show your initial titration of NIV settings.

Model Answer

IPAP	12-15
EPAP	5

Part c (10 marks)

Despite your best attempts at titration the patient continues to deteriorate. After a thorough assessment you decide to proceed with intubation. Your colleague sets up the ventilator with the following settings:

FiO ₂	1.0
RR	12 minute
PEEP	5 cmH ₂ O
TV	400 ml
PIP	22 cmH ₂ O

5 minutes post intubation the patient observations are:

HR	120 bpm
BP	100/40 mmHg
RR	16 /min
SpO ₂	84%
etCO ₂	70 mmHg
GCS	3/15

List the potential causes of this deterioration and one feature you would assess for each of them.

Model Answer

Cause	Assessment
ETT malposition	etCO ₂ waveform, migrated, visualise, CXR
Obstruction of ETT	Suction ETT
PTx	high PIP, bedside USS, CXR, auscultate
Equipment issues	disconnect from ventilator, check accurate SpO ₂ trace
Gas trapping	flow curve not returning to baseline, high PIP/plateaus, obstructive CO ₂ waveform

Others

- Anaphylaxis – Rash, wheeze, hypotension
- Brochospasm – wheeze, obstructive “shark fin” CO₂ waveform

Question 2 (12 marks)

18 year old female presents to the Emergency Department with a headache, irritability and RUQ pain. She is noted to be 28/40.

HR	115 bpm
BP	165/110 mmHg
GCS	14/15
Sats	94% RA
RR	24 /min

Part a (3 marks)

List three (3) examination findings to support your main differential diagnosis.

Model Answer

- Clonus
- Hyperflexia
- Persistent hypertension
- RUQ tenderness
- Peripheral oedema
- Normal tone power reflexes

Part b (4 marks)

List four (4) investigations you would consider in this patient.

Model Answer

- LFTs – HELLP
- FBE – plt count and baseline Hb
- Blood group and hold – risk of needing delivery
- Urine PCR – elevated in PET
- CTG – fetal monitoring
- Abdominal uss – abruption a risk with hypertension
- Uric acid – marker of PET

Part c (5 marks)

The patient proceeds to have a generalised Tonic Clonic seizure that lasts for 5 minutes. Her blood pressure is now 180/120 mmHg.

State five (5) management priorities in this patient.

Model Answer

Airway support

- Left lateral tilt
- Head up
- Airway

Magnesium load

Call obs – eclampsia obstetric emergency paedS

Blood pressure control – labetalol, hydralazine to SBP <140 and DBP <90

Betamethasone 11.4mg – fetal lung development

Question 3 (12 marks)

You respond to an emergency buzzer in your ED waiting room where a 65 yo male has collapsed after initially presenting with epigastric abdominal pain.

He is pale and diaphoretic with a weak pulse.

Part a (1 marks)

What is the most concerning life threat that should be considered in this case?

Model Answer

AAA

Part b (4 marks)

What are the four (4) risk factors for this disease?

Model Answer

Hypertension

- Smoking
- Age
- Male gender
- Connective tissue disease
- Cholesterol
- Family history

Part c (2 marks)

The patient is transferred to a resuscitation cubicle. Full physiologic monitoring and bilateral IV access is established.

You elect to perform a bedside ultrasound as part of your assessment. State two (2) findings that would support your key differential diagnosis.

Model Answer

Aortic diameter >3cm

- Intramural haematoma
- Free fluid indicative of rupture

Part d (3 marks)

You are concerned the US confirms the suspected diagnosis.

List three (3) of your initial management steps.

Model Answer

Refer for emergent vascular OT

- Reverse coagulopathy/blood for BP/permissive hypotension
- Analgesia
- Inform patient/family

Part e (2 marks)

List two (2) clinical markers (ie not features in the clinical history) of poor prognosis which may be identified during the care of this patient during their ED care.

Model Answer

Need for blood

- Need for vasopressors
- Severe hypotension <65mmHg
- Severe acidosis

Question 4 (12 marks)

An otherwise well 8 year old boy presents to your ED with a rash as shown. You make the diagnosis of Henoch Schonlein Purpura (HSP).



Part a (8 marks)

Complete the table below by listing one (1) clinical feature and one (1) complication of HSP that affects each of the body systems listed.

Model Answer

Body System	Clinical Features	Complication
Skin	Usually symmetrical Palpable purpura, petechiae and ecchymoses Gravity/pressure-dependent areas (buttocks and lower limbs in ambulatory children) Painful subcutaneous oedema, Periorbital/Dependent areas (hands, feet, scrotum)	Secondary infection
Joints	Arthritis/arthralgia Usually large joints of lower limbs Occasionally upper limbs Usually no significant effusion or warmth	In ability to mobilise due to pain
Abdominal	Abdominal Pain	intussusception/bowel obstruction, GI haemorrhage, bowel ischaemia, necrosis/perforation, protein-losing enteropathy, pancreatitis

Renal	Proteinuria/haematuria, HT	Nephrotic/Nephritic syndrome, renal failure
Genital	Testicular pain +/- orchitis +/- necrosis Cord haematoma	testicular torsion
Neurological (rare)	Changes in mental status Labile mood, apathy, hyperactivity, encephalopathy Focal neurological signs	intracranial haemorrhage
Respiratory (rare)	Shortness of breath	Respiratory distress, Diffuse alveolar haemorrhage

Part b (4 marks)

List four (4) aspects of your management of this child.

Model Answer

Analgesia- bed rest, paracetamol, NSAID

- Ensure well hydrated – usually orally
- Steroids – reduces duration of abdominal and joint pain
- Seek/treat complications- with details
- Disposition – admission if complication(s), d/c home if no complications
- Follow-up – GP, Paediatrician to identify subsequent renal involvement which rarely requires a renal biopsy +/- immunosuppression - Weekly for the first month, fortnightly from weeks 5-12, Single reviews at 6 and 12 months, Return to weekly if there is a clinical disease flare

Question 5 (12 marks)

A paediatric patient presents to your tertiary ED with apparent abdominal pain.

Part a (6 marks)

Complete the following table, listing two (2) important potential causes of abdominal pain for each age group.

Model Answer

Neonates	Infants and Children	Adolescents
Hirschprung enterocolitis Incarcerated hernia Intussusception Necrotising enterocolitis Volvulus	Abdominal trauma Appendicitis Constipation Gastroenteritis Incarcerated hernia Intussusception Meckel's diverticulum Mesenteric adenitis Ovarian torsion Pyloric stenosis Testicular torsion Volvulus	Appendicitis Abdominal trauma Cholecystitis/ Cholelithiasis Constipation Ectopic pregnancy Gastroenteritis Inflammatory bowel disease Ovarian cyst – torsion /rupture Pancreatitis Pelvic Inflammatory Disease Renal calculi Testicular torsion

Part b (3 marks)

The patient is 12 months old and had an x-ray performed. List your diagnosis and two findings from the x-ray to support this.



Model Answer

intussusception supported by:

1. abnormal gas pattern: empty right lower quadrant
2. visible soft tissue mass in upper abdomen
3. crescent sign: soft tissue mass surrounded by a crescent lucency of bowel gas

Part c (3 marks)

The patient now has the following vital signs:

HR	200 bpm
BP	60/40 mmHg
RR	40 /min
SaO ₂	97%
Temp	37.2 °C

State three (3) steps you would take in the immediate management of this child.

Model Answer

1. intravenous access and fluid resuscitation: 10-20mL/kg bolus of 0.9% NaCl followed by ongoing maintenance fluids
2. analgesia: oral paracetamol 15mg/kg and/or ibuprofen 10mg/kg ; intranasal fentanyl 1.5mcg/kg ; intravenous morphine 0.05-0.2mg/kg
3. urgent paediatric surgical referral

REFERENCES:

RCH Clinical Practice Guidelines

Textbook of Paediatric Emergency Medicine, Cameron et al.

Question 6 (12 marks)

A 32 year old woman, who is 36 weeks pregnant, is brought into your ED by an ambulance following a high speed motor vehicle collision.

Part a (6 marks)

List three (3) physiological/anatomical differences of pregnancy that relate to the primary survey and a plan of management for each one.

Model Answer

Physiological Difference of Pregnancy	Plan of management
Airway answer options: 1. Increased risk of airway management difficulty due to: Weight gain Airway mucosa congestion Hyperaemia and hypersecretion of upper airway 2. Increased risk of failed intubation	1. Early intubation 2. Use of short handled endotracheal tube with smaller ETT
Breathing answer options: 1. Increased O ₂ consumption, so risk of rapid desaturation 2. Increased aspiration risk due to decreased gastric motility, relaxed GOS sphincters	1. Apply O ₂ early and maintain SaO ₂ >95% to ensure adequate foetal oxygenation 2. Early insertion of NGT in the unconscious patient to empty gastric contents
3. Raised diaphragm	3. If chest tube indicated, insert 1-2 spaces higher than usual to avoid potential abdominal injury
Circulation options: 1. Reduced cardiac output due to aortocaval compression from gravid uterus 2. Uterine blood flow approximately 10% of cardiac output with potential for rapid massive haemorrhage 3. Increased tendency for thrombosis due to increased activation of	1. Insert wedge to achieve 15-30 degrees of left lateral tilt (right side up). If not feasible, manual uterine displacement 2. Early activation of critical bleeding protocol 3. Care not to over resuscitate and therefore risk interference with clot formation. Aim to normalise vital

coagulation cascade and increased concentration of clotting factors	signs and urine output with use of fluids
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Part b (6 marks)

List three (3) pregnancy related complications related to this type of trauma and describe how you would examine/investigate for each one.

Model Answer

Pregnancy Related Complication	Examination/Investigation strategy
Uterine rupture	Uterine tenderness with guarding and rigidity, PV bleeding, referred shoulder tip pain, palpable foetal parts abdominally US showing free fluid
Placental abruption	Vaginal bleeding, uterine contractions, uterine tenderness with “woody” feel, evidence of foetal compromise CTG better than US for risk stratification
Preterm labour	Uterine contractions of more than four per hour with cervical changes, increase or change in vaginal discharge
Feto maternal haemorrhage	May see decreased/absent foetal movements, foetal distress, mother may have transfusion type reaction Kleihauer test to quantify foetal cells in maternal circulation
Amniotic fluid embolism	Acute collapse

Question 7 (12 marks)

A 40 year old male presents to the Emergency Department with 3 days of increasing right proximal upper limb pain and swelling. He has not experienced fever, pruritis, or any other symptoms.

He has started a new job as a house painter 6 months ago. He denies a history of a recent trauma, animal or insect bites, travel, or a previous similar episode. He takes no medications, and has no allergies.

His triage vital signs and temperature are all within normal limits. He weighs 70 kg.

Part a (3 marks)

List three (3) potential underlying causes for this gentleman's working diagnosis.

Model Answer

- Effort induced thrombosis / Paget-Schroetter syndrome.
(Undiagnosed) active malignancy.
- Hypercoagulable states., eg FVL mutation.
- Recent indwelling vascular device.

Part b (3 marks)

What are three (3) signs that you may find on physical examination of this patient?

Model Answer

1. Right upper limb skin mottling / colour change.

Non-pitting oedema.

Increased prominence of forearm/ hand veins.

Dilated superficial venules over shoulder / chest wall (Urschel's sign).

Tenderness and/or palpable venous cord in the axilla.

Supraclavicular fullness

Part c (2 marks)

List two (2) preferred investigation options to confirm the diagnosis of this presentation.

Model Answer

- Ultrasonography.
- Direct venogram.
- CT venogram.
- MR venogram.

Part d (2 marks)

The diagnosis is confirmed by your chosen investigation. What are two (2) therapeutic options suitable for this condition? Please include dose, route, and frequency for any medication(s) used.

Model Answer

Therapeutic enoxaparin 70mg, subcut, BD.

Catheter directed thrombolysis.

Percutaneous mechanical thrombectomy.

Part e (2 marks)

Prior to treatment commencement, the bedside alarm is activated as the patient is found to be in a PEA arrest.

State two (2) potential life-saving treatment options in the ED for this clinical picture. Please include dose, route, and frequency for any medication(s) used.

Model Answer

Systemic thrombolysis, eg tenecteplase 40mg, IV, once only.
VA ECMO / ECMO-CPR.

Question 8 (12 marks)

A 56 year old man is brought to your tertiary emergency department by ambulance with haemoptysis.

Part a (3 marks)

List three (3) likely causes of massive haemoptysis in this patient.

Model Answer

Carcinoma of the lung, usually bronchogenic

Tuberculosis

Bronchiectasis

Mycetomas

Necrotising pneumonia

Many other causes of haemoptysis, but less likely to cause massive bleeding

Part b (6 marks)

You determine that this patient requires intubation and mechanical ventilation.

Complete the following table with two (2) advantages and one (1) disadvantage for each of the following definitive airway control options.

Model Answer

Endotracheal intubation with:	Large single lumen ETT	Double lumen ETT
Advantages	Allows use of large fiberoptic bronchoscopy for suction and placement of bronchial blocker	Single lung ventilation can be accomplished (if the lumen is not occluded with clots) If bleeding side is unknown, the lung being ventilated can be changed without changing the ETT.
	Familiar procedure for emergency providers/availability of operator	The bronchial tube usually placed in the left bronchus – avoiding collapse of the RUL compared with single lumen ETT that is placed in the right main bronchus.
Disadvantage	Single lung intubation will not allow intervention on the bleeding lung	Smaller lumen can easily occlude with clots Will only accommodate paediatric fiberoptic bronchoscopy which is inefficient for airway clearance

Part c (3 marks)

A size 8.5 single lumen ETT has been placed into the bronchus of the unaffected (non-bleeding) lung.

List three (3) options for haemorrhage control in this patient.

Model Answer

Local bronchoscopic techniques: iced saline lavage, topical adrenaline, balloon tamponade, local thermal ablative therapies. (Will require change/withdrawing of the ETT)

Arteriography and embolisation

Surgical: lobectomy/pneumonectomy

Question 9 (18 marks)

A 76 yo male, who is independent from home, presents to your urban district Emergency Department after a fall from standing height with 3 minutes of loss of consciousness as a result.

Part a (8 marks)

In the assessment and management of geriatric trauma, complete the following table by listing one (1) important difference an older patient has compared to younger adults, and one (1) strategy you could employ to mitigate the effects of this.

Model Answer

	Impacts of ageing	Clinical implications
Airway	Increased incidence of: • Edentulous • Arthritis of temporomandibular joints and/or cervical spine	Anticipate potential for difficult airway through reduced mouth opening/ neck mobility; difficulty in bag-valve-mask ventilation may be reduced by leaving dentures <i>in situ</i> with removal for laryngoscopy
Breathing	Reduced respiratory reserve secondary to reduced respiratory muscle strength, vital capacity, compliance of chest wall and increased residual volume	• Early supplemental oxygen and respiratory support; apneic oxygenation for intubation • Early incentive spirometry (if no contraindications) to reduce atelectasis • Ensure optimal analgesia to reduce splinting of respirations
Circulation	• Increased peripheral vascular resistance • Decreased cardiac sensitivity to beta-adrenergic stimuli (intrinsic and/or via medications such as beta-blockers) and reduced baroreceptor sensitivity, with resultant blunting of usual tachycardic response to hypovolemia • Increased reliance on stroke volume for rise in cardiac output • Reduced pain sensation and increased abdominal wall laxity • Increased incidence of primary or secondary cardiac ischemia • Increased premorbid use of hypotensive, antiplatelet and anticoagulant agents	Increased risk of delays to recognition of shock Early identification of shock through: • Careful physical examination • Metabolic markers of tissue hypoperfusion (e.g. BD <-6) • Timely identification of sources of haemorrhage through above plus extended FAST scan and low threshold for pan-CT scan • Timely achievement of hemostasis Need for early fluid resuscitation to augment ventricular filling
Disability	Cortical atrophy with resultant increased susceptibility of bridging veins to shearing and subdural haemorrhage	Increased incidence of intracranial hemorrhage in setting of normal GCS
Exposure	Premorbid malnutrition, immunosensence	Increased risk of: • Hypothermia • Pressure injuries • Infection

Better answers

A – Poor dentition/dentures – leave in for BVM, remove for intubation.

B – Decrease reserve or rib # - early O2 and close respiratory monitoring.

C – Medications/Anticoagulation/Cardiac event as cause of fall. Delays to recognition of shock

D- As below but Could also include pre-existing decreased GCS/delirium

Part b (5 marks)

You are 1 hour away from the nearest Major Trauma Centre.

On arrival to the ED the patients' vital signs are:

- BP 220/105mmHg
- HR 110 bpm – Irregular. AF on monitor.
- O2 Saturation 95% (3L Nasal prongs).
- GCS at scene was 14 (E3, V5, M6) but is now GCS 6 (E1, V2, M3).

Patient's past medical history: Atrial fibrillation, hypertension, gout, osteoarthritis and mild chronic renal impairment.

Current medications:

- Apixaban 5mg BD
- Irbesartan -Hydrochlorothiazide 300mg/12mg daily
- Allopurinol 100mg BD
- Paracetamol 1g TDS

The patient is in your resuscitation bay with monitoring and bilateral large bore IV access.

Primary survey identifies only a large occipital haematoma and laceration with profuse active bleeding. Their C-spine is immobilised. Chest and pelvic X-rays are normal

Outline one (1) urgent treatment priority for THIS patient in each system below. (Please include aims and/or medication doses if appropriate)

Model Answer

Life threats: Control bleeding from scalp wound – direct pressure/deep sutures/pack. (Staples won't work)

A: Secure airway – something sensible re drugs (Prop/midaz + Fentanyl + Rocca). Not ketamine – note BP of 220.

B: Ventilation strategy - Aim low normal CO₂ 35-40 unless signs of herniation. Avoid hyperoxia, low PEEP

C: AIM BP < 160 systolic (MAP > 80) – adequate sedation (ie propofol 50mg/h), sedation boluses, last line beta blocker or hydralazine.

D: neuroprotective strategies – loose ties, tilt bed, normothermia, avoid noxious stimuli

Part c (5 marks)

Outline five (5) additional ongoing management priorities for THIS patient.

Model Answer

- Reverse anticoagulation – Early Haematology consult, 50u/kg four-factor prothrombin complex concentrate, 5mg intravenous vitamin K, TXA 1g
- CT Pan Scan – to identify ICH, risk of other injuries/spine injury
- Referral to major trauma centre/neurosurgical centre
- Insertion of arterial line, central line for secure access, haemodynamic monitoring in an inter-hospital transfer
- Discussion with family re. goals of care and patient wishes.

Question 10 (18 marks)

A 20 year old male is brought by ambulance to a tertiary/major trauma centre Emergency Department. The patient was bicycling without a helmet and fell off, sustaining an isolated head injury.

On arrival, his GCS is 14 (E4 V4 M6). He is confused with an obvious right sided parietal scalp haematoma. He is moving all limbs equally.

His initial vitals signs are:

SaO ₂	89 % at 8 L/min via Hudson mask
RR	10 /min with upper airway obstructive sounds
HR	110 bpm
BP	120/60 mmHg

Part a (4 marks)

List four (4) immediate actions.

Model Answer

Immediately addresses airway obstruction + hypoxia in step wise fashion

- Open /Suction airway/ Insertion OPA/NPA, apply jaw thrust (allow up to 3 of these)
- Increase O₂: 15 l/min non-rebreather, ideally BVM 100% with assisted ventilation given low respiratory rate
- indicate cx spine protection

Part b (4 marks)

List four (4) important features of your assessment.

Model Answer

Focused history including deterioration:

- o Time frame and preceding events: 'lucid period', rapidity of deterioration, seizure
- o Presence of localising signs and/or pupil assessment
- o Signs/symptoms of C-spine injury
- o Allergies, medications, past medical history must be relevant
- Focused neurological examination:
 - o o Lateralising motor deficit
 - o o Pupil dilation – unilateral
 - o o BP/HR ('coning')
 - o o Formal repeat GCS
- Check Glucose
- Identifies need for urgent CT head NON-contrast to identify extra dural haematoma (EDH) and/or other intracranial haemorrhage
- CT C-spine also indicated

Part c (8 marks)

Your assessment reveals that he has no other injuries. His HR and BP are unchanged, Oxygen saturations are now 95%, with a Respiratory rate 10/min. Blood glucose is 5.2 mmol/L

On arrival he was confused, GCS 14/15 and he is moving all limbs equally.

Now he only withdraws to pain, less so on the left.

Outline four (4) important modifications to the intubation of this patient and provide your rationale for each.

Model Answer

Key Principles/targets: 1) Intubate as soon as possible and prior to imaging 2) Avoid hypoxia (pre-ox + early use of rescue ventilation) 3) Avoid hypotension (fluids/ pressors) 4) Avoid hypercarbia given signs of acute rise in ICP (hyperventilate/ non-apnoeic RSI/ early rescue ventilation) 5) Cervical precautions with in-line immobilization 6) Manage raised ICP: Hyperventilation and osmotic therapy

- o Pre-oxygenation: Airway opening- OPA/NPA (or jaw thrust)+
- o 1) 100% FiO2 BVM 2 handed technique as also allows non-apnoeic RSI/ preemptive hyperventilation (given RR 10 and neuro deterioration)
- o 2) Hi-flow O2 (minimum 15 l/min via NRB (sats >95%) +O2 via nasal cannulae at 15 l/min. • In-line stabilisation: Anticipates potential effects on ease of intubation: Describes use of bougie +/- laryngeal manipulation OR videolaryngoscope
- o Induction drugs: Adequate sedation for ICP, avoid hypotension.
- o Ketamine (1-2mg/kg), Propofol (1-2 mg/kg) + Fentanyl (1-2 ug/kg), Etomidate (0.3mg/kg) . Relaxant: Sux (1.5-2 mg/kg), Roc (1.2 mg/kg)
- o BP: Aiming cardiovascular stability, avoid hypotension, MAP >70-80 (high normal):
- o IV fluid load + 2nd IVC, 0.9% saline 1 litre on hand pump set
- o Push dose pressors: Metaraminol (0.5 - 2mg), Adrenaline (10 -50 mcg)
- o Post intubation care: (accept one response from post care)
- o CXR to confirm ETT +/- OGT placement
- o ICP reduction: Head up 30 degrees, neck clear of obstructions (tape/ collar). Adequate analgesia/ sedation/ paralysis. Ventilation: CO2 low normal ~ 35 / lower CO2 target (~30) rationale: in view of drop in GCS and focal signs (aiming for reversal of pupil dilatation).
- o Normothermia, Normoglycaemia , Seizure control (consider prophylaxis)

Part d (2 marks)

The patient has been intubated and is awaiting a CT. Nursing staff inform you that his HR is now 40/min, BP 170/110 and his right pupil is now enlarged. You have contacted neurosurgery & anaesthetics to facilitate immediate transfer to theatre post CT.

Outline two (2) additional temporising treatments you will implement prior to urgent decompression in operating theatre.

Model Answer

Recognises that the further deterioration represents life threatening increase in ICP with pressure on brainstem/ incipient herniation.

- Manage raised ICP: Hyperventilation (needs CO2 target) and osmotic therapy.
- o Osmotherapy: Gives mannitol (0.5 -1 g/kg) or hypertonic saline (3-5 ml/kg)
- o O2 low normal ~ 35 / lower CO2 target (~30) rationale
- Expedites CT (no indication to perform craniotomy/ OT without CT in tertiary centre)
- If has addressed ICP in part C: will accept giving further Osmotherapy + Hyperventilates patient as temporising measure

Question 11 (12 marks)

You are evaluating a patient with vertigo.

Part a (5 marks)

State five (5) features on clinical history that would favour a central cause over peripheral.

Model Answer

- Older age
- CVS risks Male gender, HT, DM, Hyperlipidaemia, Fam Hx, Smoker, Chronic inflammatory conditions e.g. Reum arthritis, HIV, COVID NB maximum of 1 mark for individual CVS risks listed here
- Past Hx of MI, CVA, AF
- Associated altered conscious state
- Associated focal neurology especially balance, coordination, dysarthria, diplopia
- Inability to stand/swaying with eyes open
- Slow onset
- Longer lasting
- Associated headache or neck pain
- Absence of associated vomiting
- Absence of hearing loss/ear symptoms/tinnitus

NB Gait disturbance is present in both so not given mark.

One mark only for multiple answers from the same group e.g. multiple focal neurological symptoms, or multiple CVS risks

Part b (1 marks)

You decide to perform the HINTS examination to help differentiate a peripheral from a central cause.

What condition needs to be present in order for the HINTS examination to be valid?

Model Answer

Vertigo at rest needs to be present at the time of the examination.

Part c (6 marks)

Complete the table below giving the three (3) elements of the HINTS exam, and the finding favouring a central cause of the vertigo.

Model Answer

Element of the HINTS exam (3 marks)	Result favouring a central cause (3 marks)
Head Impulse test	No corrective saccade
Nystagmus	Bidirectional nystagmus-Direction of nystagmus changes on eccentric gaze (e.g. looking left and fast component beats left, but looking right fast component beats right)
Test of Skew	Vertical ocular misalignment. (Seen as correction with cover and uncover)

Question 12 (12 marks)

A twenty-eight year old male has been brought in by friends after a methamphetamine binge over the preceding two days. His friends have left and he has become increasingly verbally aggressive and is threatening staff. Verbal de-escalation has failed and he is refusing to take any oral medications, so the decision has been made to physically and then chemically restrain him.

Part a (6 marks)

State six (6) preparatory steps you will take prior to restraint assuming there are no lack of personnel and resources.

Model Answer

Accept 6 of the following / principles more important than exact wording (6 marks):

- Planned Code Black or Grey
- Security enough for 5 point restraint
- Remove potentially harmful items (stethoscopes, pens, necklaces)
- PPE for staff
- Prepare area to nurse patient (monitoring / O2 etc)
- Drugs drawn up and ready (doses / drugs not required)
- Briefing to staff with positioning / code ward
- Explanation to the patient

Part b (6 marks)

List six (6) measures that can be utilised to prevent patient harm during restraint.

Model Answer

Accept six of the following (principles more important than exact wording):

- Avoid prone positioning (supine or recovery)
- Avoid pressure on neck structures
- Avoid hobble restraints (hands to legs)
- Nursing 1-1
- Remove physical restraints as soon as safe to do so
- Monitoring and frequent observations (resp/airway/cardiac)

OR

- Monitoring limb (pressure / perfusion)
- Adequate fluids

OR

- Adequate toileting

Question 13 (12 marks)

34 yo female presents to your ED with isolated pain to her wrist after tripping over her dog.

GCS 15
HR 98 bpm
SaO₂ 99% on RA
BP 159/60 mmHg

Part a (3 marks)

List three (3) abnormalities on the X-ray shown below.



Model Answer

- Lateral and AP xray of Right wrist/ no splint in situ
- Fracture of the volar rim of the distal radius - more detail needed for the marks
- Subluxation of the carpal bones
- Soft tissue swelling

Part b (2 marks)

List two (2) potential associated injuries.

Model Answer

1. **Carpal bone injury**
2. **Carpal dislocation**
3. **Radial nerve injury**
 - DRUJ injuries _
 - radial styloid fractures
 - o indicates higher energy mechanism
 - soft tissue injuries - seen in 70%

- o TFCC injury (40%)
- o scapholunate ligament injury (30%)
- o lunotriquetral ligament injury (15%)

Part c (4 marks)

List two (2) of the more common potential nerve injuries and how you would test for them.

Model Answer

Median Nerve:

progressive paresthesias, weakness in thumb opposition, flexion of thumb IP and index finger DIP (a-ok sign)

Ulnar Nerve: weakness of finger abduction or cross fingers

Part d (3 marks)

State three (3) important management steps in ED.

Model Answer

- Analgesia – any thing appropriate
- Back slab and elevate
- ED manipulation using procedural sedation if delay to theatre
- Refer ortho for definitive reduction – may need ORIF

Question 14 (12 marks)

A 10 year old child presents to your rural Emergency Department suffering thermal burns to his body from a house fire. He weighs 30 kg.

Part a (9 marks)

Please complete the table below for the different types of burn depth.

Model Answer

- Classification Blisters Capillary Refill Sensation
- Superficial No Brisk Present
- Dermal Present Brisk/Sluggish Painful/Absent
- Deep No Absent Absent

Part b (3 marks)

State three (3) indications for transfer of this patient to a Paediatric Burns Centre.

Model Answer

- >10% TBSA
- All full thickness burns
- Special areas (face, ears, neck, hands, feet, genitalia, perineum or a major joint) even if less than 10%
- Circumferential
- Chemical burns
- Electrical burns
- Associated with trauma or spinal cord injury
- All inhalational / airway burns
- Children under 12 months

Question 15 (12 marks)

The Director of your Emergency Department has advised that in the last month, there have been 3 cases of staphylococcus aureus-associated bacteraemia (SAB) arising in patients who have had peripheral IV cannulas inserted in the ED.

She has asked you to lead a quality improvement project in the ED to reduce the incidence of SABs arising from peripheral IV cannulas.

Part a (4 marks)

List four (4) stakeholders you would involve in your working group.

Model Answer

1. ED medical staff - SMS or trainees
2. ED nursing staff - educators, clinical representatives
3. Infection prevention I infectious diseases
4. Any of the following (or other reasonable stakeholder), eg.
 - Consumer
 - Quality/redesign support
 - Ambulance (pre-hospital IV)
 - Public affairs (communications, promotional campaigns)
 - Supply/equipment/procurement

Part b (4 marks)

State four (4) steps you would undertake to lead this improvement work.

Model Answer

Looking for knowledge of the PDSA cycle, with examples of actions in each broad category.

Eg 1 mark for a 'plan' type step,

1. Plan - review data, benchmark, plan interventions
2. Do - develop guidelines, implementation resources, training
3. Study - review results, seek feedback
4. Act - implement and evaluate, audit outcomes

Part c (4 marks)

State four (4) strategies you would implement to reduce the incidence of IV-cannula related staph bacteraemia in the ED.

Model Answer

Any of the following specific interventions or equivalent

One mark per line; 1st strategy in each line will be accepted

- Hand hygiene or aseptic technique training/auditing
- Standardise IV/ blood equipment trolleys /equipment
- Reduce unnecessary IV cannula insertion
- Resite pre-hospital IVs
- Competency assessment/credentialing of staff undertaking insertion
- Education resources & guidelines
- Audit outcomes
- Aseptic technique training/credentialing
- Date/time all IVs.
- Policies around resite after 72 hours

Question 16 (12 marks)

You suspect a middle aged female patient in your ED is suffering from a thyroid storm.

Part a (6 marks)

Complete the table by prescribing three pharmacological treatment priorities in the management of thyroid storm and stating their mechanism of action.

Model Answer

MEDICATION DOSE +ROUTE ROLE/ACTION

- Propranolol or esmolol: P:0.5-1mg IV q10min PRN or PO 60 mg q8h; E: 250-500mcg/kg IV loading dose, then 50-100 mcg/kg/min

Inhibit peripheral effects of thyroid hormone (inhibit $t_4 \rightarrow t_3$)

- Hydrocortisone or dexamethasone: H:100mg IV TDS; Dexa: 2-4mg IV q6h

Inhibit peripheral conversion of T4 to T3+inhibits release

- PTU or carbimazole PTU:1g PO (loading_then 250mg QID; c: 40-60mg PO loading then 5-20mg daily

Inhibit hormone synthesis+ inhibits peripheral conversion T4-t3

- Lugol's solution or Potassium iodide. LI:4-8 drops PO q6h; PI: 5 drops PO q6h

Inhibit hormone release

Part b (2 marks)

Other than the specific treatments above, list two (2) supportive treatments you would use.

Model Answer

- cooling
- dextrose replacement to maintain euglycaemia
- antipyretic (i.e. paracetamol NOT ASPIRIN)
- empiric antibiotics if infection suspected as precipitant
- IV fluids

Part c (4 marks)

List four (4) predictive features associated with high likelihood of a thyroid storm in biochemical thyrotoxicosis.

Model Answer

Burch-Wartofsky Point Scale and its elements

- Temperature
- Central nervous system effects
- Gastrointestinal / hepatic dysfunction
- Heart rate
- Congestive cardiac failure
- Presence of atrial fibrillation
- Precipitating event

Question 17 (12 marks)

A 69 year old male presents to the Emergency Department with shortness of breath. He has a past medical history of CCF and COPD. You have decided to perform lung USS to assist your assessment.

Part a (4 marks)

List two (2) probe types you would use to perform a bedside lung USS examination and a justification for each of these.

Model Answer

Type of probe	Justification
Linear probe:	good for pleural disease / abnormalities and definitely sliding sign, pneumothorax, pleural disease, better resolution
Curvature probeCurvature probe	for B lines, effusion, consolidation

Part b (1 marks)

State one (1) main diagnostic feature of pulmonary oedema in lung USS.

Model Answer

- More than 3 B-lines in any single view is considered pathological.
- Where there are numerous B-lines in close proximity they become confluent.

Part c (4 marks)

List four (4) other lung pathologies that can be identified using lung USS.

Model Answer

- Pneumothorax
- Consolidation
- Collapse lobes
- Pleural effusion

Part d (3 marks)

You have noted that there was a lack of comet tail artefacts and diminished pleural sliding at the R lateral region of the lung fields.

List three (3) possible causes for this ultrasound finding.

Model Answer

- Pneumothorax
- Prior pleurodesis or prior thoracic surgery
- Poor ventilation (in cardiac arrest) or an examination performed on the opposite side of a mainstem intubation
- Severe acute lung injury
- Atelectasis or lobar consolidation
- Large parenchymal tumor

Question 18 (18 marks)

Part a (5 marks)

State five (5) clinical features that would make you consider inpatient vs community management of a 2yr old with pneumonia.

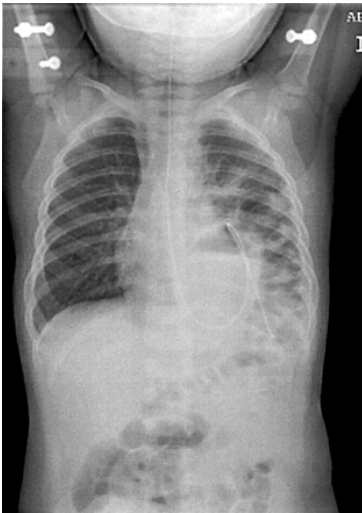
Model Answer

- 1 oxygen requirement
- 2 dehydration requiring iv/ngt treatment
- 3 CXR finding in keeping with complications eg empyema, effusion
- 4 Significant past history (CLD, immunocompromise) or social risk factors
- 5 Failure of appropriate oral therapy

Part b (3 marks)

A 2 yr old male presents to your ED with a 5 day history of fever and a cough.

List three (3) abnormalities shown on his CXR below.



Model Answer

- 1 left sided patchy changes involving left lower + middle zones
- 2 air fluid level posterior to heart border
- 3 NGT insitu, present in thoracic cavity

Part c (2 marks)

List two (2) differential diagnosis for above findings.

Model Answer

- 1 diaphragmatic hernia (must get)
- 2 pneumonia with cavitating lesion
3. left lower lobe pneumonia

Part d (5 marks)

His vital signs are:

Temp 40 °C
 HR 180 bpm
 BP 85/40 mmHg
 SaO₂ 87% on RA
 RR 45 /min
 cap refill 3 secs

Estimated weight 9 kg

Additional past history: ex 32 weeker, lost to follow up, Non English speaking background, immunisations up to date

List four (4) treatments you would consider in this patient (include doses or end-points).

Model Answer

Drug	Dose
0.9% NaCl (½)	90mls or 180 mls (1/2)
Oxygen (1/2 if gives target)	• 92%
Ceftriaxone (½)	(50x9)= 450mg daily (1/2)
Flucloxacillin (1/2)	450mg 6 hourly (1/2)
paracetamol	15x9= 135mg (1/2)

Part e (4 marks)

Your initial investigations include this venous blood gas:

pH 7.3
 PCO₂ 35 mmHg
 PO₂ 68 mmHg
 Bic 17 mmol/L
 Na 127 mmol/L
 K 3.7 mmol/L
 Gluc 3.1 mmol/L

State three (3) points in your interpretations of the blood gas findings and script your maintenance fluid prescription.

Model Answer

- Acidaemia

Metabolic acidosis, low bic, need lactate

- Moderate hyponatraemia, need to review vol status
- K+ Gluc ok
- Need to check lactate + ketones

Hyponatramia in the setting of LRTI, likely SIADH of euvoalemic (3 points)

1. Further fluid boluses maintenance to be guided by hemodynamics inc urine output

Maintenance= 2/3 normal (2/3 x 36= 24mls/hr 0.9% nacl/5% dex/20kcl) (2 marks)

Question 19 (18 marks)

A 20 yo woman, weighing 70 kg, presents to the Emergency Department 90 minutes after ingesting 80 x 300 mg aspirin tablets with the aim of ending her life. She is actively vomiting and complaining of tinnitus.

Her observations are:

HR	100 bpm
BP	100/70 mmHg
RR	28 /min
SpO ₂	98% on RA
GCS	15/15

This ABG is taken on her arrival in the ED:

pH	7.5
PCO ₂	20 mmHg
BE	-8 mmol/L
Na	136 mmol/L
K	3.5 mmol/L
Cl	96 mmol/L
HCO ₃	20 mmol/L
Lactate	1.4 mmol/L
Hb	110 g/L
Glucose	6.5 mmol/L

Part a (3 marks)

Regarding this ABG, complete the calculations and provide an interpretation of your findings in the context of this patient's presentation.

Model Answer

Anion gap (1 mark)	AG = Na-Cl-HCO ₃ AG = 136-96-20 AG = 20
Expected pCO₂ in metabolic acidosis (1 mark)	Expected pCO ₂ = 1.5 x [HCO ₃] + 8 Expected pCO ₂ = 1.5 x 20 + 8 Expected pCO ₂ = 38 (+/- 2)
Interpretation (1 mark)	Respiratory alkalosis with concomitant HAGMA consistent with salicylate toxicity (must state both respiratory alkalosis with HAGMA AND salicylate toxicity for full 1 mark – if not only 0.5 mark)

Part b (6 marks)

List three (3) additional investigations you would perform for this patient and provide one justification for each.

Model Answer

Salicylate level – salicylate concentration doesn't correlate with toxicity but the trend will guide ongoing management

And any of the following with sensible justification:

UEC – ensure baseline renal function normal to allow for appropriate enhanced elimination

ECG – assess for cardiotoxic coingestants and/or Vomiting -> hypokalaemia, and urinary alkalinisation may cause further drop in K

Paracetamol level – potential common co-ingestant

BSL – monitor for hypoglycaemia

BHCG – exclude another patient

Part c (7 marks)

List seven (7) management steps you will undertake for this patient.

Model Answer

IV fluid bolus*: 1L normal saline/CSL/plasmalyte stat, ongoing IVF aiming UO 1-2ml/kg/hr

IV antiemetics: Ondansetron 8mg IV

Decontamination with activated charcoal (IF vomiting controlled or pt intubated) 50g PO/NG

Urinary alkalinisation* - Administer 1-2 mL/kg 8.4% NaHCO₃ over 5-10 minutes, then infusion

4 hourly salicylate levels

Correct hypokalaemia (*Hypokalemia impedes urinary alkalinisation*) - Administer 5-10 mmol KCl per hour to maintain serum K⁺ 3.5 - 4.5 mmol/L

Enhanced elimination with intermittent haemodialysis according to EXTRIP criteria in consultation with clinical toxicologist (Any of: CNS disturbance, renal failure, severe acidemia, pulmonary oedema)

Intubation with controlled hyperventilation to maintain resp alkalosis if CNS depression/seizures

ICU/HDU admission (require intense monitoring and complex care)

Part d (2 marks)

Name two (2) therapeutic endpoints for ceasing enhanced elimination in this patient.

Model Answer

Resolution of biochemical abnormalities eg. metabolic acidosis

Evidence of two down trending serum salicylate concentrations

Question 20 (12 marks)

A 6 year old girl presents to (large mixed ED) with 2 weeks of cough and intermittent fever. For the past 5 days she has had a fever and been unable to lie down flat, becoming agitated whenever anybody tries to encourage or compel her to do so.

Vital signs are:

Temp	37.1 °C
HR	120 bpm
BP	107/80 mmHg
SaO ₂	100% on room air

Your resident has arranged a chest X-ray just prior to your review.



Part a (6 marks)

List six (6) key features you will seek on your physical examination with a rationale for each.

Model Answer

Engorged neck veins / facial swelling / dilated collaterals / facial plethora - SVC obstruction (2 max)

Pemberton's sign - thoracic outlet obstruction/SVC obstruction

Hypotension, muffled cardiac sounds, syncope, hepatomegaly (2 max) - tamponade

Stridor / hoarseness (only one) - thoracic compression or cerv adenopathy or recurrent laryngeal nerve involvement

Dysphagia - oesophageal compression

Horner's syndrome (or miosis/ptosis/anhydrosis together) - sympathetic trunk compression

Cachexia adenopathy - other features of malignancy

Bruising/purpura - feature of leukemia rather than lymphoma - accept only if remainder of list quite thorough

Must include a sign for SVC obstruction and tamponade for full marks

Part b (3 marks)

List three (3) severe complications she is at risk of within the next 24 hours, and the management steps you will take to ameliorate the risk of these.

Model Answer

Airway obstruction (intrathoracic) : do not lie flat even for CT / keep spont ventilating / do not sedate. use of steroids also acceptable answer

Critical tamponade: pericardial aspiration has risks and benefits

Tumour lysis syndrome: / rasburicase use / delay start of chemotherapy until after steroids used to reduce tumour size (any 1) (hyperhydration tricky answer here, can make oedema worse)

Severe laryngeal oedema/airway obstruction: lower limb IV access

SVC obstruction (steroid use)

Any answer that suggests intubation/RSI in the ED is a major safety hazard should probably get zero for whole section UNLESS it mentions intubation in theatre with some combination of fiberoptic awake / rigid bronch / ECMO avail.

Part c (3 marks)

List three (3) important differential diagnoses to consider.

Model Answer

Lymphoma (T cell, Hodgkins, NHL), Germ Cell tumour, thymoma, thymic cyst, thymic hyperplasia

Must have lymphoma for full marks. Max of 2 thymus answers

Ok answers in third box if lymphoma is one of the first two:

Lung cancer (esp NSCLC) not really keeping with patient demographics

Teratoma

Vascular malformation

Lymphatic malformation

Question 21 (12 marks)

A 12 month old boy has been referred into your emergency department from a GP who has expressed concern for intussusception.

Part a (2 marks)

List two (2) common risk factors for intussusception.

Model Answer

- Recent intussusception
- Recent rotavirus vaccination
- Recent bowel surgery
- Potential lead point (lymphoma, Meckels diverticulu

Part b (4 marks)

List four (4) important features you would look for on history and examination.

Model Answer

- Intermittent pain and distress
- Recurrent episodes, increasing in frequency
- Pallor, often associated with the episode
- Vomiting
- Lethargy
- Diarrhoea
- Rectal bleeding / 'red current jelly' stool
- Very well / 'back to normal' between episode

Part c (6 marks)

The child has an episode suggestive of intussusception in your department.

What six (6) important management and investigation steps should be taken next?

Model Answer

- V Accesss – may need USS
- Analgesia – Fentanyl, opiates.
- IV fluids to correct shock, 10ml/kg – 20ml/kg boluses Normal saline
- Nil by Mouth
- Urgent Surgical / Paeds surgical review
- Urgent Ultrasound abdomen if possible
- Nasogastric tube
- Abdo xray (USS gold standard)
- BSL – watch for hypoglycaemia
- VBG – looking for elevated lactate
- IV antibiotics
- FBE looking for signs of sepsis

Question 22 (12 marks)

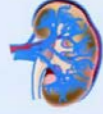
A 24 year old male arrives by ambulance to the ED post electrocution from exposure to a high voltage power line.

Part a (6 marks)

Complete the table by listing six (6) features that you would seek in your assessment that are potential sequelae from a high voltage electrocution event.

Model Answer

Body system	Any 2 findings for each system:
CVS	Arrhythmia: SVT, afib, VT, VF, bradycardia, sustained asystole myocardial ischaemia and/or necrosis, cardiogenic pulm oedema, thrombosis, autonomic dysfunction
Musculoskeletal	Joint dislocation, fractures, compartment syndrome, rhabdomyolysis
Neurological	Coma, encephalopathy, ICH, seizures, amnesia, spinal cord injury with paralysis/focal neurology, peripheral nerve injury, #skull & TBI

CARDIAC  Arrhythmias - The commonest complication, supraventricular arrhythmias (sinus tachycardia, atrial extrasystoles, or atrial fibrillation) and ventricular arrhythmias (extrasystoles, tachycardia, or fibrillation)⁶⁻⁸ - Exposure to high voltage current is more likely to cause cardiac standstill (asystole), but even low voltage alternating current can cause cardiac arrest by ventricular fibrillation⁹ - There is a vulnerable period in every heart beat during which exposure to energy at a frequency of 50-60 Hz, used in most household and commercial electrical sources, can trigger fibrillation - Although most life threatening events occur immediately after electric shock, delayed ventricular arrhythmias have been reported (up to 12 hours after the incident, with low as well as with high voltages)¹⁰ - The mechanism behind electrically induced cardiac arrhythmias is hypothesised to be initial damage to heart muscle and subsequent scar formation leading to abnormal electrical activation of the heart Bradycardia - Severe slowing of the heart rate can result from interference with the normal electrical (conduction) system, which can be delayed for months or years after the accident¹¹ - The sino-atrial and atrio-ventricular nodes responsible for impulse generation and propagation within the heart may be more susceptible to damage by electrical injury than other cardiac cells^{12,13} (necropsy shows widespread areas of cell death, mainly in these electrical pathways¹⁴) Heart muscle injury - May result from reduction of blood supply (ischaemia) or direct tissue death (necrosis) - Chest pain may be absent, and injury may manifest only as non-specific electrocardiographic changes (fig 4), increased levels of myocardial proteins in the blood (troponin) from damaged tissue, or abnormalities such as altered contraction patterns on echocardiography or cardiac MRI¹⁵ - Occasionally, mostly after high voltage accidents, myocardial infarction can be caused by occlusion of coronary arteries by blood clots or spasm¹⁶ - Cardiac function usually returns to normal shortly after the event, but cardiac abnormalities sometimes persist	RESPIRATORY ARREST  - Electric current, by interfering with usual transmission of nervous impulses, can paralyse the respiratory muscles (such as diaphragm) or cause them to seize up abruptly (tetanic contraction) - Inhibition of the centre controlling breathing in the brain SKIN BURNS  - Extensive burns can result in significant body fluid loss and infection, due to loss of skin barrier NEUROLOGICAL  - Damage to nerve tissue may cause loss of consciousness, impaired recall, spinal cord injury, paralysis, or loss of sensations in limbs - Neuropsychological problems are often underappreciated, but post-traumatic stress disorder, depression, and chronic neuropathic pain have been reported¹⁷ VASCULAR  - Clotting in blood vessels due to injury to vessel walls can compromise blood flow to organs KIDNEY FAILURE  - Myoglobin tubular precipitation caused by damaged muscles releasing myoglobin to the circulation and thus to the kidneys MUSCULOSKELETAL EFFECTS  - Bone fractures and luxations - Direct muscle damage, rhabdomyolysis¹⁸ - Compartment syndrome
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Part b (2 marks)

You receive the VBG below. What pathological process is likely to be contributing to the hypocalcaemia, and what finding would confirm this on urinalysis?

VBG		Reference Range
pH	7.15	7.35-7.45 mmHg
CO ₂	24	34-45 mmHg
O ₂	58	(VBG)
HCO ₃	10	21-28 mmol/L
Calcium (ionized)	0.8	1.16-1.3 mmol/L
Na	139	135-145 mmol/L
K	7	3.2-4.3 mmol/L
Cl	103	99-109 mmol/L
Glu	6.2	3.0-5.5 mmol/L
Lactate	4.0	0.5-2.0 mmol/L

Model Answer

Pathological process:	Rhabdomyolysis (as RAGMA, hyperkalaemia, hypocalcaemia)
Confirmation:	Dipstick positive for blood (indicating myoglobinuria)

Part c (4 marks)

The patient has extensive burns that include a full thickness circumferential burn to an upper limb. List four (4) signs developing in a limb that may indicate the need for an escharotomy.

Model Answer

Pallor, cyanosed
Reduced or absent capillary return related to capillary return in non-burned areas
Coolness (poikilothermia)
Loss of palpable pulses (late sign)
Paresis
Paraesthesiae – numbness, tingling
Decreased oxygen saturation as detected by pulse oximetry (usually <95%)
Decreased pulse pressures as measured by doppler ultrasound

https://aci.health.nsw.gov.au/_data/assets/pdf_file/0003/162633/Escharotomy-for-Burn-Patients.pdf

Question 23 (12 marks)

A 9 yo girl presents a week of with progressive right eye swelling despite taking amoxicillin with clavulanic acid for the past 5 days. You suspect orbital cellulitis. She has a weight of 30 kg.

Part a (3 marks)

List three (3) factors which may predispose a patient to developing orbital cellulitis.

Model Answer

- a. sinusitis – acute or chronic
- b. orbital trauma leading to facial bone fractures
- c. immunosuppression eg type 1 DM

others: unimmunised, children <10y of age, post eye or sinus surgery

penetrating trauma accepted, but not a great answer

Comment: a number of candidates answered 1. immunosuppression and 2. a condition that caused immunosuppression – need to diversify answers to maximise marks.

Part b (3 marks)

List three (3) findings on examination that would suggest a diagnosis of orbital cellulitis.

Model Answer

- a. proptosis
- b. decreased visual acuity right eye
- c. ophthalmoplegia
- d. painful eye movements
- e. relative afferent pupil defect
- f. raised IOP

others: signs of intracranial infection, unwell, toxic looking child

Part c (3 marks)

Prescribe your specific treatment for orbital cellulitis (include drug name, dose, frequency and route).

Model Answer

3rd generation cephalosporin, either ceftriaxone 50mg/kg (1.5g) daily, or cefotaxime 50mg/kg (1.5g) 6 hourly

Plus

Flucloxacillin 50mg/kg (1.5g) 6 hourly

Comments: many candidates had an upper limit of 1g/dose when the guidelines recommend up to 2g/dose.

Marking matrix for this question: Drug/dose/frequency – 0.5 marks for each X 2 drugs.

From RCH clinical practice guidelines/paediatric improvement collaborative (PIC) – Vic/NSW/Qld

Part d (3 marks)

In addition to antibiotic therapy, list three (3) management priorities for this patient.

Model Answer

- a. Referral to specialty team (ophthalmology) to drain collection (need to articulate why you are referring for full mark – ie to drain retrobulbar collection)
- b. Analgesia (many options accepted)
- c. Antiemetic (appropriate drug and dose)

Others: fast, decongestants, pathology – FBE/blood culture

Comment: CT/MRI commonly answered. This is a critical investigation, not a management priority. For consistency, no investigations were awarded marks in this section. (Management = 'interventions including resuscitation and treatment')

Another theme was 'refer to ophthalmology' or 'refer to paediatrics for ongoing management'. Neither of these answers are fellowship level responses. If your answer is a referral to a colleague, please explain WHY. ie 'refer to ophthalmology to drain retrobulbar collection' is a FACEM level response.

Question 24 (12 marks)

Due to recent media attention, you have been asked to audit ambulance ramping in your emergency department and its impact.

Part a (3 marks)

Complete the table below regarding ACEM definitions for:

Model Answer

Ambulance ramping	unable to complete transfer of clinical care of their patient to the hospital ED within an appropriate timeframe
Emergency Department Overcrowding	ED function is impeded because the number of patients exceeds either the physical or staffing capacity of the ED, whether patients are waiting to be seen, undergoing assessment and treatment, or waiting for departure.
Access block	Access block refers to the percentage of patients who were admitted or planned for admission but discharged from the emergency department (ED) without reaching an inpatient bed, transferred to another hospital for admission, or died in the ED whose total ED time exceeded 8 hours

Part b (4 marks)

State four (4) adverse effects associated with ambulance ramping.

Model Answer

- Delayed access to definitive assessment and care because of slowed ambulance response times
- Delays in the timeliness of ambulance responses due to fewer crews available to cover the same

geographic areas. These delays are captured in deteriorating response times for critical and emergent patients

- Ambulance workforce undersupply and a lack of investment in infrastructure to meet demand, with

greater overtime costs

- Financial penalties on ambulance services and hospitals when KPIs for ambulance services and EDs are not met
- Adverse publicity leading to poor staff morale and negative public perceptions of the health system
- Increased stress and interpersonal conflict between patients, paramedics and ED staff.
- Increased patient morbidity and mortality

Poor patient experience

Part c (5 marks)

To measure the prevalence and impact of ambulance ramping, list five (5) key TIME-BASED components for data collection as part of your audit.

Model Answer

- Ambulance arrival time at the ED
- ED notification time
- Patient triage time
- Patient entry to ED
- Transfer of care/clinical handover
- Ambulance crew preparation time
- Ambulance egress time out of ED

Question 25 (12 marks)

A 50-year-old man presents to your Emergency Department with an abrupt onset of chest pain migrating to his neck with blurred vision in his left eye (see photo).



Part a (3 marks)

List two (2) relevant clinical abnormalities seen in the photo and the clinical syndrome they suggest.

Model Answer

a. Clinical abnormalities:

1. Left eyelid ptosis
2. Left pupil constriction

b. Clinical syndrome: Horner's Syndrome

Would also accept syndromes that include Horner's Syndrome:

1. Wallenberg's syndrome
2. Babinski-Nageotte syndrome
3. Cestan-Chenais syndrome
4. Klumpke syndrome
5. Villaret syndrome
6. Raeder syndrome

Part b (5 marks)

List the most likely diagnosis in this patient and four (4) other possible diagnoses of this syndrome.

Model Answer

1. Carotid dissection
2. Cluster headache
3. Malignancy (Neck eg. Thyroid; Apex of lung eg SqCC; Brainstem)
4. Stroke: lateral medullary syndrome
5. Trauma (Brachial plexus trauma, Neck trauma)
6. Syringomyelia

Part c (4 marks)

List four (4) medications that can cause miosis.

Model Answer

- opioids
- phenothiazines
- pilocarpine
- olanzapine
- clonidine

Question 26 (12 marks)

A 30 year old female, G2 P1 and currently 14 weeks pregnant, presents on a Saturday evening to your rural emergency department (you don't have after hours O&G support) with post coital light PV spotting. She is afebrile and hemodynamically stable.

Part a (3 marks)

State the performed examination shown in the image below with two (2) relevant findings.



Model Answer

Speculum exam

A small polyp (approx. 0.5 cm) protruding through the cervix
closed cervix

No active PB bleeding

Part b (4 marks)

List four other causes of pv spotting in this patient.

Model Answer

- Threatened miscarriage
- cervical ectropion
- cervical/vaginal malignancy
- vaginal /cervical trauma
- vaginal infection

- Categorically (pregnancy related / non pregnancy related: Infective, malignancy, trauma, anatomical/other) 1 mark per category

Part c (3 marks)

State three (3) Investigation you perform in ED including a rationale for each.

Model Answer

- Ultrasound to locate the polyp and assess the pregnancy
- Blood group
- Hb
- Vaginal swab (with caution if infective cause is considered)
- 1st catch Urine/FWT

Part d (2 marks)

State two (2) pieces of advise you would give her upon discharge.

Model Answer

- Advice to avoid intercourse
- regular follow up Gp/Gynae etc
- when to represent

Question 27 (18 marks)

A 28 year old male construction worker, without any known past medical history, presents to your Emergency department with fatigue, exertional dyspnoea and intermittent dizziness. His vital signs on arrival are:

BP	149/98 mmHg
RR	26 /min
SaO ₂	93% RA
Temp	36.2 °C

He had an ECG on arrival and is shown below:



Part a (2 marks)

State two (2) important diagnostic abnormal findings in his ECG.

Model Answer

P II (PIII, PaAVF) → RAE / P pulm

R1, Right axis, rSR in V1, notched QRS in V2 → RVH

Part b (2 marks)

List two (2) expected diagnostic findings in the assessment of his cardiovascular system.

Model Answer

Pronounced (high-frequency, accentuated) P2

TR murmur

Graham Steell murmur

Pulmonary arterial flow murmur (bruit sounds)

Part c (6 marks)

His D-dimer is 200 ng/ml and other biomarkers are:

Sodium	138 mmol/L
Potassium	3.8 mmol/L

Chloride	103 mmol/L
Bicarbonate	30 mmol/L
Urea	4.8 mmol/L
Creatinine	96 umol/L
eGFR	80 mL/min
Glucose	7.2 mmol/L

Using the following table calculate the following characteristics of accuracy of D-dimer test using the conventional cut-off (500 ng/ml), showing your formula for each. (4 marks)

D Dimer Result	PE diagnosis	Not PE diagnosis
Positive (+)	239	2318
Negative (-)	7	4091

Model Answer

1. Sensitivity 97.2
2. Specificity 67.9
3. Positive Likelihood ratio 3.03

Sensitivity= $[a/(a+c)] \times 100$

Specificity= $[d/(b+d)] \times 100$

Positive predictive value (PPV)= $[a/(a+b)] \times 100$

Negative predictive value (NPV)= $[d/(c+d)] \times 100$

Part d (3 marks)

State the definition of the Confidence Interval (CI), list the most common CI used in medical research/biostatistics and state one (1) parameters that can affect the width of it?

Model Answer

- A **confidence interval (CI)** is a range of estimates for an unknown parameter and is computed at a designated *confidence level*;
- the 95% confidence level is most common.
- Factors affecting the width of the CI include the confidence level, the sample size, and the variability in the sample.

Part e (5 marks)

You decide the patient is safe for discharge and can be followed up in the community. Based on the above assessment and investigations, state five (5) **important semi-urgent** outpatient investigations that you would recommend for his GP to organise.

Model Answer

1. Sleep study → Cause of PHTN 2nd OSA/High BMI
 2. Fasting BSL/HbA1c → abnormal random BSL in ED undiagnosed DM/pre diabetic state
 3. Lipid profile → metabolic syndrome/dyslipidemia
 4. TTE → confirm PHTN and assess the pressure/complications also assess for LVH/LV function ?HTN Cardiomyopathy
 5. TFT → high BMI/metabolic syndromes
 6. Renal doppler US → Reduced eGFR and HTN
- Won't accept random investigations; Should be justifiable / important and Semi-urgent