



Model Answers — Monash Practice SAQ Trial 2024.2

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Question 1 (12 marks)

A 9 day old child is brought to your Emergency Dept with complaints of poor feeding and recurrent sudden changes in colour during feeds. He was a home birth and this is his first medical contact.

An x-ray is taken as part of your initial assessment.



Part a (2 marks)

List two (2) abnormal findings on this chest x-ray.

Model answer

1. Cardiac apex elevation consistent with RV enlargement (boot-shaped heart) (Cardiomegaly = 0.5 mark)
2. Decreased pulmonary vascularity.
3. Right-sided aortic arch

Part b (3 marks)

List three (3) components of this pathological condition which characterise it.

Model answer

1. Pulmonary stenosis
2. Right Ventricular hypertrophy
3. Ventricular septal defect
4. Overriding Aorta

Part c (2 marks)

List two (2) clinical features would be noted on cardiac auscultation that would be consistent with this condition.

Model answer

1. Systolic murmur at the left sternal edge
2. Murmur radiation through to the back
3. Loud second heart sound and is single (pulmonary valve closure is inaudible)

Part d (2 marks)

List two (2) triggers, other than feeding, which may precipitate these colour changes in this child.

Model answer

1. Defaecation
2. Crying
3. Pain
4. Distress
5. Dehydration

Part e (3 marks)

This child has another episode whilst in the department. List three (3) treatment actions you would initiate in this child.

Model answer

1. High-flow oxygen via mask/head box
2. Console child by cradling in knee-chest position
3. Avoid exacerbating distress/remove precipitants
4. Administer analgesia (opioids IV, IM or subcut)
5. Small IV fluid bolus (to increase preload and reduce dynamic outflow obstruction)
6. Beta blockers e.g., Propranolol (blocks β receptors in the infundibulum, thereby lessening RV outflow obstruction)
7. Vasoconstrictor e.g., Phenylephrine, Metaraminol, to increase afterload and decrease R to L shunt
8. Correct any underlying cause e.g., arrhythmia, hypothermia, hypoglycaemia

Answer must include at least one 'invasive' treatment i.e. one of options 4-7

Question 2 (12 marks)

A 25 year old man arrives by ambulance to your ED following a suspected overdose. He was found at home, unconscious, with pinpoint pupils and shallow respiration. Paramedics treated him with 400 micrograms naloxone I.M injection with good response.

En route to your tertiary ED, he became drowsy again.

His current observations are:

GCS	11/15
RR	8 breaths/min
HR	105 bpm
BP	140/70 mmHg
O ² Sat	94% on room air

Part a (4 marks)

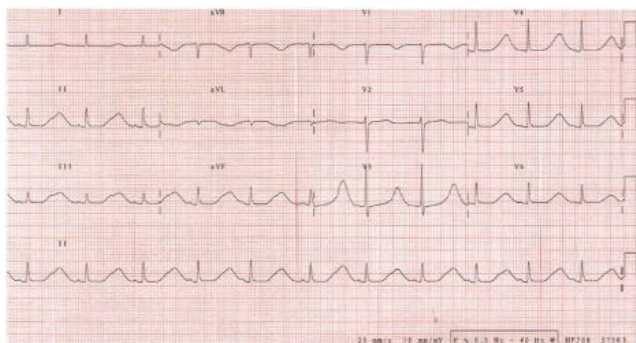
Outline your four (4) management priorities for this patient.

Model answer

1. Administer naloxone 100mcg IV in increments until adequate spontaneous respiration established – RR > and SaO₂ >
2. Commence naloxone infusion at 2/3 initial dose required per hour
3. Check for and correct hypoglycaemia with 50mL 50% glucose IV
4. Seek and treat any co-ingestants
5. Monitor conscious state and adequacy of ventilation and adjust naloxone infusion as necessary
6. Admit to HDU, consult Toxicology or Addiction Med

Part b (1 mark)

His initial ECG is displayed below.



Click image to enlarge

What is the main abnormality demonstrated?

Model answer

Prolonged QT

Part c (1 marks)

What is the likely cause in this patient?

Model answer

Methadone toxicity

Part d (4 marks)

List four (4) other causes of this ECG abnormality.

Model answer

1. Drug example (eg sotalol, CPZ, flecainide etc)
2. Electrolyte
3. Hypothermia
4. Myocard ischaemia
5. Congenital

Part e (2 marks)

List two (2) reasons a standard urine drug screen would NOT be useful in THIS patient.

Model answer

Model answer not provided

Question 3 (18 marks)

A 57-year-old male worker from a nearby insulation materials and dyes factory presents with confusion, dizziness, shortness of breath and cyanosis to his finger nails. You suspect Methaemoglobinaemia.

Part a (4 marks)

List four (4) drugs/toxins from separate classes that cause Methaemoglobinaemia.

Model answer

- Nitrites/nitrates: Sodium nitrite/nitrate (food preservatives), GTN, well-water, recreational use of amyl nitrite ('poppers'), Sodium Nitroprusside
- Local anaesthetics: prilocaine, benzocaine, lignocaine
- Antibiotics / antimalarials: dapson, sulfonamides, chloroquine, primaquine
- Others: Rasburicase, propanil, paraquat, aniline dyes, moth balls (naphthalene), potassium permanganate, copper sulphate

Part b (5 marks)

Apart from cyanosis and confusion, list five (5) other clinical and/or biochemical findings in Methaemoglobinaemia.

Model answer

- Seizures
- Headache
- Arrhythmias
- Chest pain
- Tachypnoea
- Metabolic Acidosis
- Chocolate Brown Discolouration of Blood
- Elevated MetHb % on Blood Gas
- Cyanosis – Oxygen saturation gap (or PaO₂ – Sats mismatch)

Part c (4 marks)

Complete the table by listing two (2) indications and two (2) adverse effects regarding antidote treatment with Methylene Blue in this patient.

Model answer

Any (2) indications below

- Indications for antidotal Rx with methylene blue
- MetHb fraction % > 20%
- MetHb fraction % > 10% AND symptomatic OR co-existing anaemia / chronic lung disease / cardiac failure
- Role in treatment-resistant drug induced vasoplegic shock.

Any (2) Adverse effects below

Adverse effects

- Headache, dizziness, nausea / vomiting, chest discomfort, dyspnoea

- Blue staining of mucous membranes
- Hyper or Hypotension
- Pain at site of IV administration
- Doses > 7mg / kg given over less than 1-2 hours may induce methaemoglobinaemia
- Serotonin toxicity may be induced in the presence of serotonergic drugs or MAOI

Part d (5 marks)

The patient has been given Methylene Blue with some improvement in his clinical state but wants to discharge himself without further management.

State the five (5) steps required for best practice in discharge against medical advice

Model answer

- Explore and address reasons for wishing to discharge
- Assess decision making capacity
- Explain the risks of not following advice and benefits of treatment
- Offer alternate management options and safety netting.
- Documentation (in notes as well as form if available)

Question 4 (12 marks)

A 75 year old lady is brought to your ED by ambulance with a chief complaint of feeling weak and lethargic. According to her husband, she has been relatively bed-bound for the last few days and has had diarrhoea, occasional vomiting and decreased oral intake.

Her past medical history includes Alzheimer's dementia, hypertension, hypercholesterolaemia, ischaemic heart disease and gastro-oesophageal reflux.

Her medications include atenolol, rosuvastatin, aspirin, frusemide and esomeprazole.

She is usually cared for at home by her husband, who states that she enjoys her alcohol.

On arrival, her vitals are as follows:

HR	110 bpm
BP	90/60 mmHg
RR	20
Sats	97% on Room Air
T	37.6° C
GCS	13/15

As part of your initial work up, you perform a VBG which returns a result of Na 161 mmol/L and lactate 3 mmol/L. The rest of the VBG is unremarkable.

Part a (3 marks)

List the three (3) most likely causes of hypernatraemia in this patient.

Model answer

1. Poor oral intake (elderly, cognitive impairment: commonest cause of hypernatraemia)
2. Severe volume loss due to GI losses
3. Chronic renal failure (common in elderly especially if on longterm diuretics)
4. Diuresis/diuretic excess
5. Alcohol excess

No points for diabetes insipidus as there are other more likely causes in this patient.

Part b (3 marks)

List three (3) possible complications of hypernatraemia.

Model answer

1. Death
2. Seizures
3. Altered conscious state
4. Intracranial haemorrhage
5. Ataxia, tremor, hyper-reflexia, spasticity
6. Other electrolyte disturbances eg hypocalcaemia

Part c (3 marks)

Apart from the VBG that has already been performed, list three (3) other investigations that you would perform for this patient with a rationale for each?

Model answer

1. Urine sample for sodium and osmolality to help rule in or rule out likely cause of hyperNa
2. Other electrolytes in order to correct as needed, common for coexistent electrolyte disturbance with hyperNa but also with diarrhoea/volume loss
3. Renal function as patient likely has AKI due to volume depletion,
4. Bedside echo to assess volume status and help guide fluid resuscitation
5. CXR to assess for fluid overload especially given patient usually on diuretics
6. Consider CT abdo in elderly patient with vomiting, diarrhoea and high lactate for possible ischaemic colitis

Part d (3 marks)

State three (3) points about the general principles of fluid management for this patient. Specific formulas are not required.

Model answer

1. Restore intravascular volume: can use isotonic solution such as either normal saline or Hartmann's safely despite the Na content due to relative total body Na deficit, the Na content of the fluid is lower than the patient's serum Na level, allows gradual reduction in serum Na level. Can also use albumin.
2. Replace water deficit: need to use hypotonic solution such as 0.45% NaCl or 5% dextrose. Can also use oral water if patient will tolerate.
3. Ongoing maintenance fluids until underlying medical condition has resolved: usually 0.45% NaCl as hypotonic solution. Caution with patient developing congestive cardiac failure especially given they are usually on diuretics.

Question 5 (12 marks)

You are managing a 45-year-old man with undifferentiated abdominal pain and vomiting.

His past history is Hypertension and Type 2 diabetes.

His initial VBG is:

pH	7.28	(7.35-7.45)
HCO ₃	14 mmol/L	(20-28 mmol/L)
pCO ₂	28 mmol/L	(35-45 mmol/L)
Na	149 mmol/L	(135-145mmol/L)
K	5.1 mmol/L	(3.5-4.5 mmol/L)
Cl	110 mmol/L	(100-115 mmol/L)
Lac	2.0 mmol/L	(<2mmol/L)
Glucose	6.2 mmol/L	(4-11mol/L)

Part a (6 marks)

Complete the following table by performing the calculations and interpreting each result.

Model answer

	Calculation	Interpretation
Anion Gap	$149 - 14 - 110 = 25$	HAGMA: possible causes ketones, renal failures, less likely lactate, toxins
Delta Ratio	$(25 - 12) / (24 - 14) = 13 / 10 = 1.3$	Isolated HAGMA, no NAGMA or metal. alkalosis
Expected pCO₂	$1.5 \times 14 + 8 = 29$	Expected/appropriate Resp. Compensation

Part b (1 marks)

Bloods and ECG are non-diagnostic and CT abdomen/pelvis normal.

A finger prick Ketone level is significantly elevated.

What is the most likely diagnosis?

Model answer

Euglycaemic DKA

Part c (1 marks)

Which medication class is MOST associated with this condition?

Model answer

SGLT2 inhibitors

0.5 mark for individual drug name: canagliflozin, dapagliflozin, empagliflozin

Part d (4 marks)

State four (4) steps in your treatment of this patient.

Model answer

- Stop Inciting Agent, - i.e. stop SGLT2i
- Fluid Replacement With Monitoring of Electrolytes and Ketones - deficit 6-9L, 1-1.5L/hr N/Saline or CSL first 1-2 hours then slow, titrate to clinical and biochemical state ie anion gap closing, resolution of acidosis/ketosis
- Insulin Infusion - 0.05 U/kg/hour to 0.1 U/kg/hour, until resolution of acidosis/ketosis
- Potassium replacement as drops from insulin and correction of acidosis – reasonable dose of K
- Dextrose Administration – usually 5%, maintain BSL > 14 or similar
- Supportive Care – analgesia, antiemetic's with details
- Seek/Treat other precipitants long list accept reasonable answers eg abdominal condition
- eg gastroenteritis, sepsis

0.5 mark for management and 0.5 marks for detail eg dose, end point

Accept only 1 supportive measure

Question 6 (12 marks)

A 26-year-old female presents to your Emergency Department with a severe migraine. She is 30 weeks pregnant and is concerned about which medications will be safe for her to receive during her pregnancy.

Part a (2 marks)

Other than paracetamol and metoclopramide, list two (2) medications which are safe to use for migraine treatment in pregnancy.

Model answer

- IV Mg Sulphate
- Steroids (prednisolone, dexamethasone)
- Triptans (unclear cat B, but probably ok)
- Local anaesthetic options in an appropriate regional technique
- Sparing use of opiates (eg codeine)

Part b (5 marks)

In relation to the safe prescription of medicines in pregnancy in Australasia, complete the table below, stating the definition of each categorisation.

Model answer

Category	Definition
A	Drugs which have been taken by a large number of pregnant women and women of childbearing age without any proven increase in the freq. of malformations or other direct/indirect harm to the foetus
B	Similar to Cat A but only taken by a limited number of preg/childbearing age women
C	Drugs which, owing to their pharmacological effects, have caused or may be suspected of causing, harmful effects on the human fetus or neonate without causing malformations. These effects may be reversible.
D	Drugs which have caused, are suspected to have caused or may be expected to cause, an increased incidence of human fetal malformations or irreversible damage. These drugs may also have adverse pharmacological effects.
E	Drugs which have such a high risk of causing permanent damage to the fetus that they should not be used in pregnancy or when there is a possibility of pregnancy

Part c (5 marks)

List five (5) medications from different classes which are known to cause harm to the foetus in utero AND include their effect on the foetus.

Model answer

- Antibiotics
 - Sulphonamides – haemolysis, kernicterus
 - Tetracyclines – teeth and bone dysgenesis
 - Gentamicin – ototoxicity
 - Metronidazole – facial defects
 - Analgesics
 - Opioids – foetal / neonatal dependence
 - NSAID – PDA closure, oligohydramnios
 - Salicylates – bleeding
- Anticoagulants
 - Heparin
 - Warfarin
 - Aspirin
- Anticonvulsants
 - Phenytoin – syndrome
 - Topiramate, gabapentin (B)
- Cardiovascular
 - Amiodarone, ACEi/ARB, vasoconstrictors
- Lithium – congenital heart defects
- Many other reasonable...

Question 7 (12 marks)

There is an increasing frequency of the use of POCUS to diagnose a pneumothorax in the Emergency Dept.

Part a (4 marks)

List four (4) findings on lung ultrasound which serve to diagnose a PTX.

Model answer

- Loss of lung sliding, M-Mode: Barcode sign/stratosphere is
- M-mode: Barcode sign/stratosphere sign
- Absent lung pulse (left side of chest)
- Presence of a Lung point
- Loss of comet tail artefacts
- (Absent physiological B lines)

Part b (2 marks)

Which ultrasound probe is favoured to best see a pneumothorax and provide a justification for your choice.

Model answer

Linear Probe

- Large footprint (1)
 - o Fit in-between ribs,
 - o Covers two rib spaces
- High frequency probe (1)
 - o Greater resolution
 - o Decreased dept penetration

Part c (4 marks)

List four (4) conditions that can lead to false positive finding suggestive of a pneumothorax on lung Ultrasound.

Model answer

1. Decreased ventilation
 - a. Apnoea
 - b. Breath holding
 - c. Mucus plugging
 - d. COAD
 - e. One lung intubation
 - f. Oesophageal intubation
2. Symphysis/increased adhesion between pleural layers
 - a. Chemical pleurodesis
 - b. Pleural fibrosis
 - c. Interstitial lung disease
 - d. Pneumonia
 - e. ARDS

Part d (2 marks)

List two (2) echocardiographic findings in a tension pneumothorax.

Model answer

- Plethoric IVC
- Collapse (severe) of the right ventricle
- Displacement of the heart to the left (mediastinal shift)

Question 8 (12 marks)

A 35 yo male presents to your ED with acute atraumatic thoraco-lumbar back pain. He is drowsy, with pin point pupils and has a known history of IVU.

Part a (5 marks)

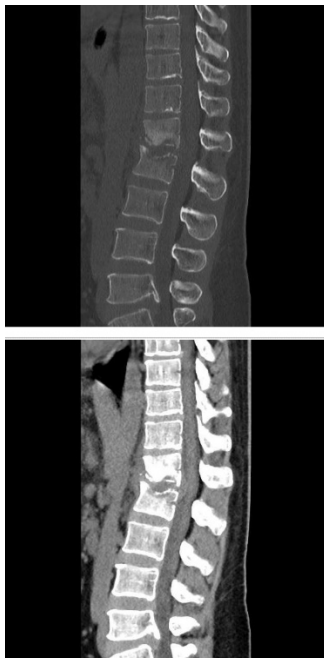
List five (5) other factors, from a clinical history and examination, that you would seek to determine if this patient required imaging.

Model answer

- Systemically unwell and/or fever
- immunosuppression
- Significant neurological symptoms or signs on neuro exam
 - o focal weakness in lower limbs, sensory changes in approp dermatomes, bowel or bladder disturbance
- Unexplained weight loss, B symptoms
- Constant, progressive pain not relieved with bed rest and adeq analgesia
- Past history of malignancy
 - o (with example lung, thyroid, renal, prostate)
- Structural deformity (bony cyst)
- risk factors for pathological fracture (early osteoporosis, osteogenesis imperfecta, paget's, osteomalacia)

Part b (3 marks)

You elect to perform a CT scan on this patient. The following images are obtained.



List three (3) abnormal findings on these images.

Model answer

- Loss of intervertebral disc height (number them)

- Bony destruction
- Sclerotic change especially at the inferior aspect of T12
- Prevertebral soft tissue swelling
- Posterior soft tissue swelling extending into the central canal causing spinal stenosis

Part c (3 marks)

Prescribe your initial antibiotic regimen.

Model answer

- Flucloxacillin 2 g intravenously, 6-hourly
- PLUS
- vancomycin intravenously
- PLUS EITHER
- ceftriaxone 2 g intravenously, 12-hourly
- OR
- cefotaxime 2 g intravenously, 6-hourly.

Part d (1 marks)

What is the most likely micro-organism to have caused this illness?

Model answer

Staph Aureus

Question 9 (12 marks)

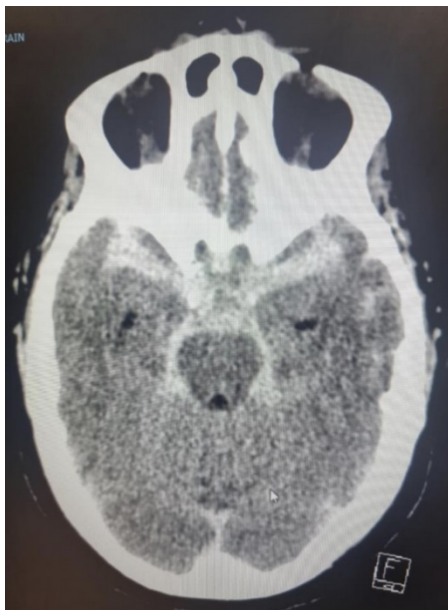
A 45 year old female presents to your urban district Emergency Department with a sudden onset of headache and confusion.

Her vital signs are:

HR	97 bpm
BP	200/110 mmHg
Sats	97% on RA
RR	18
Temp	37.1°C
GCS	14/15

Part a (2 marks)

A single slice from the CT that was obtained is provided below.



List the major abnormal finding with an interpretation of its significance.

Model answer

- Extensive blood in the basal cisterns
- consistent with a SAH likely of aneurysmal origin

Part b (5 marks)

List five (5) of your management priorities.

Model answer

Analgesia – (paracetamol 1g), Fentanyl titrated to pain score

Neuro protection

- Head up 30 degrees
- Normoglycaemia

- Normothermia
- Normalise electrolytes

Blood pressure control with appropriate titrable agent (eg Sodium Nitroprusside) and dose aiming for SBP 120-160

- Arterial Line placement

Correct coagulopathy with relevant agents

Urgent Transfer to neuro surgical centre

- semi-elective intubation for airway protection

Nimodipine 60mg PO q4h

Part c (5 marks)

List five (5) early, non-infective complications of this condition.

Model answer

- Re-bleeding 15%
- SDH/ICH
- Global ischaemia
- Cerebral vasospasm
- Hydrocephalus 20%
- Seizures
- Fluid/electrolyte disturbance
- Hyperglycaemia/hyperthermia
- Pulmonary oedema
- Arrhythmias
- VTE
- Respiratory failure

Question 10 (12 marks)

A previously well 25 year old patient presents with atraumatic unilateral scrotal pain. They have normal vital signs.

Part a (12 marks)

Complete the table by listing four (4) differential diagnosis, for this presentation, and two (2) supporting features for each on initial assessment

Model answer

- Testicular torsion- sudden onset, usually during exercise/trauma, associated nausea/vomiting, exam findings- absent cremasteric reflex, high riding testicle, hard testicle, swelling Orchitis/ - slower more gradual onset associated with infection,
- Epididymo-orchitis- pain radiates up spermatic cord, radiates into abdomen in torsion, associated fevers, STI risk factors, Prehn's sign- relief on lifting testicle
- Referred pain- renal stone, haematuria, non-tender scrotum/testicle
- Torted testicular appendage- Visible bluish discolouration of scrotal appendage, usually no systemic symptoms, pain free at rest, point tenderness just below upper ant border of testicle
- Incarcerated inguinal hernia – swelling at inguinal ring, absent BS/vomiting, loop of bowel palpable superior to testis

Question 11 (12 marks)

You are a consultant in a tertiary trauma centre caring for patient who has sustained an isolated left lower limb injury from a motor vehicle accident.

Part a (4 marks)

List four (4) points in your description of the x-ray that was obtained.



Model answer

- **Oblique fracture at juncture of mid and distal third of the tibial shaft**
- **Degree of posterior and lateral angulation and displacement**
- Associated soft tissue swelling
- **Associated oblique, displaced fracture of proximal third of the fibula**
- (No apparent knee joint involvement..*not an accepted answer in current College marking scheme i.e. no marks for negative findings*)
- Appears to be a closed injury

Pass criteria: Bold plus 1 other

Part b (4 marks)

The patient's leg has been immobilised in a splint after re-alignment.

List four (4) features of his pain that would suggest impending compartment syndrome.

Model answer

- **Pain out of proportion to apparent injury**
- **Pain on passive stretch of the compartment**
- Pain on active stretching of involved muscle
- **Pain worsening despite adequate analgesia and casting**
- Pain onset 6-24 hours post injury
- May be described as burning in nature

Pass criteria: Bold plus 1 other

Part c (2 marks)

You elect to measure the compartment pressure. State two (2) points about what is considered an abnormal reading?

Model answer

1. Either an appropriately high pressure = compartment syndrome (at least 30mmHg),
2. Mention of perfusion/delta pressure (diastolic pressure - compartment pressure) <30mmHg

Part d (2 marks)

State two (2) points about your technique for needle insertion to measure pressures in the anterior compartment of the lower leg.

Model answer

- Perpendicular to skin
- 1 cm lateral to anterior border of tibia at junction of prox and middle ⅓ of lower leg
- Advance the needle to depth that allows rise in pressure when force is applied over the anterior compartment or with flexion of the foot

Question 12 (12 marks)

An otherwise well 20 year old male patient presents with sepsis seven days after developing a severe sore throat. You suspect Lemierre syndrome.

He has no significant past history, is on no regular meds and has NKDA.

Part a (3 marks)

List the three (3) elements of Lemierre syndrome.

Model answer

- Pharyngeal tonsillitis (Any other oro-facial infection accepted e.g. odontogenic, matoiditis, otitis media, sinusitis, parotitis)
- Thrombus in IJ vein
- Septic emboli or distant abscesses or distal infection.

Part b (4 marks)

State four (4) specific findings you would seek on physical examination.

Model answer

- Purulent enlarged tonsils
- Other orofacial septic source
- Trismus
- Unilateral neck swelling, induration and/or tenderness especially along IJ, including angle of jaw and SCM (NB Midline swelling not consistent with this syndrome unless directly related to a mentioned primary oro-facial infective source)
- Signs metastatic emboli e.g. focal resp signs, septic arthritis, abdominal tenderness, neuro deficits/meningitis, pyuria. Accept up to 2 marks maximum

NB No marks for non-specific signs such as fever, tachycardia etc

Part c (1 marks)

What is the commonest complication of this condition?

Model answer

Septic emboli/metastatic abscess in pulmonary system

Part d (1 marks)

What is the confirmatory investigation?

Model answer

- CT neck with contrast demonstrating IJ filling defect/thrombus
- May include chest to look for metastatic lesions.

Must say CT with contrast or CT venogram to gain full mark. 0.5 mark for CT only.

No marks for positive blood cultures or similar as non-specific and not confirmatory of Lemierre synd

Part e (1 marks)

Prescribe your antibiotic treatment regimen including dose and frequency.

Model answer

- Pip/tazo 4.5g every 6-8 hours OR Amoxy/clav 1.2g 6-8 hourly OR Ceftriaxone 2g bd plus metronidazole 500mg bd.

May add Vanc/clinda to any of these. Accept clinda instead of metronidazole

0.5 mark for drug, 0.5 for correct dose and regime.

Part f (2 marks)

IV fluid resuscitation has been commenced and he is currently haemodynamically stable. Analgesia has been provided.

State two (2) other specific treatments you would consider in this patient.

Model answer

- Source control (e.g. drain abscess, effusion)
- Anticoagulation with heparin or LMWH
- Dex accepted
- Consider RSI + Intubation if features of airway compromise / neurological deterioration / oxygenation/ventilatory failure in setting of sepsis

NB ENT consult only scores if justification including source control or similar. Consult alone scores zero (Not a treatment)

Admission is not a treatment and so no score.

Analgesia already provided in stem so no marks

Question 13 (12 marks)

A 4 week old infant presents with recurrent vomiting. You suspect that they have pyloric stenosis.

Part a (5 marks)

List five (5) differential diagnoses that you would also consider in this infant.

Model answer

- [Urinary tract infection](#)
- [Gastroenteritis](#)
- [Gastro-oesophageal reflux](#)
- Surgical causes eg volvulus, malrotation
- Congenital adrenal hyperplasia

Part b (1 marks)

At what age would pyloric stenosis become an unlikely diagnosis?

Model answer

- 12 weeks

Part c (3 marks)

List three (3) preventable or modifiable risk factors for pyloric stenosis.

Model answer

- Maternal smoking
- Postnatal exposure to macrolide antibiotics
- Formula feeding

Part d (2 marks)

The following blood gas is performed:

Blood Gas Values				
↑ pH	7.618		[7.350 - 7.450]	
↑ pCO ₂	54.4	mmHg	[35.0 - 45.0]	
pO ₂	164	mmHg	[- -]	
↑ cHCO ₃ ⁻ (P) _C	56.2	mmol/L	[21.0 - 28.0]	
?↑ cBase(Ecf) _C	30.1	mmol/L	[-3.0 - 3.0]	
sO ₂	99.3	%	[- -]	
Oximetry Values				
ctHb	108	g/L	[- -]	
FCOHb	1.2	%	[- 6.0]	
FHHb	0.7	%	[- -]	
FMetHb	1.5	%	[- 1.5]	
Hct _C	33.2	%		
Electrolyte Values				
cNa ⁺	136	mmol/L	[134 - 146]	
↓ cK ⁺	3.0	mmol/L	[3.4 - 5.0]	
↓ cCa ²⁺	0.97	mmol/L	[1.12 - 1.32]	
↓ cCl ⁻	72	mmol/L	[98 - 108]	
Metabolite Values				
↑ cGlu	8.7	mmol/L	[3.0 - 5.4]	
↑ cLac	1.7	mmol/L	[- 1.3]	

State two (2) reasons to explain the hypokalaemia

Model answer

- K^+ sequestered intracellularly in exchange for H^+ to buffer the alkalosis
- K^+ secreted in the distal tubules to preserve H^+ to buffer the alkalosis
- (vomiting of gastric contents containing K^+)

Part e (1 mark)

Why is correction of bicarbonate prior to pyloric stenosis surgery important?

Model answer

- risk of hypoventilation/apnoea post-operatively in the setting of a metabolic alkalosis

Question 14 (12 marks)

A 20 year old female is brought into your ED after having been found in cardiac arrest on a beach in far north Queensland.

Part a (8 marks)

Fill in the table below with four (4) marine envenomations and a mechanism by which they can each cause cardiac or respiratory arrest

Model answer

Marine Envenomation	Mechanism
Box Jellyfish	Cardiac arrhythmia Cardiogenic shock Impaired cardiac contraction Possibly Ca channel mediated Hypertension then CV collapse Decreased coronary blood flow
Blue Ring Octopus	Neurotoxicity (flaccid paralysis) - respiratory failure Hypotension (smooth muscle blockade), bradycardia Tetrodotoxin and blocks Na channels Hypotension (shock state) (1/2)
Stone fish	Hypotension, bradycardia, CV collapse Pulmonary oedema Venom neurotoxic, myotoxic, cardiotoxic, cytotoxic
Sea Snake	Neurotoxicity - respiratory failure Neurotoxin causing paralysis Myotoxic (Myolysins) causing severe rhabdomyolysis - hyperK (1/2)
Irukandji	Toxic cardiomyopathy/cardiac failure/APO Cardiogenic shock Potent neuronal Na channel modulator Induces massive catecholamine release Cardiac failure may be due to HTN or direct myocardial depression
Cone snail	Neurotoxicity - respiratory failure Conotoxin leads to progressive paralysis

Part b (4 marks)

List four (4) features of serum sickness which can occur following antivenom administration for marine envenomation.

Model answer

- Rash (urticarial)
- Joint pain/erythema/swelling
- Muscle pain
- Lymphadenopathy
- Fever
- HA, nausea or vomiting
- Facial/periorbital/peripheral oedema
- Erythema of hands/feet

Question 15 (12 marks)

An 11 month old girl is brought into your rural emergency department with suspected community acquired pneumonia after being unwell for 5 days with fevers and increased work of breathing.

Part a (4 marks)

List four (4) clinical findings that are suggestive of severe respiratory distress.

Model answer

- Irritable/lethargic/altered mental status
 - Increased or reduced RR (tiring)
Marked increase in accessory muscle use/retractions/tripoding/nasal flaring/head bobbing
 - Grunting
 - Hypoxia <90% or cyanosis
 - Significantly increased HR or bradycardia (periarrest)
 - Hypertension or hypotension (late sign, periarrest)
 - Poor air movement/reduced breath sounds
- ** needs to provide 3 findings from different assessment modalities. E.g hypoxia and cyanosis not acceptable*****

Part b (4 marks)

Her vital signs are as follows:

HR	175 bpm
BP	95/68 mmHg
Central capillary refill time	5 seconds
Oxygen Saturations	86% on room air
RR	44
Temperature	38.9° C

She is flat and lethargic

State your next four (4) priorities in her management with appropriate details

Model answer

1. Oxygenation: Hudson mask 6L/NRB at 15L or HFNP O2 aim SpO2 >92% (or something sensible)
2. Ventilatory support e.g HFNP O2, CPAP, prepare for intubation if remains hypoxic/tiring
3. Circulation: Fluid bolus, N/saline 10-20ml/kg, consider early vasopressor (adrenaline)
4. Antibiotics – Ceftriaxone or Cefotaxime (50mg/kg)/flucloxacillin (50mg/kg) (or vanc), cef/azithro (10mg/kg), something sensible
5. Consult retrieval services – needs PICU

*****must address life threats** paracetamol etc not acceptable. This child is critically unwell***

Part c (4 marks)

The decision is made to proceed with intubation.

Complete the table below with appropriate equipment sizes for airway management of this patient.

Model answer

ETT size (cuffed)	4mm (age/4 + 3)
ETT measurement at lips (oral intubation)	12.5cm (Age/2 +12)
Laryngoscope blade and size	Mac or Miller, size 1
NGT size (Fr)	6 or 8 Fr

Question 16 (18 marks)

You receive notification at your Major Trauma Centre of a patient arriving in 15 mins - a 27-year-old male motorbike rider, who T-boned a car at approximately 100Km/ hr. He was propelled across the bonnet landing several meters away. The patient did not lose consciousness and is complaining of severe pelvic and right sided chest pain.

The patient has no significant past medical history, takes no medications, and has no allergies.

His reported vital signs with the ambulance paramedics are:

SBP	90mmHg
HR	105/min
RR	30/min
SpO ₂	92% on room air
Temp	36.7°C
GCS	15

The patient received 100micrograms of intranasal fentanyl, with no other interventions.

Part a (4 marks)

State four (4) steps you make take in preparation for the patient's arrival into your ED.

Model answer

- Trauma call-out / team activation- Critical point
- Assemble a team and equipment. Allocate roles. (ICCs, large-bore IVCs, massive transfuser, C collar, etc)- Critical point
- Call for help- (Inform general surgery, OT, anaesthetics)- Critical point
- Call blood bank– request two units PRBC, thaw FFP, standby for MTP - Critical Point
- Call radiology – to attend trauma bay for trauma series X rays on arrival.
- Prepare for blood tests- Hb, electrolytes, Ca 2+, lactate, coagulation studies, Troponin, VBG

Part b (4 marks)

The patient deteriorates shortly after arrival into the ED.

His vital signs are now:

BP	70/55 mmHg
HR	120/min
RR	32/min
SpO ₂	90% on RA
GCS	14 /15

An eFAST US is negative for intraperitoneal and pericardial fluid but is inconclusive over the chest due to sub-cutaneous emphysema. Chest and pelvic x-rays are rapidly performed.



List four (4) immediate treatment priorities based on the patient's current condition and trauma series X ray.

Model answer

- Decompress right chest- Critical point [Finger thoracostomy to decompress followed by formal ICC post initial resuscitation]
- MTP - Resuscitation with blood products– Critical point
- Cervical spine immobilisation
- Large bore PIVC access/ Central access/ RIC lines.
- Invasive blood pressure monitoring /Arterial line
- Call Interventional Radiology team- Notify potential case for embolization
- Repeat chest X ray - Post decompressions/ICC
- Trauma CT scans – CT brain/ C Spine/ Chest/ Abdomen and Pelvis/ Consider carotid angiogram
- Send blood samples for trauma labs- (FBE, UEC, LFTs, Lipase, Coagulation, INR, Troponin)

Part c (4 marks)

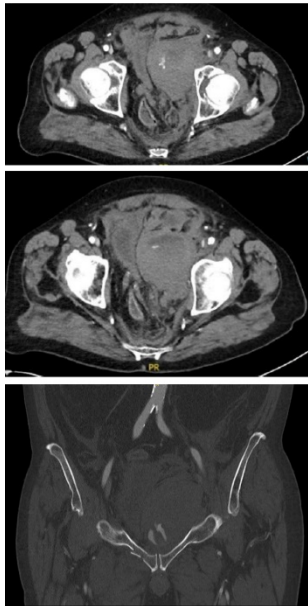
List four (4) laboratory-based target parameters you would use to guide your resuscitation / massive transfusion protocol, in any patient with severe trauma.

Model answer

- pH > 7.2
- Base excess < -6
- Lactate < 4 mmol/L
- iCa²⁺ > 1.1 mmol/L
- Platelets ≥ 50 x 10⁹ /L (>100 x 10⁹ if head injury/ intracranial haemorrhage)
- INR ≤ 1.5
- Fibrinogen > 1.0 g
- Hb > 80

Part d (3 marks)

After initial stabilisation, the patient undergoes CT scans. Three slices of the Pelvic CT are available for review below.



Describe three (3) positive findings on the CT.

Model answer

- Large left pelvic hematoma displacing bladder to the right.
- Active haemorrhage within the hematoma- Critical point
- Fractured right superior pubic ramus

Part e (3 marks)

State three (3) key differences between pre-peritoneal pelvic packing and pelvic angioembolisation in the management of pelvic injury.

Model answer

Preperitoneal Pelvic Packing	Pelvic Angioembolization
Considered if pt going to OT for other intra-abdominal injuries – Critical Point	Useful prior to surgical repair of other (orthopaedic) injuries.
Surgical placement of packs in the peritoneal space- Critical point	Catheter based embolization of an artery- Critical point
Rapid application- Critical Point	Time consuming- Critical point
Widely available in surgical settings	Requires specialised radiology skills + equipment – Critical Point
Effective for broad haemorrhage control in pelvic injuries- Critical point	Effective for specific arterial bleeding in pelvic injuries– Critical point
Immediate control for severe bleeding	Secondary measure for ongoing arterial bleeding

Question 17 (12 marks)

A 42 year old man presents to your ED with a history of palpitations over the last few hours.

Part a (4 marks)

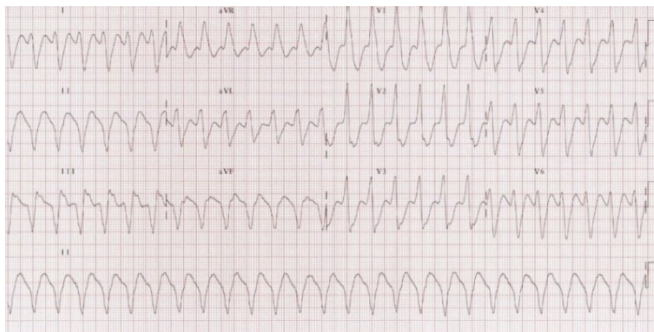
List four (4) questions on history that will help you prioritise his initial investigations and management.

Model answer

1. Current symptoms – chest pain, dyspnoea, dizziness
2. Are palpitations ongoing?
3. Description of palpitations – rapid/slow, reg/irreg
4. History of exertional symptoms incl chest pain, dyspnoea, collapse
5. Personal history of cardiac pathology, MI or arrhythmia
6. Family history of sudden cardiac death or arrhythmia
7. History of cardiac risk factors – smoking, HT, Chol, obesity and management
8. Results of previous cardiac investigations (if any)

Part b (1 marks)

The patient's nurse shows you their ECG. What is your diagnosis?



Model answer

Ventricular tachycardia

Part c (4 marks)

List four (4) features on the ECG to support your diagnosis.

Model answer

- Rapid rate (>130bpm)
- Broad QRS Complexes (~200ms)
- Brugada sign – onset of QRS complex to nadir of S-wave is >100ms
- Josephson's sign – notching of S-wave near nadir (II, III, aVf)

Part d (3 marks)

List three (3) treatment options for this diagnosis (including doses and routes where appropriate).

Model answer

1. Synchronized cardioversion 50-200 Joules biphasic
2. Amiodarone 150-300mg IV OR 5mg/kg IV
3. Lignocaine (Lidocaine) 1-2mg/kg IV

Question 18 (18 marks)

You are the consultant working in a major trauma centre when an 85 year old man is brought in by ambulance from home after a fall. He undergoes CT imaging which reveals 2 right sided rib fractures as well as a right sided neck of femur fracture.

The patient had been treated by his GP for a urine infection over the last 4 days. You learn this is his 3rd fall in 2 months.

His vital signs are as follows:

HR	75bpm
BP	135/72 mmHg
RR	15
SpO ₂	94% on room air
GCS	14 (E4V4M6)

Part a (1 marks)

State a definition of frailty.

Model answer

BGS Definition: This means older people are more likely to experience frailty - a long-term condition in which multiple body systems gradually lose their in-built reserves, resulting in an increased risk of unpredictable deterioration from minor events. The consequences of escalating frailty are adverse outcomes such as disability and its consequences, frequent hospital admissions and increasing demand for long-term social care support.²

Frailty is most often defined as an aging related syndrome of physiological decline characterised by marked vulnerability to adverse health outcomes.

Frailty is a multidimensional geriatric syndrome characterised by a decline of physical and cognitive reserves that leads to increased vulnerability.

Frailty increases with age and is associated with falls, longer stays in hospital, difficulty recovering from illness and surgery, and mortality.

Frailty is theoretically defined as a clinically recognizable state of increased vulnerability resulting from aging-associated decline in reserve and function across multiple physiologic systems such that the ability to cope with everyday or acute stressors is comprised. In the absence of a gold standard, frailty has been operationally defined by Fried et al. as meeting three out of five phenotypic criteria indicating compromised energetics: low grip strength, low energy, slowed waking speed, low physical activity, and/or unintentional weight loss.

Part b (10 marks)

Complete the following table outlining how aging can impact each of the below and a clinical implication of each.

Model answer

	Impact of aging	Clinical Implication
Airway	Increased incidence of Edentulous/ arthritis TMJs/C-spine	Anticipate difficult airway due to reduced mouth opening/neck mobility, difficult BVM may be overcome by placing dentures
Breathing	Reduced resp reserve secondary to reduced resp muscle strength, vital capacity, compliance of chest wall and increased residual volume.	Early supplemental O2/resp support, apneic O2 for intubation, early spirometry to reduce atelectasis, ensure optimal analgesia to reduce splinting of respirations.
Circulation	Increased peripheral vasc resistance, decreased cardiac sensitivity to beta adrenergic stimuli and via medications e.g. beta blockers. Reduced baroreceptor sensitivity with resultant blunting to tachycardic response to hypovolaemia. Increased reliance on stroke volume for rise in cardiac output. Reduced pain sensation and increased abdominal wall laxity Increased incidence of primary and secondary cardiac ischaemia Increased pre-morbid use of hypotensive, antiplatelet and anticoagulant agents	Increased risk of delays to recognising shock, need careful physical exam, metabolic marker of tissue hypoperfusion, timely identification of haemorrhage, timely achievement of haemostasis, need for early fluid resus to augment ventricular filling.
Disability	Cortical atrophy with increased susceptibility of bridging veins to shearing and SDH	Increased incidence of ICH in setting of normal GCS.
Exposure	Premorbid malnutrition and immunosensence.	Increased risk of hypothermia, pressure injuries and infection

Part c (7 marks)

State seven (7) factors you will take into consideration when planning a discussion on goals of care for this patient.

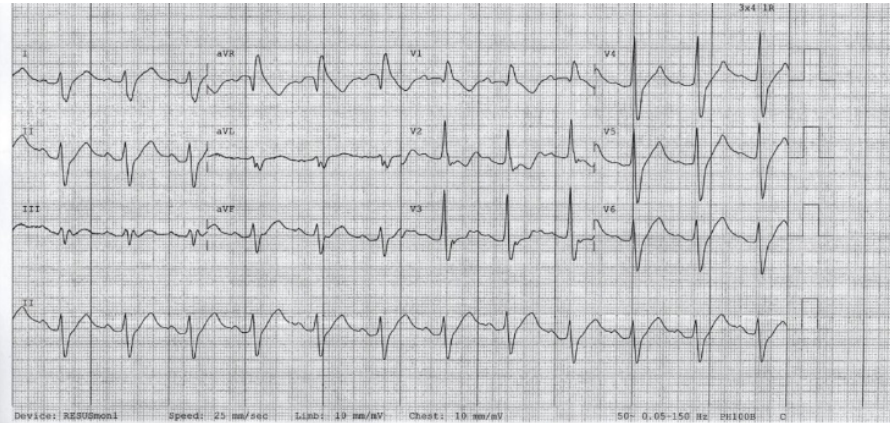
Model answer

- Environment: Cubicle, Relatives Room
- Rest of Department-hand off phone
- Members of meeting- patient, family, NOK, SW, nursing staff
- ACD/mPOA, previously stated wishes
- Values
- Pre-morbid function

- Expected course of disease
- PMHx
- Religious and cultural beliefs.

Question 19 (12 marks)

A 20-year-old is brought to your ED unconscious following a suspected carbamazepine overdose.



Part a (3 marks)

List three (3) ECG features that suggests the patient has taken a toxic amount of carbamazepine.

Model answer

- Broad QRS complex - ~160ms
- Prolonged QT interval - ~480ms
- Dominant R-wave in lead aVR
- Markedly abnormal cardiac axis (north-west)

Part b (4 marks)

Apart from carbamazepine, list four (4) medications that in overdose may cause this ECG appearance. Each medication must be from a different drug class.

Model answer

- Amitriptyline, clomipramine, imipramine (TCAs)
- Quinidine, procainamide, flecainide, encainide (anti-arrhythmic)
- Bupivacaine; ropivacaine; lignocaine (Las)
- Chloroquine, hydroxychloroquine, quinine (anti-malarials)
- Dextropropoxyphene (opioid analgesic)
- Propranolol (beta-blockers)

Part c (3 marks)

Sodium bicarbonate is administered in order to manage the abnormalities seen on the ECG. List three (3) biochemical adverse effects associated with sodium bicarbonate infusion.

Model answer

- Hypokalemia
- Ionised hypocalcemia
- Alkalemia
- Hyponatremia
- Hyperosmolality

Part d (2 marks)

Apart from sodium bicarbonate, list two (2) other specific therapies that may be considered in severe carbamazepine overdose.

Model answer

- Haemodialysis
- Multi-dose activated charcoal

Question 20 (12 marks)

A 28 year old male carpenter, with no allergies, presents to your Emergency Department, with fever and severe arm pain. He sustained an open wound to his right hand in the preceding fortnight and you suspect he has Necrotising Fasciitis.

Part a (3 marks)

Prescribe your antibiotic regime for this patient.

Model answer

For empirical therapy for necrotising skin and soft tissue infection not associated with water exposure, in combination with surgical debridement, as a three-drug regimen, use:

1	meropenem 1 g (child: 20 mg/kg up to 1 g) intravenously, 8-hourly	  
OR		
1	piperacillin + tazobactam 4+0.5 g (child: 100 +12.5 mg/kg up to 4+0.5 g) intravenously, 6-hourly	  
PLUS with either of the above regimens		
	vancomycin (adult and child) 25 to 30 mg/kg intravenously, as a loading dose; see Principles of vancomycin use for subsequent dosing and principles of use	  
PLUS EITHER		
1	clindamycin 600 mg (child: 15 mg/kg up to 600 mg) intravenously, 8-hourly	  
OR		
2	lincomycin 600 mg (child: 15 mg/kg up to 600 mg) intravenously, 8-hourly.	  

Part b (4 marks)

You decide to explore the effectiveness of the LRINEC Score for predicting upper and lower extremity Necrotising Fasciitis.

List four (4) components of your chosen framework/model when formulating your research question.

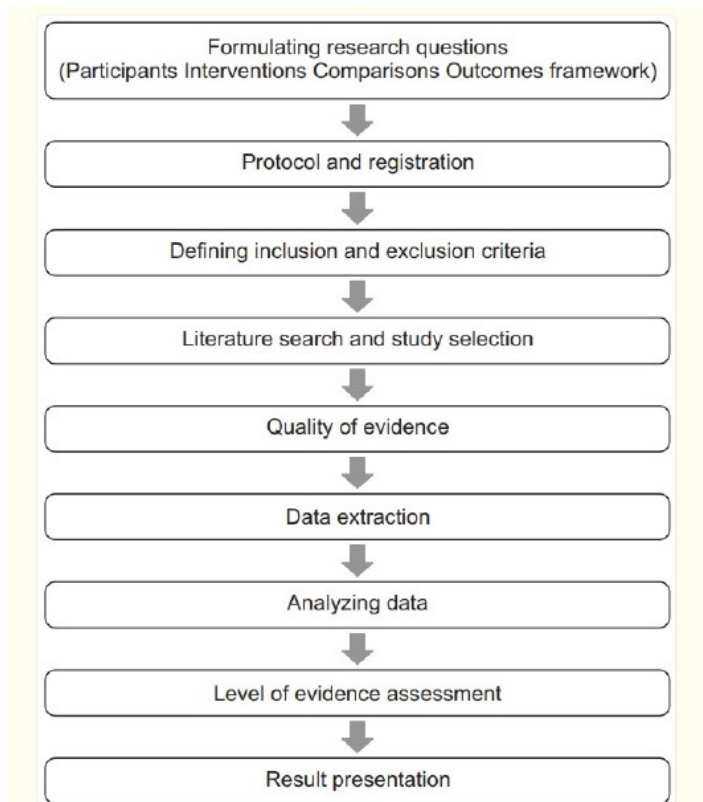
Model answer

PICO framework :

Patient/population/problem —> Intervention/exposure —> Comparison —> Outcome

Part c (4 marks)

State four (4) other steps, after formulating the research question, that you would consider to conduct a Systematic Review and Meta-Analysis on this topic.

Model answer**Part d (1 marks)**

State the difference between A Systematic Review and Meta-Analysis.

Model answer

A systematic review is an objective, reproducible method to find answers to a certain research question, by collecting all available studies related to that question and reviewing and analyzing their results.

A meta-analysis differs from a systematic review in that it uses statistical methods on estimates from two or more different studies to form a pooled estimate

Question 21 (12 marks)

Your ED registrar has seen a 60 year old with unilateral leg swelling, they suspect a Deep Vein Thrombosis (DVT).

Part a (3 marks)

State three (3) risk factors on history that give a positive score on the WELLS criteria for DVT (write timings of conditions if relevant)?

Model answer

- Active cancer,
- bedridden for more than 3 days,
- major surgery within 4 weeks,
- paralysis/immobilization of lower extremities,
- Previously documented DVT

Part b (3 marks)

List three (3) clinical features in the affected limb seen in DVT associated with Phlegmasia Cerulea Dolens.

Model answer

- Sudden onset colour change in leg,
- Severe venous congestion,
- Venous gangrene, Shock,
- Arterial insufficiency,
- Fluid sequestration

Part c (2 marks)

Apart from allergy, list two (2) contraindications to prescribing FXa inhibitors (ie Dabigatran, apixaban, rivaroxaban) and choosing warfarin instead?

Model answer

- Significant hepatic disease (ie Child-Pugh B/C),
- severe renal impairment/ dialysis,
- concomitantly treatment with strong inhibitors of CYP3A4 or P-glycoprotein such as HIV antiretrovirals (protease inhibitors) or antifungals azole antimycotics (ketoconazole)

Part d (2 marks)

List two (2) conditions that would benefit from long term (ie >6 months) use of anticoagulation in DVT?

Model answer

- Unprovoked DVTs,
- active malignancy,
- multiple recurrent DVTs,
- severe burden of disease either extensive DVT or large PE,
- known congenital or ongoing thrombophilia

Part e (2 marks)

List one (1) acquired thrombophilia condition and 1 inherited thrombophilia condition that can provoke a DVT.

Model answer

- F. V leiden,
- prothrombin, antithrombin 3 deficiency, protein C/S deficiency,
- Factor 13 mutation, antiphospholipid syndrome,
- Acquired- Heparin induced thrombocytopaenia

Question 22 (12 marks)

A 27 year old lady presented to your ED overnight following an apparent seizure. This patient is well known to your ED and frequently presents following a seizure. She has previously been worked up by the neurology department thoroughly and is clinically appropriate for discharge home.

Your Registrar approaches you to ask for assistance in discharging her because she is refusing to leave.

Part a (5 marks)

List five (5) features on assessment that suggest a seizure is a Psychogenic Non-Epileptiform Seizure.

Model answer

Will accept negatives (EG: Lack of Post-ictal Confusion)

Max 0.5 marks for “double up” / same concept (EG: lack of injury and lack of tongue bite)

Do not accept features unrelated to the seizure activity itself (IE: gender, age, past medHx) as question was on features of the seizure

TABLE 1. Clinical Features That Aid the Diagnosis of Psychogenic Nonepileptic Seizures (PNES) vs Epileptic Seizures (ES)		
Clinical features favoring PNES	Clinical features favoring ES	Insufficient evidence
• Long duration: > 2 minutes highly suggestive (excluding status epilepticus) • Fluctuating course: brief pauses in rhythmic movement, change in tempo over time • Asynchronous (nonrhythmic) movements: arms and legs jerking at separate times • Pelvic thrusting: suggests PNES but can be seen in frontal lobe ES • Side-to-side head or body movements: use with caution as can sometimes occur in partial or frontal lobe ES • Forced-eye closure • Ictal crying/weeping • Memory recall of items presented during ictus	• Occurrence out of EEG-confirmed sleep • Postictal confusion • Noisy/labored breathing after generalized convulsive event	• Gradual onset: commonly seen in PNES and focal ES • Nonstereotyped events • Flailing/thrashing • Opisthotonus: backward arch of head, neck, and spine • Tongue biting • Urinary incontinence

Adapted from Avbersek et al. (2010) and Perez & LaFrance (2016).

Part b (2 marks)

Upon your review, the patient is distressed and reports that your Registrar accused them of “faking it”. She reports she overheard the Registrar laughing about her, and that he told the nursing staff to “stop giving her attention”.

State two (2) points about the meaning of Trauma-informed Care.

Model answer

1 mark for recognising impact of prior trauma on patient presentation/holistic overview of patient

1 mark for actively avoiding re-traumatisation

Guiding Statements:

Trauma is defined as: “an event, a series of events or a set of circumstances that is experienced by an individual as physically or emotionally harmful and has lasting adverse

effects on a person's mental, physical, social, emotional or spiritual well-being". There is a high prevalence of trauma in the lives of people accessing mental health services.

Trauma-informed care is based on the principles of safety, choice, collaboration, trust and empowerment. It emphasises safety and minimises re-traumatisation for both service providers and people accessing services.

--

Trauma-informed care seeks to:

- Realize the widespread impact of trauma and understand paths for recovery;
- Recognize the signs and symptoms of trauma in patients, families, and staff;
- Integrate knowledge about trauma into policies, procedures, and practices; and
- Actively avoid re-traumatization.

Part c (5 marks)

State five (5) points about your immediate actions in response to the patient's complaint.

Model answer

- # Unreserved apology to patient
- # Advise of formal complaints process
- # Feedback directly to Registrar – unacceptable behaviour
- # Feedback to DEMENT / Registrar supervisor

Anything else reasonable as part of "immediate" response (Assuming ownership of ongoing care, referral to Neuro/Psych/FND followup, enquiry about Registrar mental health/wellbeing, advise Registrar to contact indemnity etc)

Answers should be targeted to this patient on this shift.

Label inappropriate behaviour

Avoid generic complaints response EG: "ensure patient safety" "develop a policy on FND" "consult stakeholders"

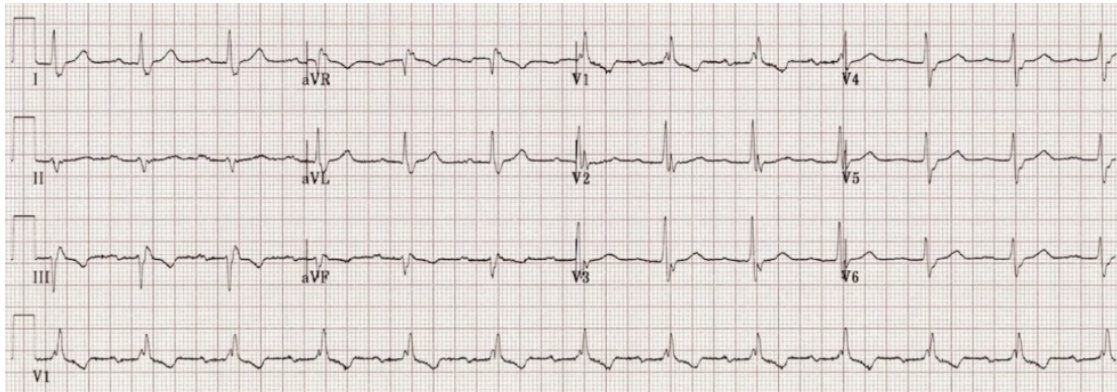
Question 23 (12 marks)

A 73 year old woman is brought in by ambulance following a syncopal episode. Her past history includes Type II DM, hypertension and Ischaemic Heart Disease.

Medications include atenolol, aspirin, amlodipine, metformin, and atorvastatin.

Her vital signs on arrival are all within normal limits and her GCS is 15.

An ECG is done on arrival.



Part a (3 marks)

List three (3) abnormalities noted on this ECG.

Model answer

1. Right bundle branch block
2. Left axis deviation
3. First degree AV block

Part b (1 marks)

What diagnosis are you most concerned about?

Model answer

Trifascicular block

(will accept bifascicular block + first degree AV block)

Part c (4 marks)

In cases of syncope, list four (4) other abnormal findings you would search for on an ECG, that may assist with diagnosis.

Model answer

1. Prolonged QT interval
2. Brugada
3. Changes consistent with HCM
4. Delta wave – WPW
5. Conduction block

Part d (4 marks)

List four (4) other causes of syncope that you would consider in this 73 year old woman.

Model answer

1. Drug effects – Beta blocker, Ca channel blocker
2. Arrhythmia – tachy or brady
3. Hypoglycaemia
4. Vertebro-basilar insufficiency/stroke
5. PE
6. Alcohol effects
7. AMI

Question 24 (12 marks)

You are reviewing a 4-year-old, in your ED, who has presented from the GP with hip pain and fever.

Part a (12 marks)

Please fill in the below table with three (3) differentials and the important features of each.

Model answer

	Osteomyelitis	Septic arthritis	Pyogenic myositis	Discitis	Transient synovitis
Fever	May be absent	Usually present	Usually present	Typically absent or low-grade	Typically absent or low-grade
Onset	Subacute onset of limp, non-weight bearing or refusal to use limb	Acute onset of limp, non-weight bearing or refusal to use limb	Subacute onset. May involve limp	Subacute onset of irritability and back pain. May involve limp or refusal to crawl or walk	Subacute or acute onset of limp. Recent recovery from viral illness
Localised features	Limb pain, may be poorly localised	Hot, swollen, painful, immobile joint	Pain usually well localised. May have abdominal pain (psoas involvement)	May show: refusal to bend forward, loss of lumbar lordosis, percussion tenderness over spine, hip pain, lower limb neurology, ileus (higher lesions)	Weight bearing, with limp
Systemic features	With or without systemic illness	Systemic symptoms usually more severe	Systemic symptoms usually more severe	Irritable, with or without systemic illness	Systemically well. Recent viral symptoms

Question 25 (18 marks)

An emergency alarm is activated in your ED after a rapid labour delivery of a preterm baby in the carpark.

Part a (1 mark)

What is the recommended length that an umbilical cord should be clamped at in a newborn who is at risk of needing resuscitation?

Model answer

At least 3 to 4 cm length of umbilical cord below the cord clamp

Part b (2 marks)

State two (2) methods to maintain normothermia in a preterm newborn.

Model answer

- Radiant warmer aiming for body temperature between 36.5 and 37.5
- Place the newborn immediately in a polyethylene bag without drying (it is important to mention without drying)

Part c (2 marks)

This is an image of a neopuff infant resuscitator. What are the numbered parts of the resuscitator used for?



Model answer

- 1) cover for the valve to set the maximum PIP Or the value to set the maximum PIP (both answers are acceptable)
- 2) Valve or gauge to set PIP (peak inspiratory)

Part d (2 marks)

Where should a pulse oximetry be placed on a newborn and why is this placement important?

Model answer

- Right hand or right wrist
- To measure the preductal blood oxygenation

Part e (2 marks)

After one minute of resuscitation, the spontaneously breathing preterm newborn has signs of respiratory distress so you decide to use CPAP.

What would be your initial CPAP pressure settings and your FiO₂?

Model answer

- 5 cm H₂O
- Room air (21%) or blended air and oxygen up to O₂ saturation of 30%

Part f (1 marks)

After 1 min, you decide to increase the PEEP (Positive End Expiratory Pressure) using your neopuff infant resuscitator. How do you achieve this?

Model answer

By dialling the tap at the top of the T-piece

Part g (2 marks)

After 2 min of resuscitation, you decide to secure the airway. What size and type of blade are you going to use for the patient?

Model answer

- Straight blade
- Size 0 (7.5cm) or 00 (6cm)

Part h (4 marks)

At the conclusion of the resuscitation, you are asked to perform a debriefing session.

List four (4) major components of a hot debriefing session.

Model answer

- (IRASTT framework - ANZCA)
Introduction and intention
Reactions phase
Analysis phase
Summary phase
Take homes phase
Thanks you phase
- Or STOP framework
Summarise the case
Things that went well
Opportunities to improve
Points of action and plans going forward
Is a code debrief required

Part i (2 marks)

State an advantage and disadvantage of a cold debrief compared to a hot debrief.

Model answer

- Cold debriefs allow more data to be collected, additional staff may be able to attend, expert facilitators may be available, and staff have had a chance to reflect
- However, compared with “hot debriefs” the events may not be clearly recalled by participants, some participants may not be able to attend, immediate support for staff is not provided, and learning from the event may be delayed.

Cold debriefs are best viewed as complementary to hot debriefs, and may be informed by the hot debrief.

Question 26 (12 marks)

A 65yr old male presents via ambulance with severe shortness of breath. The patient has a past history of multiple medical comorbidities and recently diagnosed lung cancer.

Obs:

BP	70/40 mmHg
HR	142 Sinus Tachycardia
RR	40 breaths/min
Temp	37.8 °C
Sats	86% on 10L via non rebreather mask

Part a (2 marks)

State two (2) limitations for the use of venous blood gases vs an arterial blood gas for this patient.

Model answer

- Shocked state- pH & pCO₂ correlates poorly
- A-a gradient cannot be calculated – A-a may guide diagnosis
- PO₂ correlates poorly

Part b (4 marks)

You decide to perform a POCUS exam. Utilising the “SLICE” protocol, for each component please STATE one (1) LIKELY positive finding for this patient’s clinical presentation .

Model answer

Component of SLICE protocol	Finding
Lung	Symmetrical B-pattern- APO/ interstitial fibrosis Tension pneumothorax Pulmonary consolidation Massive pleural effusion
IVC	Distended > 2.5cm
Cardiac	Pericardial effusion with tamponade- - RA collapse in diastole, RV early diastole Massive clot in RA/ RV PE- Enlarged RV, R free wall motility with sparing of the apex Acute MI- regional wall abnormalities
Extra	Intrabdominal bleeding secondary to trauma Peripheral DVT AAA Cholecystitis Pyelonephritis- obstructed kidney

Part c (4 marks)

Utilise the “SLICE” protocol to LIST four (4) LIKELY conditions that may lead to false positive findings for this patient.

Model answer

Component of SLICE protocol	Condition leading to false positive
Lung	RM ETT- L PTX
IVC	Right heart failure Mechanical ventilation
Extra- FAST scan	Peritoneal metastases CLD- Ascites
Cardiac	Dilated cardiomyopathy Prior MI

Part d (2 marks)

STATE two (2) ways in which the “SLICE” protocol differs from the “RUSH” protocol.

Model answer

- Begins with lung vs heart in RUSH ends with lung
- By starting with lung- designed to guide steps of resuscitation- esp can fluids be given?
- Starting scan is lung which can be performed in any position
- RUSH- set list of scanning points vs SLICE – stop if findings, extra studies as indicated- minimises time of study
- SLICE not as good at differentiating hypovolaemic and distributive shock
- Rush just for Shock, SLICE can be used for shock but in addition for the SOB or traumatised pt
- Diagnostic and assessment and to guide investigations and intervention

Question 27 (12 marks)

You have just performed a Lumbar Puncture on a 45 year old man with a 2 day history of a headache.

Here is an image of the samples you collected:



Credit to Dr M Masilamany, Frankston Hospital.

Part a (1 mark)

What is the likely diagnosis?

Model answer

Subarachnoid haemorrhage

Part b (6 marks)

Complete the table of suggestive CSF findings for each differential. A range can be provided where appropriate.

Model answer

	White cell count	Red cell count
Bacterial meningitis	>500 or thereabouts	<10
Viral meningitis	>500 or thereabouts	<10
Subarachnoid haemorrhage	<10	>500 or thereabouts

Part c (5 marks)

Describe a clinical grading system for this disease. State five (5) points in your answer.

Model answer

- World Federation of Neurosurgeons (Clinical Grading)
 - o I GCS 15/15 no motor deficit
 - o II GCS 13 -14 no motor deficit
 - o III GCS 13 – 14, with motor deficit
 - o IV GCS 7 - 12, with motor deficit
 - o V GCS 3 – 6, with or without deficit
- Fisher (CT grading)
 - o I No blood
 - o II Diffuse deposition of SAH without clots/layers > 1mm
 - o III Localised clots/layers of blood ≥ 1mm
 - o IV Diffuse or no subarachnoid blood but intracerebral or intraventricular clots.
- Hunt and Hess (Clinical Grading)
 - o I Asymptomatic or mild headache
 - o II Moderate to severe headache, meningism and no weakness
 - o III Mild alteration in mental state
 - o IV Depressed level of consciousness and/or hemiparesis
 - o V Posturing or comatose.

Question 28 (12 marks)

A 24 year old woman represents to your ED, for the third time this month, following a syncopal event. Previous syncope assessments have not found an ECG, lab pathology or radiological abnormality. You note that the patient appears very underweight and suspect a possible underlying eating disorder.

Part a (6 marks)

Complete the table below listing three (3) findings, other than weight/BMI, with a justification, that you would look for **on examination** to support your suspicion that this patient may have an eating disorder.

Model answer

	EXAMINATION FINDING	REASONING
	Loss of subcutaneous fat	Disproportionate loss of weight to height prior to growth being disturbed Over reliance on fat stores as energy source
	Hypotension	Note NOT contraction of intravascular space (do not accept) but accept loss of vascular tone Predominantly due to diminished CO (multifactorial)
	Bradycardia	Predominantly related to electrolyte disturbance (mainly K+) Can be due to thyroid disturbance so accept this
	Hypothermia	Loss of adipose tissue / subcutaneous fat as a thermoregulation layer OR also accept Central action of neurohormonal axis on central temperature set point
THREE OF THESE FINDINGS WITH ASSOCIATED REASONING	Hair Loss	Multifactorial so accept diversion of energy use away from non-vital functions such as hair growth OR Under nutrition with loss of access to core minerals for hair growth (note vit A E or selenium are incorrect) in particular B2, folate, biotin, iron, zinc, fatty acid
	Parotid Gland Swelling	Consequence of malnutrition specifically related to purging behaviour. Two hypotheses booth accepted - regurgitation of enzymes stimulating amylase with vomiting OR autonomic peripheral neuropathy increasing zymogen granules in acinar cells
	Carotenaemia	Lipid metabolism required for the proper storage and processing of carotenoids
	Insensitivity to Pain	Drive for thinness - hardwiring centrally due to distorted beliefs re weight (i.e. type of conversion disorder)

	Dental	Acid vs enamel in purging Halitosis due to change in saliva production and mouth hygiene
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Part b (6 marks)

List SIX (6) indications for inpatient care of this patient.

Model answer

- **Medical**
 - o heart rate < 40 bpm
 - o BP < 90/60 mmHg
 - o symptomatic hypoglycaemia
 - o K⁺ < 3 mmol/L
 - o T < 36 C
 - o dehydration
 - o HR < 40
 - o sodium < 130 mmol/L
 - o phosphate < 0.5 mmol/L
 - o prolonged QTc
- **Weight related**
 - o weight < 75% of expected
 - o weight loss of > 1 kg in a week
 - o unable to eat independently
 - o requiring NG feeding
- **Psychological**
 - o failure of outpatient treatment
 - o severe coexisting psychiatric disease