



Model Answers — NSW Practice SAQ Trial 2023.1

Contents

Question 1 (18 marks)	2
Question 2 (18 marks)	4
Question 3 (12 marks)	6
Question 4 (12 marks)	8
Question 5 (12 marks)	9
Question 6 (12 marks)	11
Question 7 (12 marks)	12
Question 8 (12 marks)	17
Question 9 (12 marks)	19
Question 10 (18 marks)	21
Question 11 (18 marks)	23
Question 12 (12 marks)	25
Question 13 (12 marks)	27
Question 14 (12 marks)	29
Question 15 (12 marks)	31
Question 16 (12 marks)	32
Question 17 (12 marks)	33
Question 18 (12 marks)	35
Question 19 (18 marks)	37
Question 20 (18 marks)	39
Question 21 (12 marks)	41
Question 22 (12 marks)	43
Question 23 (12 marks)	45
Question 24 (12 marks)	47
Question 25 (12 marks)	49
Question 26 (12 marks)	50
Question 27 (12 marks)	52

Question 1 (18 marks)

You are the consultant in charge of the Emergency Short Stay Unit. You have just received handover from the night shift registrar when the nurse asks you to immediately review a 43-year-old female who is receiving a blood transfusion for anaemia.

She is now 30 minutes into her 2nd unit of packed red blood cells.

She has become unwell in the past 5 minutes with dyspnoea.

Her vital signs are:

Temp:	38.6°C
HR:	135 bpm
BP:	98/62
RR:	27
SpO ₂ :	90% (8L via Hudson mask)
GCS:	15

Part a (3 marks)

List three (3) transfusion-related adverse reactions which could explain this presentation.

Model Answer

1. Acute haemolytic transfusion reaction
2. TRALI
3. Febrile non-haemolytic transfusion reaction
4. Anaphylaxis
5. TACO (cardiogenic pulmonary oedema)
6. Transfusion-transmitted bacterial infection / sepsis

Part b (5 marks)

List five (5) immediate interventions you would perform for this patient.

Model Answer

1. Stop the transfusion (1 mark)
2. Investigations: (1 mark)
3. Check blood unit and patient compatibility
4. Obtain new IV access & send bloods including new group & hold, coagulation profile, haemolytic screen & culture
5. Send blood unit to blood bank for culture
6. Respiratory support: (1 mark)
 - a. High-flow oxygen (non-rebreather)
 - b. Plan for deterioration (NIV or RSI)
7. Optimise haemodynamics: (2 marks)
 - a. IV fluid bolus (10ml/kg or equivalent), repeat x3, with appropriate end-points mentioned.
 - b. Empiric broad-spectrum IV antibiotics (if sepsis suspected)
Flucloxacillin/Gentamicin or Tazocin or similar.
 - c. Vasopressors for fluid refractory shock
Noradrenaline commencing at 0.1mcg/kg/min & titrated to MAP>65mmHg

Part c (5 marks)

You decide to send a haemolysis screen on this patient.

Complete the table listing five (5) investigations you would order in this screen and the expected results should haemolysis be present.

Model Answer

Test (0.5 mark each)	Result in haemolysis (0.5 mark each)
Direct antiglobulin test (DAT)	Positive
LFTs (Bilirubin)	Elevated
Haptoglobin	Reduced
Lactate dehydrogenase	Elevated
FBC (haemoglobin)	Reduced
Blood film	Schistocytes, spherocytes

Part d (5 marks)

You review the patient's notes.

She was referred to the Emergency Department by her GP with fatigue and outpatient bloods confirming anaemia. She has a history of menorrhagia having been previously diagnosed with dysfunctional uterine bleeding, but nil current active bleeding. She has no other past medical history, takes no regular medications and is not pregnant. She has never received a blood transfusion previously.

Prior to transfusion, her blood results were as follows;

Hb	89 g/L	
Plt	370 x 10 ⁹ /L	
MCV	70 fL	(80-100 fL)
MCH	25 pg	(27-32 pg)
Iron	8 mmol/L	(8-30 mmol/L)
Ferritin	26mg/L	(30-150 m/L)
Transferrin	3.6 g/L	(1.8-3.5 g/L)
Transferrin Saturation	13%	(15-45%)

Outline the main points in your discussion with the registrar

Model Answer

- Ensure appropriate timing/environment (minimise delay from event to feedback but NOT at end of night shift)
- Review case/notes
- Establish indication for transfusion, noting pt was on 2nd unit
- Discuss that in otherwise well, healthy young pt, transfusing at Hb 89 usually inappropriate
- Dosage – single unit PRBCs then review is considered best practice for most pt when transfusion indicated
- Other options eg iron supplementation, IV infusion/PO
- DUB/Menorrhagia Mx eg Norethisterone (Primolut), TXA
- Review AUS/NZ transfusion guidelines
- Recommend study resources eg blood.gov.au modules, ARC/Lifeblood, local guidelines

Question 2 (18 marks)

A 47 year old male is brought into the resuscitation bay of your trauma centre by paramedics with a stab wound to the left side of his chest.

He is agitated, pale and diaphoretic.

Vital signs:

HR	128/min
BP	90/-
RR	28/min
Sats	98% on 15L O2 NRBM

A trauma-call was activated prior to the patient's arrival and the team has been assembled.

Part a (2 marks)

List two (2) indications for Emergency Resuscitative Thoracotomy

Model Answer

1. Penetrating chest/epigastric trauma with loss of output for <15mins
2. Penetrating chest/epigastric trauma with profound hypotension <70mmHg despite blood resuscitation & pleural decompression
3. Blunt trauma with confirmed cardiac tamponade and loss of vital signs in the ED

Part b (2 marks)

List two (2) contraindications (excluding the reverse of above points) for Emergency Resuscitative Thoracotomy

Model Answer

1. Other unsurvivable injuries
2. Staff not trained
3. Penetrating abdominal trauma without cardiac activity
4. Advanced age/comorbidities

Part c (5 marks)

The patient becomes unresponsive and his systolic blood pressure is now 60mmHg.

Outline your immediate management as you prepare for thoracotomy

Model Answer

1. Obtain intravenous access & **commence blood transfusion** (O-negative blood initially, then cross matched)
 - a. **Activate massive transfusion protocol (MTP)**
2. Administer TXA (slow IV infusion, 1g over 10 minutes), followed by second infusion (1g in 100mL over 10 hours).
3. **Intubate** (RSI) with details - best operator, first pass.
 - a. Pre-load first !!
 - b. Reduced sedative dosing (No sedation also suitable)
 - c. Appropriate NMJB dose (1.5mg/kg Rocuronium minimum)
 - d. Prepare for arrest, post institution of positive pressure ventilation
4. **Pleural decompression (or exclusion of tension pneumothorax)**
 - a. Needle decompression (temporising only)

- b. Open vs tube thoracostomy
 - c. Ultrasound for exclusion
5. Consider pericardiocentesis as temporising measure only
 - a. Acknowledge high failure rates (clot!)
6. Alert Cardiothoracic Surgeon, Anaesthetics, OT...

Bold to pass-

Part d (5 marks)

List five (5) therapeutic interventions you could undertake once access to the thoracic cavity is achieved

Model Answer

1. Pericardotomy & release of tamponade
2. Identification and closure of cardiac laceration
3. Compression/cross-clamping of descending thoracic aorta
4. Internal cardiac compressions
5. Management of pulmonary haemorrhage (hilar twist or tie off vessels)
6. Control of bronchovenous air embolism
7. Right atrial catheterisation facilitating IV fluids/blood products administration

Part e (4 marks)

List two (2) advantages and two (2) disadvantages for utilising either the anterolateral or clamshell thoracotomy approach

Model Answer

	Anterolateral	Clamshell
Advantages	• direct and quick access to heart/pericardium • Easy to close • Less morbidity assoc.	• Greater exposure for simultaneous interventions • Access both pleural cavities • Better performance/easier for non-surgeons
Disadvantages	• Limited access • Unfamiliar anatomy • Limited interventions (esp. Right chest)	• Difficult wound closure • Post-op morbidity (pain)

* ½ mark for each correct answer.

Question 3 (12 marks)

A 42 year old woman presents with a sudden onset severe headache.

This is a slice of her CT brain



Part a (4 marks)

List four (4) abnormalities on her CT

Model Answer

- SAH with blood seen in suprasellar cisterns + sylvian fissure + frontal fissure
- Blood in 4th ventricle
- Evidence of hydrocephalus- dilated temporal horns of lateral ventricles
- Giant ACA aneurysm
- Loss grey white differentiation/ effacement of sulci

Part b (6 marks)

She has been safely intubated for decreased level of consciousness in preparation for retrieval to the neurosurgical centre who have accepted her care. The retrieval team will be arriving in 30 minutes.

Her observations are:

HR	85/minute
BP	135/80

Pupils mid-size and reactive bilaterally

List six (6) interventions to minimise secondary brain injury in preparation for the arrival of the retrieval team

Model Answer

- **Elevate head of bed 30 degrees**
- **Avoid tight tapes/ties**
- **Adequate sedation titrated to HR/BP**
- Oxygenation - maintain O2 sats 92-95
- **low normal ETCO2 ~35, TV 6ml/kg**
- NGT
- IDC
- Nimodipine 60mg Q4hr NG or IV in liaison with Neurosx
- Ensure euglycaemia, normothermia

Bold to pass

Part c (2 marks)

Her BP increases to 176/89 with no change in her heart rate or pupillary findings.

Describe your management of her blood pressure including drug doses and endpoints.

Model Answer

- Increase sedation
- Specific anti-HT therapy with appropriate drug and dose –suggested agent in most guidelines IV labetalol
- Target SBP <160 or MAP <110 (aim balance risk ischaemia vs rebleeding)

Ref:

EmCrit.org

Neurocritical care society guidelines

AHA/ASA guidelines

**Note LITFL states 140 SBP target but references do NOT support this

Question 4 (12 marks)

You are managing a 2-month old baby in cardiac arrest after being found unresponsive in their cot. The resuscitation has been ongoing for 40 minutes and the baby has remained in asystole since arriving in the Emergency Department.

Part a (3 marks)

List three (3) potential advantages of having the parents present during the resuscitation

Model Answer

- Parents can see that all efforts have been made
- Improves ability to accept death and deal with grief
- Reduces risk of litigation
- Improves professional behaviour of staff
- Opportunity to say good-bye

Part b (3 marks)

List three (3) potential disadvantages of having the parents present during the resuscitation

Model Answer

- Needs designated staff member to support family
- Potential for parental interference
- Distress for parents seeing invasive procedures and other intervention
- Increase stress for staff providing resuscitative care

Part c (6 marks)

List six (6) factors that should be considered prior to terminating resuscitation

Model Answer

- Downtime prior to commencement of resuscitation (eg presence of rigor mortis)
- Have all reversible causes been identified and treated
- Underlying severe comorbidity or terminal disease
- Severe biochemical derangement (pH < 7.35, K > 5.5)
- Has there been any response to treatment during resuscitation
- Duration of resuscitation with no evidence of cardiac output
- Persistently low end tidal pCO₂ (less than 10-15mmHg)
- Has a senior clinician been involved in managing the arrest (phone or in person)
- Is there team agreement the further resuscitation is futile

Question 5 (12 marks)

A 51 year old female presents to your Emergency Department with palpitations. An ECG shows an irregular narrow complex tachycardia which is confirmed to be atrial fibrillation with a rapid ventricular response.

Part a (4 marks)

Complete the table listing two (2) causes (other than atrial fibrillation) of an irregular narrow complex tachycardia and list two (2) ECG features for each

Model Answer

	Conditions	ECG feature 0.5 marks each feature
1	Atrial flutter with a variable rate block	Inverted sawtooth pattern of flutter waves in II,III, aVF Upright flutter waves in V1 Regular atrial activity at 300bpm Loss of isoelectric baseline
2	Multifocal atrial tachycardia	3+ distinct p wave morphologies in the same lead Preserved isoelectric baseline between p waves Irregular PR intervals

Part b (3 marks)

List six (6) factors which increase the risk of stroke in atrial fibrillation

Model Answer

- C Congestive heart failure
 - H Hypertension
 - A Age >75
 - D Diabetes
 - S Stroke or TIA or thromboembolism
 - V Vascular disease
 - A Age 65-75
 - Sc Sex category (female)
- ½ mark for each

Part c (2 marks)

List four (4) factors which increase the risk of major bleeding in patients taking anticoagulants for atrial fibrillation

Model Answer

- H Hypertension
 - A Abnormal renal / liver function
 - S Stroke
 - B Bleeding tendency
- ½ mark for each

- L Labile INR on warfarin
- E Elderly (Age 65+)
- D Drugs - Aspirin, NSAIDS, Alcohol

Part d (3 marks)

List three (3) patient factors that would favour a rhythm controlled approach for atrial fibrillation with rapid ventricular response

Model Answer

Haemodynamically unstable

Young

First presentation

Onset <24 hours

No structural / valvular heart disease

1 mark each

No precipitant cause

Normal electrolytes

Normal thyroid function

Intolerable symptoms

Question 6 (12 marks)

A 35-year-old female with a known history of multiple sclerosis (MS) presents with unilateral eye pain

Part a (4 marks)

List four (4) clinical features you may find in a patient with optic neuritis

Model Answer

- Eye pain, worse w movements
- Reduced visual acuity
- Loss of colour vision out of proportion to loss of visual acuity (particularly red)
- Visual field defect
- RAPD
- Fundoscopy – optic disc oedema, disc pallor, peripapillary haemorrhage

Part b (3 marks)

List three (3) other possible ophthalmological manifestations of multiple sclerosis

Model Answer

- Internuclear ophthalmoplegia
- Uveitis
- Gaze paresis /diplopia / skew deviation
- Nystagmus
- Impaired smooth pursuit/ Oscillopsia
- Stereopsis
- Reading fatigue
- Ocular inflammatory diseases eg pars planitis, retinal periphlebitis

Part c (1 marks)

Prescribe a treatment for an acute exacerbation of MS

Model Answer

- High dose corticosteroids; IV methylprednisolone 1000mg

Part d (4 marks)

Complete the table stating one (1) manifestation for each category that can be seen with MS

Model Answer

Psychiatric	Depression, mania, psychosis
Urinary	Urgency Urinary retention Urinary tract infection
Bowel	Constipation, incontinences
Pain	Neuropathic, electric shock type pain – distribution; lower limbs or thorax, or trigeminal neuralgia

Question 7 (12 marks)

A 50 year old woman presents 72 hours after a deliberate polypharmacy drug overdose. She complains of lethargy, drowsiness, appetite loss and nausea.

Part a (2 marks)

Describe and interpret her arterial blood gas

pH	7.12
pO ₂	100mmHg
PCO ₂	40mmHg
HCO ₃	14 mmol/L
Glucose	2 mmol/L
Lactate	9.1 mmol / L

Na	128 mmol/L
K	5 mmol / L
Cl	84 mmol/L
Creat	444 micromol/L

Model Answer

Mixed metabolic and respiratory acidosis

AG 35 with k (30 without)

Expected CO₂ 29

So high anion gap metabolic acidosis with hypoglycaemia, severe lactic acidosis with inadequate respiratory compensation (concomitant respiratory acidosis)

Part b (2 marks)

Her formal laboratory results return.

Describe the following results and interpret them in the context of the blood gas

Bilirubin	27 micromol/L
Albumin	42g/L
Protein	82g/L
ALP	140 u/L
GGT	89 u/L
ALT	4808 U/L
AST	5872 U/L

WCC	12x10 ⁹ /L
HB	135g/L
Platelets	48x10 ⁹ /L
INR	3.3

Model Answer

- Evidence of transaminitis, thrombocytopaenia and coagulopathy and renal injury.
- All of this is consistent with acute fulminant liver failure and in the context of delayed presentation post overdose this is most likely paracetamol overdose with fulminant hepatic failure (or hyperacute) meeting multiple laboratory criteria for discussion with a Liver Centre

Part c (1 marks)

List two (2) acute toxicological causes for her presentation

Model Answer

- **Must say delayed presentation post paracetamol overdose**
- Amanita phalloides
- Halothane
- Some of below xenobiotics in table
- Some are idiosyncratic e.g valproate and phenytoin
- Herbal supplements
- isoniazid

List never ending so best resource

<https://www.ncbi.nlm.nih.gov/books/NBK547852/>

Others in list at end. I think these should be the main ones they list. I'll have to look up random ones if they answer them.

Part d (1 marks)

List two (2) acute non toxicological causes

Model Answer

- **Viral: need to name at least one virus** hep b (hep a rare to progress to FHF) hep d (with b) (c less accepted as a cause and e is very unlikely in australia). Cmv, hsv, ebv, vzv, parvo, parainfluenza, yellow fever, vzv – herpes virus with immunosuppression

PLUS OTHER.

- Ischaemic / hypoxic versus budd chiari etc
- Environmental with severe hyperthermia and heat stroke
- Metabolic: Wilsons – super rare mostly chronic (other rares acute fatty liver pregnancy and reye's syndrome
- Autoimmune hepatitis more commonly chronic
- Sepsis with MOF
- Pregnancy (acute fatty liver)

The list is so big that they must say paracetamol and they must come up with an infective cause as I think they are probably the common ones to think of.

Part e (6 marks)

On review, she is hypotensive and increasingly drowsy.

Vital signs:

GCS	10/15
HR	125
BP	89/50

RR 22
Sats 95% ra

Outline the management of this clinical condition (as a distinct entity from its chronic form) in the Emergency Department

Model Answer

- Main focus of answers should reflect careful fluid management (including early dialysis) and neuroprotection with prevention of cerebral oedema including early intubation. Removal of causative agent.
 - A & B: Early **intubation** is recommended for these patients for neuroprotection, minimising ICP surge and prevention of aspiration and hypoxia. Neuroprotective ventilation.
 - Commence **NAC**
 - Metabolic: **Correct hypoglycaemia**, electrolytes, monitor ammonia (*may be indication for dialysis) and focus on enteral nutrition
 - C: Aim for meticulous **fluid management** with an aim to keep the patient dry with early use of **vasopressors** with MAP >70 sometimes >80 if concerns re raised ICP with norad as first line. Shock is usually vasodilatory. (A fluid bolus of 20ml/kg is reasonable as a start but then limit)
 - D: Early neuroprotection along similar lines to other causes – CO2 optimisation, head of bed, Na control aiming 145-150. Deep sedation. ICP monitors centre dependent worry re coagulopathy (may need surrogate ways of monitoring ICP e.g. optic nerve diameter etc. ICP aim same as TBI)
 - Renal: Early **dialysis** for fluid management, hyperammonaemia and oligoanuria plus acidosis, hyperkalaemia *plus minus toxin removal or toxin effect
-
- **Early referral / (discussion with) to a liver centre – must say this**
 - **Toxicology involvement**

Environment: Temperature control and prevention of fever

[https://www.journal-of-hepatology.eu/article/S0168-8278\(16\)30708-5/fulltext](https://www.journal-of-hepatology.eu/article/S0168-8278(16)30708-5/fulltext)

TABLE 21–3

Occupational Exposures Associated With Liver Injury

Xenobiotic	Type of Injury
Arsenic	Cirrhosis, angiosarcoma
Beryllium	Granulomatous hepatitis
Carbon tetrachloride	Acute hepatocellular necrosis
Chlordecone	Minor hepatocellular necrosis
Copper salts	Granulomatous hepatitis, angiosarcoma
Dimethylformamide	Steatohepatitis
Methylenedianiline	Acute hepatocellular cholestasis
Phosphorus	Acute hepatocellular necrosis
Sodium azide	Steatohepatitis
Tetrachloroethane	Acute, subacute hepatocellular necrosis
Tetrachloroethylene	Acute hepatocellular necrosis
Toluene	Hepatocellular steatosis (minor)
Trichloroethane	Hepatocellular steatosis (minor)
Trinitrotoluene	Acute hepatocellular necrosis
Vinyl chloride	Acute hepatocellular necrosis, fibrosis, angiosarcoma
Xylene	Steatosis, hepatocellular vacuolation

Table 3. Some Drugs Which May Cause Idiosyncratic Liver Injury Leading to ALF

Isoniazid	Pyrazinamide
Sulfasalazine	Isoflurane
Phenytoin	Itraconazole
Statins	Nicotinic acid
Propylthiouracil	Imipramine
Ciprofloxacin	Gemtuzumab
Nitrofurantoin	Terbinafine
Disulfiram	Methyldopa
Cocaine	MDMA (Ecstasy)
Valproic acid	Labetalol
Amiodarone	Tolcapone
Dapsone	Allopurinol
Etodolac	Methyldopa
Didanosine	Ketoconazole
Efavirenz	Abacavir
Carbamazepine	Doxycycline
Valproic Acid	Diclofenac

Combination agents with enhanced toxicity:

Trimethoprim-sulfamethoxazole

Rifampin-Isoniazid

Amoxicillin-clavulanate

Some herbal products/dietary supplements that have been associated with hepatotoxicity include:

Kava Kava

Herbalife

Hydroxycut

Comfrey

Senecio

Greater celandine

He Shon Wu

LipoKinetix

Ma Huang

Table 1. Commonly used medications in critical care causing drug-induced acute liver failure

Drugs	Hepatotoxic Reaction
Acetaminophen, ketoconazole, rifampin, isoniazid, phenytoin, valproic acid, carbamazepine, venlafaxine	Necrosis
Amoxicillin/clavulanate, chlorpromazine, angiotensin-converting enzyme inhibitors, erythromycin	Cholestasis
Didanosine, valproic acid	Acute steatosis
Phenytoin, sulfamethoxazole/trimethoprim, nitrofurantoin, cyclosporine	Mixed pattern
Methotrexate	Fibrosis/cirrhosis
Amiodarone, tamoxifen, chloroquine	Nonalcoholic steatohepatitis

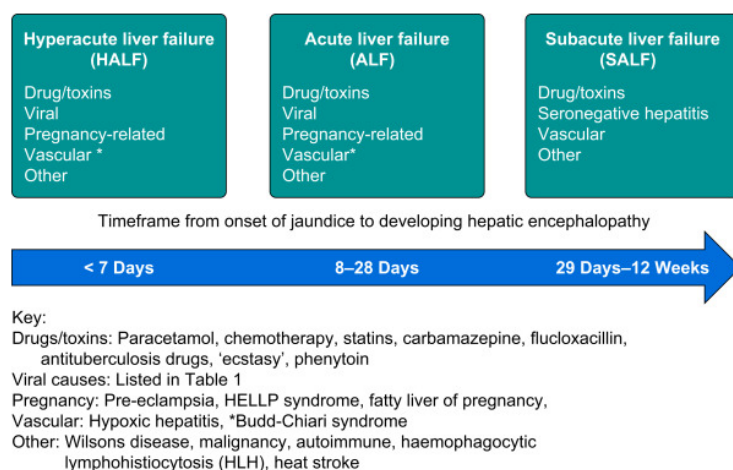


Fig 1 Subclassification of acute liver failure (ALF) to aid in identifying underlying aetiology and possible prognostication.^{1,6} Adapted from Willars CWJ, Liver failure, *Oh's Intensive Care Medicine Manual*, 2013; 501–19. Reproduced with permission from Elsevier. HELLP, haemolysis, elevated liver enzyme, and low platelet levels.

[View Large Image](#) | [Figure Viewer](#) | [Download Hi-res image](#) | [Download \(PPT\)](#)

Question 8 (12 marks)

A 17 year old has presented to your Emergency Department with an isolated dental injury following a fall.

This is a photograph of his injury.



Part a (6 marks)

Complete the following table regarding the Ellis classification of dental injuries

Model Answer

Ellis classification	Injury	ED Management
I	Fracture through enamel	Smooth edge with file if needed , no other treatment required
II	Fracture through dentin & enamel	Clean with saline, apply glass ionomer
III	Fracture through pulp, dentin & enamel	Apply calcium hydroxide to pulp then glass ionomer to cover fracture

Part b (1 marks)

How would you classify the injury in this patient based on the photo

Model Answer

- Ellis 3

Part c (3 marks)

You decide to anaesthetise the tooth prior to treatment.

List three (3) ways in which pain associated with injection of local anaesthesia can be minimised

Model Answer

- Smaller diameter needle
- Slowing speed of infiltration

- Warming LA solution
- Buffering lignocaine with NaHCO_3 (10:1)
- Smallest volume necessary
- Topical anaesthetic prior
- Alveolar nerve block rather than local periosteal infiltration

Part d (2 marks)

Other than dental fractures, list two (2) other types of dental injury

Model Answer

- Avulsion, intrusion, subluxation, lateral luxation, extrusion

Question 9 (12 marks)

A 65 year old man presents to your tertiary Emergency Department with shortness of breath, haemoptysis and pleuritic chest pain.

His vital signs are:

BP	124/87
HR	100
Sats	90% on 8 L
RR	32
Temp	37.9

A CXR was taken which showed a moderate sized right pleural effusion

Part a (3 marks)

List three (3) sonographic features you would expect to see on an ultrasound suggestive of a pleural effusion

Model Answer

- Spine sign / Thoracic spine sign
- Collapsed lung
- The space above the hemidiaphragm does not mirror the echogenicity of the liver
- Anechoic area where you would expect to see lung field
- Sinusoid sign
- Quad sign (the boundaries defining a pleural effusion)
- Plankton sign

Reference:

Ma and Mateer's Emergency Ultrasound, 3e

ACEM elearning

Radiopaedia

<https://accessemergencymedicine.mhmedical.com/content.aspx?bookid=686§ionid=45956944#57790996>

<https://elearning.acem.org.au>

<https://radiopaedia.org/articles/pleural-effusion>

Part b (4 marks)

You decide to insert a right-sided chest drain.

List four (4) risk factors for developing re-expansion pulmonary oedema

Model Answer

- Large Ptx
- Drainage of large volume >1.5L
- Young patient
- Lung collapse >7/7
- Application of negative pressure (suction)

Reference: Emergency Procedures App and ACI website

<https://aci.health.nsw.gov.au/resources/respiratory/pleural-drains/pleural-drains-in-adults/section-2-insertion/complications>

Part c (5 marks)

After successfully inserting the ICC, 850mls of turbid pleural fluid is drained.

You suspect this patient has TB.

Complete the table listing findings you would expect to see in his pleural fluid

Model Answer

- Protein content > 30g/L (>3.0g/dL)
- Low glucose <5.6mmol/L
- pH <7.4
- High LDH –usually >500IU/L
- Pleural fluid protein to serum protein ratio >0.5
- Pleural fluid LDH to serum LDH ratio >0.6
- Pleural fluid level >2/3 of upper value for serum LDH
- Predominance of lymphocytes >50%
- Mycobacterium tuberculosis culture +ve (only in 25% of cases)

Reference LITFL

Dunn online

<https://litfl.com/pleural-fluid-analysis>

https://emergencymedicinemanual.com/Content/v6/indigo/Responsive%20HTML5/topic.htm#t=TEMM_6_single_volume%2FRespiratory%2FPleural_diseases%2FPleural_effusion.htm

<https://emcrit.org/ibcc/hemoptysis>

Question 10 (18 marks)

An 82 year man presents following several episodes of dark red PR bleeding in the preceding 12 hours followed by a syncopal episode at home.

He has a background history of hypertension and atrial fibrillation.

His current medications include metoprolol, candesartan and warfarin.

His observations are:

P	70
BP	85/60
T	36.5
O2 sats	98% RA
GCS	15

Part a (5 marks)

List five (5) possible causes for his PR bleeding

Model Answer

- Diverticular disease
- Angiodysplasia
- Colonic malignancy
- Colitis (ischaemic, inflammatory, radiation)
- Anorectal source (fissure, haemorrhoid) – unlikely if dark blood
- Rapid upper GI bleeding (PU, varices)

Must include 3 of the first 4 for full marks as these are most likely source

Part b (3 marks)

The patient states he is a Jehovah's Witness and presents a written Advanced Care Directive stating that he will not consent to treatment with blood products under any circumstances.

List three (3) criteria that must be fulfilled for this Directive to be valid

Model Answer

- Written voluntarily / without coercion
- Written when patient was competent/had capacity
- Relevant to the current situation

Part c (5 marks)

Assuming that his Advanced Care Directive is valid, outline five (5) treatments you could administer in the ED to optimise his care

Model Answer

- Judicious IV fluids to maintain SBP >90 eg 250-500ml normal saline boluses
- Early use of vasopressors to maintain BP eg aramine infusion or boluses
- 10mg IV Vitamin K for warfarin reversal
- Tranexamic acid 1g IV
- Recombinant factor VIIa
- Possibly other recombinant factors (VIII and IX) in discussion with haematology

Cannot give any plasma derived product including blood, FFP, platelets, Prothrombinex, FEIBA, albumin

Part d (5 marks)

The patient continues to bleed despite your interventions.

Outline five (5) further actions you would consider to optimise his chance of survival

Model Answer

- Urgent CT mesenteric angio +/- embolization (control of bleeding source is his best hope)
- Urgent surgical referral to consider hemicolectomy as life-saving procedure if embolization not possible
- ICU referral for ongoing haemodynamic support including inotropes
- Maintain normothermia (hypothermia may worsen coagulopathy)
- Engage family members to reconsider refusal of blood products and ensure he is aware that he will likely die without transfusion (but accept that unlikely to change his mind)
- Consult with haematology regarding other options to minimise bleeding and enhance erythropoiesis

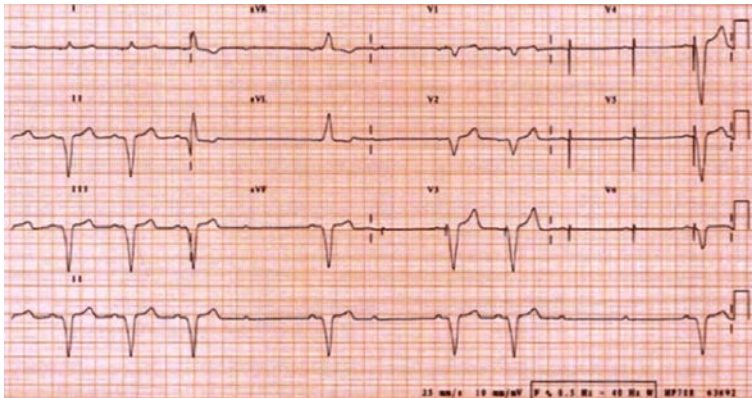
Question 11 (18 marks)

A 55-year-old male is brought in by ambulance from the gym following a syncopal episode.

In ED, his vital signs are:

GCS	12/15
BP	80/40 mmHg
RR	18 brpm
SaO2	100% NRM 15L/min

His 12-lead ECG performed at triage is shown below.



Part a (4 marks)

List four (4) abnormalities on his ECG

Model Answer

- **Rate:** 36bpm
- **Rhythm:** Irregularly irregular
- **Axis:** LAD
- **P waves:** Present and intermittently preceded by a QRS complex
- **PR interval:** Fixed (120ms)
- **QRS complexes:** LBBB pattern, Wide (200ms) (paced and non-paced complexes)
- **ST segments:** 2mm elevation II, III, aVF, V2-V4
- **TW:** Inverted aVL
- **QT interval:** 400ms
- **Extra waves / Artefacts:** Ventricular pacing spikes with electrical capture (V3) and intermittent failure to capture (V4-V6)

Reference: ECG sourced from LITFL

Part b (1 marks)

What is your diagnosis?

Model Answer

- Haemodynamically unstable bradydysrhythmia secondary to pacemaker malfunction (intermittent failure to capture) in the context of underlying complete heart block / high-grade second-degree AV block (fixed PR interval, AV dissociation present).

Part c (6 marks)

List six (6) factors which may have contributed to this patient's diagnosis

Model Answer

- **Functional:** Battery malfunction, Electrode displacement, Lead fracture, Inadequate lead contact
- **Pathological:** Myocardial ischaemia/infarction, Electrolyte abnormalities (esp hyperkalaemia), Acidosis, Hypoxia, Increased stimulation threshold (fibrosis), Medications (Class 1C and 3 anti-arrhythmics e.g., flecainide, amiodarone).

Reference: Tintinalli's Emergency Medicine 9E, Rosen's 9E

Part d (7 marks)

The patient has been placed in a resuscitation bay with continuous cardiorespiratory monitoring attached, and bilateral proximal large bore IV access has been obtained. Your resus team has been assembled.

Outline your immediate management priorities

Model Answer

Each of the following headings and at least 2 points from each.

1. Stabilise haemodynamics and restore end organ perfusion

- **Asynchronous pacing:** Apply magnet which will result in asynchronous pacing. If asynchronous pacing fails to improve haemodynamics and perfusion, consider chemical, transcutaneous, or transvenous pacing
- **Chemical pacing:** Temporising measure. Atropine unlikely to be effective given infranodal block. Titrate Adrenaline 1:100 1000 10-20mcg q5min followed by infusion 5mcg/min OR IV Isoprenaline 1-10mcg/min while preparing for transcutaneous pacing.
- **Transcutaneous pacing:** May be required if demand pacing following magnet application or chemic pacing ineffective. IV Ketamine 0.5-1mg/kg. Apply defib pads A-P and 10cm away from PPM box and attach ECG leads. Set defib to pace. Set output to 80mA. Set rate to 80bpm. Increase output by 10mA until electrical and mechanical capture achieved. Set output 10%/10mA above capture threshold.
- **Transvenous pacing:** May be required if all above measures fail to restore adequate output.
- **Endpoints:** Improvement in haemodynamics (HR >60bpm, SBP >90bpm) and end-organ perfusion (Lactate <2mmol/l, Baseline mentation, CRT <2s).

2. Seek and treat reversible causes

- **Myocardial ischaemia:** ECG is Sgarbossa negative. Serial troponins. DAPT and Anti-thrombin if ACS confirmed.
- **Electrolyte disturbance (esp HyperK):** VBG. Treat with IV Calcium Gluconate 10% 10ml, IV Glucose 50% 50ml and IV Actrapid 10U, Neb Salbutamol 10mg, IV NaHCO₃ 100ml (acidosis present).
- **Lead fracture/displacement:** CXR and compare to previous CXR. Arrange TVP while awaiting PPM repair
- **Battery malfunction:** Urgent interrogation once stabilised. TCP/TVP while awaiting battery replacement

3. Disposition

- Urgent cardiology review and admission for ongoing investigation and management incl PPM interrogation.

Reference: Dunn Emergency Medicine Manual Online Version

Question 12 (12 marks)

A 3-year-old presents to your tertiary paediatric ED with five days of fever and reduced oral intake. He was recently unwell with cough and coryza. He is fully immunized and has no significant past medical history. He has been taking amoxicillin for the past 3 days which was initially prescribed by the GP.

His temperature is 39.2 degrees.

On examination, he is miserable but alert. You notice the following rash:



Part a (3 marks)

You suspect that the child has Kawasaki Disease (KD).

List three (3) other important differential diagnoses

Model Answer

Must include drug eruption and at least one viral cause for full marks

- Drug eruption - penicillin
- Viral exanthem - EBV / CMV / adenovirus/roseola/rubella/
- Scarlet fever
- Toxic shock syndrome
- Mycoplasma pneumonia
- PIMS-TS
- SJS
- Malignancy – leukaemia

Part b (5 marks)

Other than a maculopapular rash, list the other criteria required to make a diagnosis of complete KD

Model Answer

- Fever for ≥ 5 days

Plus 4 or more of the following (including rash):

- Cervical lymphadenopathy - usually unilateral, at least one $>1.5\text{cm}$
- Oromucosal changes - strawberry tongue, cracking / bleeding lips
- Conjunctival injection
- Extremity changes - palmar/plantar hyperaemia and oedema followed by desquamation

OR coronary artery abnormality on echo with less than 4 of the clinical criteria

Part c (2 marks)

List four (4) complications of Kawasaki disease

Model Answer

- Half mark for any of : Coronary artery aneurysm, heart failure, myocardial infarction, arrhythmias, peripheral arterial occlusion, multiorgan failure, renal failure, sensorineural hearing loss, abdominal catastrophes

Part d (2 marks)

What are the two (2) key treatments (including doses) for Kawasaki Disease?

Model Answer

Half mark for treatment, half for correct dose

- IVIG 2g/kg
- Aspirin $3\text{-}5\text{mg/kg PO}$

Question 13 (12 marks)

A 45 year old man presents following an alleged assault. He has been hit in the face with a high heeled shoe. He has severe eye pain. His right eye is grossly swollen.

You do a bedside ultrasound as part of your assessment.



Part a (3 marks)

List three (3) abnormalities on this ultrasound

Model Answer

- Anterior chamber collapse/disruption globe architecture/loss of spherical structure/decreased globe volume, **vitreous haemorrhage**, abnormal/displaced lens

Part b (1 marks)

State the investigation of choice to confirm his diagnosis

Model Answer

- CT orbits

Part c (6 marks)

Outline your immediate management priorities

Model Answer

- Analgesia with morphine 5-10mg IV titrate to pain
- Antiemetic ondansetron 4mg IV /metoclopramide 10mg IV
- Keep upright, Eye shield (not pad) and avoid anything that increases intraocular pressure,NBM (3 max for supportive care)
- Broad spectrum IV antibiotics (avoid topical agents unless directed by ophthalmology) need to include gram negative cover – Vanc 1g plus ceftazidime 2g or cipro400mg (from UTD)
- ADT 0.5mg IM
- Urgent Ophthalmology review for OT

Part d (2 marks)

He presents to the Emergency Department 2 months after this injury complaining of pain, blurred vision and photosensitivity in both eyes.

State the diagnosis and the underlying pathophysiology of this condition

Model Answer

- Sympathetic Ophthalmia.
- Delayed hypersensitivity reaction. Accept autoimmune inflammatory response.

Question 14 (12 marks)

You receive an ambulance notification for a 77 year old woman from home who is in respiratory distress.

Her vital signs :

RR	60/min
Sats	75%RA >> 90% on 15L O2 NRB
BP	90/50
HR	138/min
Temp	38.2deg
GCS	12

Part a (4 marks)

Describe how you will prepare to manage this patient

Model Answer

- Critically unwell patient for **Resus: assemble resus team**: airway, assessment, procedural and team leader +- Inform ICU/Anaesthetics
- Delegate departmental oversight
- **Assess airway, breathing and optimize**: 100% (15L O2) NRB / NIV, mobile CXR, prepare intubation equipment, bronchodilators/adrenaline/steroids/abx as indicated
- **Circulation: IVC x2** inc VBG/ABG, bloods, culture, cautious fluid bolus (max 2x250mls), Arterial line, consider inotropes/CVCs
- US RUSH protocol to assess for possible reversible causes
- Delegate collateral history/pt note review whilst resuscitating patient
- Disability & Exposure: assess GCS and head to toe examination

Part b (4 marks)

After arrival and establishing her on NIV, you gain further history from her daughter who tells you that she has metastatic lung cancer, with recent cessation of active treatment due to disease progression. She has deteriorated and is now bed bound and fully dependent. No end of life discussions have occurred previously.

You deem the best course of action is to focus on end of life comfort care.

Outline your approach to this situation with the daughter.

Model Answer

Private environment

- Explanation of rationale of change of focus to comfort, maintaining dignity
- Include pt if possible
- Establish pt's previous wishes, enquire about ACD
- Stakeholders/family/priest/cultural rep
- Engage treating teams
- Social worker

Part c (4 marks)

Complete the table prescribing four (4) crisis medications including route, dose, frequency and indication for each

Model Answer

Medication	Route	Indication	Dose	Tips
Metoclopramide	S/C	Nausea/ vomiting	10mg TDS + PRN	Recommended that patient has antiemetic charted even if asymptomatic Do not use in Parkinson's patients
Haloperidol	S/C	Nausea/Agitation	0.5mg BD	Preferred antiemetic in renal impairment Do not use in Parkinson's patients
Morphine	S/C	Dyspnoea/Pain	Regular 2.5mg 4/24 PRN 2/24 max dose 6	Opioid naïve patients with normal renal function
Dilaudid/hydromorphone	S/C	Dyspnoea/Pain	Regular 0.25 0.5mg 4/24 PRN 2/24	Opioid naïve patients with abnormal renal function
Lorazepam	S/L	Anxiety secondary to dyspnoea	Regular 0.5mg TDS PRN 8/24	
Clonazepam	S/C	Seizures/myoclonus	Regular 0.5mg-1mg BD PRN same	
Midazolam	S/C	Seizures/catastrophic haemorrhage	PRN 5mgx3 20MINS	Prophylactic seizure medication unable to swallow
Midazolam	S/C	Agitation	PRN 2.5mg 4/24	Prophylactic seizure medication unable to swallow
Glycopyrrolate	S/C	Respiratory secretions	Regular 200mcg-400mcg 4/24 PRN 2/24	If patient has obvious secretions give Stat 0.4mg S/C
Nilstat	Oral	Stomatitis/oral thrush	1ml 4/24	
Sodium Bicarbonate	Oral	Stomatitis/oral thrush/dry mouth	Wash mouth with swabs	Consider using a water mouth spray
Coloxyl and Senna	Oral	Constipation	Regular 1-3tablets 8/24	Only if patient can swallow
Movicol	Oral	Constipation	Regular 1-2 sachets BD	Only if patient can swallow
Microlax enema	PR	Constipation	1-2 as required	

Question 15 (12 marks)

A 5 year old boy presents with a one-day history of unsteady gait. He is alert and does not look unwell. He has no previous medical history.

Part a (4 marks)

Apart from acute post-viral cerebellar ataxia, list four (4) other possible causes for this presentation

Model Answer

- Toxins (anti-epileptic meds, etoh, cannabis, benzos, heavy metals and endless others)
- Tumour esp posterior fossa
- Trauma esp NAI
- Immune (guillain barre, ADEM)
- Metabolic – vitamin deficiency esp thiamine, folate
- Stroke
- Infection (meningoencephalitis, brain abscess)

Must give 1 toxin and tumour plus 2 others for full marks. If list of specific entities in any one category, no more than 2 marks per category

Part b (4 marks)

List four (4) findings on history which would not support a diagnosis of acute post-viral cerebellar ataxia in this child

Model Answer

- Altered behaviour, seizures, myoclonic or other abN movements, fever, vomiting, headache, recurrent episodes

Part c (4 marks)

If the child has acute cerebellar ataxia, describe the expected finding on neurological examination in the following table

Model Answer

	Describe the expected finding
Romberg test	Negative – closing eyes will not affect steadiness of stance
Position and vibration sense	Normal – P&V sensation intact as dorsal columns not affected
Deep tendon reflexes	Normal – spinal cord and cerebrum not affected
Gait	Wide-based or staggering

Question 16 (12 marks)

A 35 year gardener presents with a painful right index finger. You suspect flexor tenosynovitis

Part a (4 marks)

What are the four (4) cardinal signs of flexor tenosynovitis

Model Answer

- Tenderness along the course of the flexor tendon
- Symmetrical oedema of the finger ("sausage digit")
- Finger slightly flexed at rest
- Pain along the tendon on passive extension

Part b (4 marks)

Describe your initial ED management

Model Answer

- IV antibiotics- vancomycin 20-35mg/kg + 3rd generation cephalosporin eg ceftriaxone 1g
- Elevation
- ADT if not immune
- Splint / restricted activity
- NSAIDs or other analgesia- appropriate drug and dose
- Imaging to exclude FB, fracture
- Referral to plastics/hands for admission

Part c (4 marks)

List four (4) indications for operative intervention/surgery

Model Answer

- Failure to improve with antibiotic therapy within 24 hours
- Presence of compartment syndrome
- Bursal involvement eg. "horseshoe abscess"
- Bony involvement
- Suspected foreign body
- Tissue necrosis

Question 17 (12 marks)

An 85-year-old female has presented following a fall. She is complaining of left hip pain and is unable to mobilise. Her pelvic radiograph is shown below.



Part a (2 marks)

Describe and interpret her pelvic radiograph

Model Answer

- AP pelvis radiograph demonstrating minimally displaced comminuted left transcervical neck of femur fracture.

No marks for: subtrochanteric extension, widening of SIJ/pubis symphysis, pubic rami/pelvic ring fractures or lumbar spine/sacral fractures

Part b (4 marks)

Following a thorough assessment, she is found to have no other injuries and is admitted under the care of the orthopaedics team who have requested you perform a nerve block to control her ongoing pain. She has no known drug allergies, and no contraindications to regional anaesthesia.

Complete the table listing one (1) potential complication associated with peripheral nerve blocks performed in the ED and provide two (2) risk avoidance strategies for each complication

Model Answer

- **Procedure Failure:** Training, Supervision, Skill maintenance, US guidance
- **Pain/Discomfort:** Anaesthetise site of needle insertion, Limit number of passes, US guidance
- **Bleeding/Haematoma:** Avoid non compressible sites and deep blocks in anti-coagulated patients, Avoid all blocks in severe coagulopathy e.g., DIC, US guidance
- **Infection/Abscess:** Maintain sterility of key parts/sites, ASNTT preferred, Sterile transducer cover and gel, Avoid areas of soft tissue infection
- **Local anaesthetic systemic toxicity (LAST):** Do not exceed safe maximum dose of LA, Avoid cardiotoxic agents i.e., Bupivacaine, Intermittently aspirate and inject small aliquots, Add vasoconstrictor to detect vasoconstrictor toxicity early, Avoid highly vascular areas/high risk blocks i.e., intercostal nerve blocks, Continuous cardiorespiratory monitoring, Continuously monitor patient clinically, Clear understanding and early recognition of toxicity, Shared

understanding of management, Clear management plan, Access to rescue medications/equipment

- **Vasoconstrictor toxicity:** US guidance, Intermittently aspirate and inject small aliquots, Continuous cardiorespiratory monitoring, Avoid in patients at risk of ischaemia/infarction (severe CAD/PVD)
- **Damage to adjacent neurovascular structures:** Training, Supervision, US guidance, Plane blocks, Do not inject >15PSI, Stop injecting if pain or resistance encountered
- **Damage to adjacent critical structures:** Training, Supervision, US guidance, Plane blocks

Reference: ACEM Online Learning Module – Ultrasound – Procedural Guidance – Regional Anaesthesia

Part c (6 marks)

You have delegated your senior registrar to perform a fascia iliaca block. You review the patient shortly after and her pain is adequately controlled.

Thirty minutes later the arrest alarm is activated, and the patient is found unresponsive and actively seizing. Her vital signs are:

GCS	3/15
SBP	70 mmHg
HR	50 bpm
SpO2	75% RA

You have identified that the patient was administered 300mg of Bupivacaine 0.5%. The diagnosis of local anaesthetic systemic toxicity is made.

The patient has been moved to resus, attached to cardiorespiratory monitoring, IV access has been obtained and your resus team has been assembled.

Outline your immediate management priorities

Model Answer

- Support airway to establish patency, apply high flow oxygen via BVM, provide intermittent positive pressure ventilation and target SpO2 >94%. Hyperventilate during pre/peri/post intubation to avoid respiratory acidosis compounding pH dependent cardiotoxicity, targeting ETCO2 30-35mmHg and pH 7.45-7.55.
- Terminate seizure activity with IV Midazolam 5-10mg. Seek and treat alternate causes of seizures e.g., Hypoglycaemia with IV G50% 50ml, Hyponatraemia with IV NaCl 3% 100ml.
- Restore haemodynamics with IV NS 20ml/kg followed by IV Adrenaline 1:100 000 10-20mcg q5-min and then an infusion 0.5mcg/min for refractory hypotension.
- For QRS widening, serum alkalinisation with IV NaHCO3 1mmol/kg (up to 100mmol) q1-2min (Max 6mmol/kg) targeting pH 7.45-7.55 and Na <150mmol/l. Monitor for hypokalemia.
- IVLE 20% 1.5ml/kg over 1-min then 15ml/kg/hr (Max 2 boluses if CV stability not restored/adequate circulation deteriorates)
- Critical incident management
 - o Open disclosure with family / next of kin
 - o Critical incident reporting process (IIMS)
 - o Debrief registrar
 - o Report incident to term supervisor e.g., DENT

References: eTG – Toxicology/Toxinology – Local anaesthetic toxicity. ANZCA Policy PG37A – Guideline for health practitioners administering local anaesthesia outside the operating theatre. AAGBI Safety Guideline – Management of severe local anaesthetic toxicity.

Question 18 (12 marks)

A 28 year old motorbike rider involved in a head on collision presents with an isolated knee injury.

The x ray of his knee and a picture of his knee is shown below:



Part a (1 marks)

What is the diagnosis

Model Answer

- Posterolateral dislocation of the knee- 1 marks
- Posterior dislocation of the knee- 0.5 mark
- Knee dislocation- no marks as the anatomy of the dislocation is evident.

Part b (4 marks)

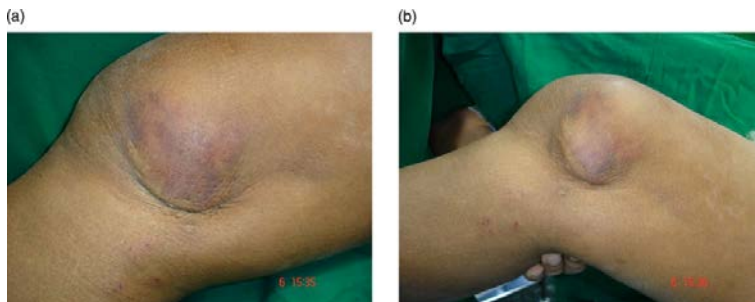
Name four (4) structures that are at risk of injury

Model Answer

- **Popliteal artery**, Tibial nerve/ Common fibular (Peroneal) nerve, ligaments (collaterals, cruciates), meniscus

Part c (1 marks)

This is a photo of his injury. How does this photo influence your ED management of this injury



Model Answer

- Closed reduction is contraindicated.
- The puckering of skin on the medial aspect of the knee joint known as the “dimple sign” and the x ray findings suggest that there is buttonholing of medial femoral condyle through the medial capsule. This is a contraindication for closed reduction as there is a risk of skin necrosis.

Part d (2 marks)

Please calculate the ankle brachial pressure index (ABPI) using the appropriate values and formula using ; the measurements provided below

Right brachial artery: 115 mmHg

Left brachial artery: 120 mmHg

Right dorsalis pedis: 80 mmHg

Right posterior tibial artery: 75 mmHg

Model Answer

- $ABPI = 80 \div 120 = 0.66$ - one mark each for choosing the correct pressure.
- $ABPI = (\text{highest pressure of either right PTA or DP}) \div (\text{highest brachial pressure})$

Part e (1 marks)

What is the significance of the value obtained

Model Answer

- Significant arterial occlusion.

Part f (1 marks)

Name the appropriate investigation to assess vascular injury

Model Answer

- CT angiogram of the lower limbs/ CT aortogram with run off to lower limbs

Part g (2 marks)

The patient develops increasing pain and you are concerned about compartment syndrome.

List four (4) clinical findings that you would support this diagnosis

Model Answer

- **Disproportionate pain**
- **Tight tender compartment**
- **Pain on passive stretch**
- Paraesthesia
- Pallor
- Paralysis
- Pulselessness

(bold to pass, last 4 late signs, max 0.5 mark)

Question 19 (18 marks)

You are reviewing an infant brought in by his parents with shortness of breath.

You suspect Bronchiolitis

Part a (7 marks)

List seven (7) risk factors for severe bronchiolitis

Model Answer

Risk factors for severe disease

- gestational age less than 37 weeks
- chronological age at presentation less than 10 weeks
- chronic lung disease
- congenital heart disease
- chronic neurological conditions
- Indigenous ethnicity
- failure to thrive
- Trisomy 21
- post-natal exposure to cigarette smoke
- breast fed for less than 2 months

Part b (9 marks)

In the table below provide details of assessment of severity of Bronchiolitis

Model Answer

Assessment	Mild 0.5marks each	Mod 0.5marks each	Severe 0.5 each
Behaviour	mild	Some/intermittent irritability	Increased irritability Lethargy fatigue
Respiratory Rate	Normal-mild tachypnoea	Increased RR	Marked increased or decreased RR
Use of accessory muscle	Nil –mild chest wall retraction	Mod chest wall retraction Suprasternal retraction Nasal flaring	Marked chest wall retraction Marked suprasternal retraction/T tug Marked nasal flaring
Oxygen saturation/oxygen requirement	O2 sats >92% on room air	Sats 90-92% on RA	Sats <90 Hypoxaemia not corrected by oxygen
Apnoic episodes	none	May have brief apnoea	Frequent or prolonged apnoea
feeding	normal	Reduced feeding or may have difficulty feeding	Unable to feed or reluctant

Part c (2 marks)

Name a Randomised Control Study assessing the use of High Flow Nasal Cannulae in bronchiolitis and state its conclusion

Model Answer

- PARIS (Paediatric Acute Respiratory Intervention Study)
- High Flow Nasal Cannula therapy in infants in Bronchiolitis
- Among infants with bronchiolitis who were treated outside an ICU, those who received high-flow oxygen therapy had significantly lower rates of escalation of care due to treatment failure than those in the group that received standard oxygen therapy

<https://www.nejm.org/doi/full/10.1056/NEJMoa1714855>

<https://www.childrens.health.qld.gov.au/wp-content/uploads/PDF/guidelines/CHQ-GDL-60012-bronchiolitis.pdf>

https://www.rch.org.au/clinicalguide/guideline_index/Bronchiolitis/

<https://rebelem.com/the-paris-trial-hfnc-in-infants-with-bronchiolitis>

Question 20 (18 marks)

A 28 year old woman who is 34 weeks pregnant is brought to the Emergency Department with increasing headache and confusion.

Her vital signs are:

HR 95
BP 175/115
Sats 96% RA
T 37.8°C
GCS 14/15

You suspect she has severe pre-eclampsia.

Part a (6 marks)

List six (6) maternal risk factors for pre-eclampsia

Model Answer

	Maternal risk factors
1	Nulliparity or interpregnancy interval >10yrs
2	Multiple gestation
3	Artificial insemination with donor sperm
4	Thrombophilia such as antiphospholipid syndrome
5	Diabetes
6	Chronic HTN
7	Congenital heart conditions
8	Autoimmune disease
9	Previous gestation hypertension
10	Age>40
11	Previous pre-eclampsia
12	migraine
13	Obesity

List from Cameron Textbook of Emergency Medicine 4th Edition

Table 19.7.2

Part b (6 marks)

Complete the table listing four (4) maternal and two (2) foetal complications of pre-eclampsia

Model Answer

Maternal	Foetal
Eclampsia	IUGR
Seizure	Intrauterine death
ICH	Preterm delivery
Placental abruption	
HELLP	
Pulmonary oedema/ARDS	

Maternal	Foetal
DIC	
Thromboembolism	
Cortical blindness	
Renal failure	
Death	

Part c (6 marks)

She has a generalised tonic-clonic seizure and is moved to the resuscitation bay.

Outline your initial management

Model Answer

- Airway management - O₂, prepare intubation
- Positioning L lateral, manual displacement
- Seizure control with IV/IM midazolam 5mg (while Mg is being prepared)
- PREVENTION OF FURTHER SEIZURES - Magnesium sulphate 4g loading over 20 mins followed by infusion 1-2g/h
- CONTROL OF HYPERTENSION - BP control aim <150/90
- IV hydralazine 5-10mg q5m up to 20-30mg, IV labetalol 10mg q10m up to 80mg, PO Nifedipine 10-20mg q45m up to 40mg, (IV GTN, IV SNP)
- Obstetrics for urgent delivery
- Consider IM betamethasone 12 mg

References

https://www.health.qld.gov.au/_data/assets/pdf_file/0034/139948/g-hdp.pdf

RANZCOG/SOMANZ guideline for management of hypertensive disorders of pregnancy

Question 21 (12 marks)

You are the consultant in charge of the ED short stay ward. You receive morning handover from the night shift registrar. One of the patients on the ward is a 38 year old aboriginal woman who was admitted overnight with acute lower back pain.

Part a (1 marks)

Define cultural competency in health practice

Model Answer

- Cultural competency is a set of attitudes, skills and knowledge that allow an individual to interact effectively in cross-cultural situations (ACEM Statement on culturally-competent care and cultural safety in EM)

OR

- Cultural competence allows us to work effectively in cross-cultural situations

OR

- Cultural competence focuses on the capacity of doctors and other health staff to integrate culture into the clinical context and tailor care to meet patients' social, cultural and linguistic needs.

Part b (3 marks)

Give three (3) examples of ways in which cultural competency can be incorporated into your practice

Model Answer

- Treating the patient with their specific cultural context in mind
- Ensuring that the patient feels safe
- Approaching those of other ethnicities with a mixture of empathy, respect, self-reflection and curiosity, ensuring that the patient does not feel judged based on their cultural background
- Being aware of how our own culture impacts on our health practice
- Knowledge of different ethnicities and their health statuses
- Knowledge of different cultures and their beliefs and experiences around health
- Continuing to improve your skills in these areas

Part c (4 marks)

List four (4) clinical criteria for discharge of this patient

Model Answer

- Pain controlled
- Able to mobilise
- Afebrile, haemodynamically stable
- Nil serious alternate diagnosis/red flags (NOT a list of red flags)
- Safe discharge destination
- Appropriate follow-up arranged

Part d (4 marks)

You decide she is safe for discharge, however you are concerned about a communication barrier.

List four (4) approaches that may be used to facilitate good communication

Model Answer

- Offer an interpreter or ALO
- Use engagement that is appropriate to the area the patient is from eg. Talking to family, elders, avoiding eye contact, offering gender specific staff
- Slow, clear & concise plain English, allow time for questions
- Offer culturally appropriate written or illustrated information
- Inquire whether there are any concerns of the family that need addressing
- Involve culturally specific health services for discharge planning and follow-up

Question 22 (12 marks)

A 28-year-old landscape gardener presents following a snake bite to her forearm 20 minutes earlier. She was driven directly to hospital by a co-worker.

On arrival she is distressed but has normal vital signs.

Antivenom is available at your hospital.

Part a (2 marks)

You decide to apply a pressure immobilisation bandage.

Outline the key steps in applying a pressure immobilisation bandage

Model Answer

0.5 marks per point

- Firm bandage directly over the bite area – wide and elasticised
- Apply second bandage of entire limb
- From distal to proximal
- Splint/sling to limb, keep immobilised

Part b (2 marks)

List four (4) examination findings that indicate systemic envenomation

Model Answer

Diplopia, ptosis, weakness (peripheral and/or bulbar), muscle tenderness, spontaneous bleeding from bite site and distant areas, cardiovascular instability, non-specific systemic features (sweating, vomiting)

Part c (4 marks)

List four (4) laboratory findings which suggest systemic envenomation

Model Answer

- INR > 1.2
- Prolonged APTT
- Low/undetectable fibrinogen
- Raised D-dimer at least 10x assay cut off or > 2.5mg/L
- Raised CK > 1000 IU/L
- Raised creatinine
- Signs of thrombotic microangiopathy – thrombocytopenia, red cell fragments, spherocytes, raised LDH

Part d (1 marks)

What are the criteria for safe removal of the pressure immobilisation bandage

Model Answer

- One hour post bite with no clinical or laboratory evidence of systemic envenomation

Part e (3 marks)

Assuming the patient meets these criteria, outline your management after removal of the pressure immobilisation bandage

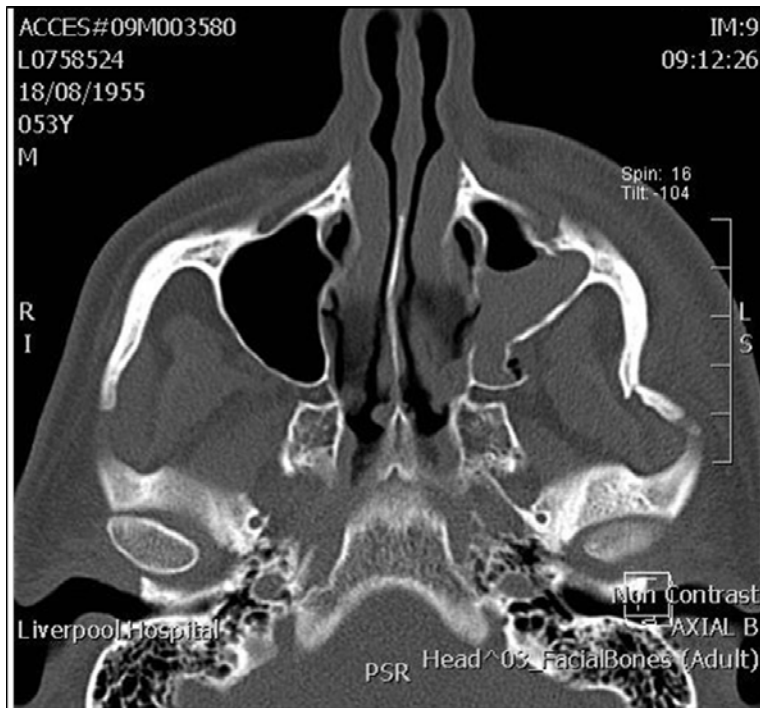
Model Answer

- Repeat blood tests 1, 6 & 12 hours after removal of PIB
- Continue to monitor patient for 12 hours
- Reapply PIB if evidence of envenomation occurs and seek toxicology advice

Question 23 (12 marks)

A 53 year old man presents with facial swelling following an assault. This is an isolated injury.

A CT scan is performed.



Part a (3 marks)

Describe the abnormalities on the CT

Model Answer

- Fluid in L maxillary sinus
- # lateral and anterior +/- medial walls of maxillary sinus
- # L zygoma
- ? # of nasal septum (new or old??) with deviation to R

Part b (3 marks)

What clinical features would you assess for on examination in relation to the demonstrated injuries

Model Answer

- Diplopia, especially on upward gaze
- Restriction of upward gaze
- Eye examination – VA, hyphaema, RAPD, fundoscopy for haemorrhage/detachment, IOP
- Altered sensation over cheek or upper lip on L indicative of ION injury

Part c (6 marks)

Following discussion with the plastic surgical team, the patient is to be discharge with follow up in their clinic with 48 hours.

Outline your discharge plan for this patient prior to his follow-up appointment.

Model Answer

- Analgesia +/- antiemetics
- Do not blow nose
- Ice to minimise swelling
- Sleep with head elevated on pillows
- Oral antibiotics (Amoxil, Keflex)
- Head injury advice
- Return to ED if – change in vision, increasing pain
- Ensure appointment

Question 24 (12 marks)

You are assessing a 3-year-old girl who has been triaged to a resuscitation bay.

She has had four days of URTI symptoms and is now complaining of "tummy pain", associated with loss of appetite, vomiting and lethargy.

She looks pale, miserable and lethargic.

Her vital signs are:

RR	45 bpm
Sats	98% RA
HR	150 bpm
BP	105/65
Temp	38C
CRT	4secs
GCS	15

Weight: 15 kg

You have inserted an IVC and have taken a VBG:

pH	7.10
pCO ₂	29 mmHg
pO ₂	100 mmHg
HCO ₃	14 mmol/L
Base Excess	-8.7 mmol/L
Na	128 mmol/L
K	4.0 mmol/L
Glu	35 mmol/L
Lac	3.5 mmol/L

Part a (2 marks)

Describe four (4) key abnormalities on this blood gas

Model Answer

- Metabolic acidosis with respiratory compensation
- Dilutional hyponatraemia (normal when corrected for BSL),
- Extreme hyperglycaemia
- Raised lactate

Part b (1 marks)

What is the most likely diagnosis

Model Answer

- Diabetic ketoacidosis

Part c (7 marks)

Describe in detail your intravenous therapy in the first two hours

Model Answer

- Fluid resuscitation with 0.9% saline, 10ml/kg boluses aiming to reduce CRT to less than 3 seconds and reduce heart rate. Maximum 20ml/kg
- Fluid replacement with 0.9% saline + 40mmol KCL per litre bag. Likely ~7% dehydrated at least. (somewhere between 5-10%)
- Rate = usual maintenance (1250ml/24 hours) plus replacement ($\sim 15000 \times 0.07 / 24$ hours) = ~75ml/hr (can write formula without final calculation)
- Insulin (Actrapid or other short acting) at 0.05 U/kg/hr. Commence after initial fluid resuscitation and first hour of replacement fluids
- Consider IV antibiotics if evidence of sepsis

Part d (2 marks)

Three hours after commencing treatment she becomes drowsy. You are concerned about cerebral oedema.

Other than an altered level of consciousness what are two (2) other clinical features of cerebral oedema

Model Answer

- Severe or progressive headache (early sign)
- Agitation or irritability (early sign)
- Vomiting (early sign)
- Cranial nerve palsies especially III, IV & VI & other focal neurological signs (later sign)
- Signs of raised ICP: bradycardia, hypertension, decrease in RR (very late signs)
- Incontinence (later sign)
- Temperature instability (later sign)

Question 25 (12 marks)

A 49 year old woman is brought into your Emergency Department with erratic behaviour on a background of bipolar disorder

Part a (5 marks)

List five (5) features on your mental state examination that would be consistent with mania as her underlying cause

Model Answer

1 mark each:

- Delusions Often grandiose / persecutory
- Distractibility
- Disinhibited Risk general / sexual / financial behaviour
- Psychomotor agitation
- Reduced sleep
- Euphoric
- Pressure of speech
- Flight of ideas
- Irritable affect

Part b (4 marks)

List four (4) features which would suggest an organic cause of her behavioural disturbance

Model Answer

1 mark each:

- Abnormal vital signs – esp fever, tachycardia
- Confusion
- Focal neurological findings
- Evidence of toxidrome
- Presentation different to previous presentations
- Evidence of trauma

Part c (1 marks)

What is the difference between type 1 & type 2 bipolar affective disorder?

Model Answer

- Type 1 = Mania + Depression whereas Type 2 = Depression only

Part d (2 marks)

The patient is detained under the mental act. You are informed later that they have absconded from the ED and cannot be found by staff.

Describe your subsequent management

Model Answer

Any 2 of:

- Notify security
- Notify police
- Notify mental health team
- Critical incident report
- Any other sensible suggestion

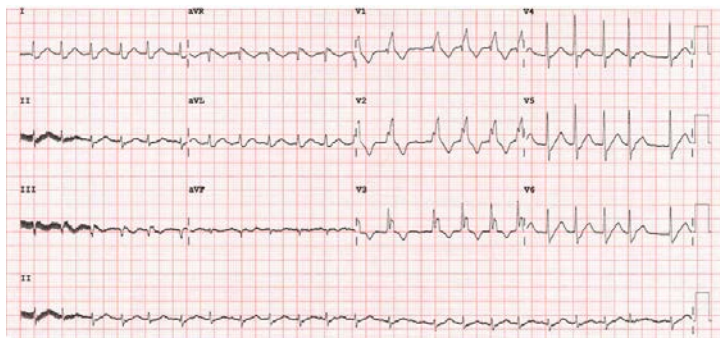
Question 26 (12 marks)

A 52-year-old man is brought into your resuscitation bay by paramedics following a 4-metre fall from scaffolding, striking his chest on a metal beam. He is complaining of chest pain. On examination he is clammy and diaphoretic with an associated chest wall contusion. There are no other obvious external injuries. He has no past medical history and is on no regular medications.

His vital signs are:

GCS 15
BP 87/51
RR 26
SpO2 98% on 2L NP O2

His 12-lead ECG is shown below:



Part a (3 marks)

List three (3) abnormal features of his ECG

Model Answer

1. Tachycardia (rate 100-150 bpm)
2. Atrial fibrillation (with rapid ventricular response)
3. Right bundle branch block
4. T-wave inversion V1-3

Part b (6 marks)

Other than haemorrhagic shock, complete the table listing three (3) other traumatic causes of hypotension in this patient and describe the expected point-of-care ultrasound findings for each

Model Answer

Cause	Ultrasound findings
Tension Pneumothorax (obstructive)	Absent lung sliding Lung-point may be found "Stratosphere" or "Bar-code" via M-mode
Cardiac tamponade (obstructive)	Pericardial effusion with RA/RV diastolic collapse Full/non-collapsing IVC
Myocardial contusion (cardiogenic)	Impaired contractility inc RV free wall hypokinesis
Neurogenic	Normal EFAST

Part c (3 marks)

List three (3) regional anaesthesia techniques which may be used for rib-fracture associated pain management

Model Answer

1. Serratus anterior plane block
2. Erector spinae plane block
3. Paravertebral block
4. Intercostal block

Question 27 (12 marks)

A 70 year old man presents with one day history of sudden onset flank pain associated with vomiting. You suspect renal colic.

Part a (12 marks)

Complete the table below listing four (4) imaging modalities, with two (2) pros and two (2) cons for each

Model Answer

	Imaging Modality 1 mark each -	Pros 0.5mark each	Cons 0.5 mark each
1	CT KUB	• High sensitivity 97% and specificity 96% • Measures stone size accurately • location • Can detect obstruction • Can diagnose other causes for flank pain • Can avoid use of contrast	• Exposes patient to radiation • Higher cost
2	Xray KUB	• Readily available • Fast • Low radiation for monitoring stone passage	• Low sensitivity for non radio-opaque stones • Unable to assess assoc complications
3	Intravenous pyelography	• Information regarding size and location of stone • measures renal function	• Contrast nephropathy • Contrast allergy/reaction • time consuming than CT • unable to exclude alternative diagnoses • radiation exposure
4	Ultrasound	• Non invasive • no radiation • modality of choice for pregnant patient • bedside/mobile procedure • high sensitivity for hydronephrosis	• lower sensitivity than IVU • cannot measure size of stone • not accurate for location, esp distal • operator dependent • may not be available 24hrs • may miss small stones • difficult with large body habitus
5	MRI	• non invasive • no radiation • no contrast req • other causes can be identified	• Not readily available • Time consuming • Expensive • Accuracy may be less than IVP

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