



Model Answers — NSW Practice SAQ Trial 2022.2

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Question 1 (18 marks)

A 62 year old woman presents with chest pain. She does not speak any English and an interpreter is not immediately available.

She is diaphoretic and clutching her chest.

Her initial vital signs are:

BP 140/90

O₂ sats 97% RA

A 12 lead ECG is performed.



Part a (3 marks)

Identify three (3) important findings on her ECG.

Model Answer

- Paced ventricular rhythm approx 90-100bpm
- First degree AV block
- ST depression 2-4mm V1, V2 +/- V3
- Left axis

No marks for LBBB pattern or Twi I, aVL

Part b (1 marks)

With an interpreter you confirm that she has central chest pain radiating to the left arm for one hour. She has a history of hypertension, diabetes and 'a heart problem'.

What is the most likely diagnosis?

Model Answer

STEMI equivalent, Sgarbossa B

Needs to comment on both for full mark

Part c (3 marks)

List three (3) medications, including drug name, dose and route, you would give this patient to manage her presenting complaint.

Model Answer

- **Aspirin 300mg**
- **Second antiplatelet agent (ticagrelor 180, prasugrel 60 or clopidogrel 300-600)**
- Analgesia – incremental low dose opioid, appropriate dose and route
- GTN sublingual

(bold 2 plus one other for full marks)

Part d (4 marks)

In general, for patients presenting with suspected acute coronary syndrome, describe four specific ECG criteria that are diagnostic for STEMI.

Model Answer

- 2.5 mm ST elevation in leads V2-3 in men under 40 years
- 2.0 mm ST elevation in leads V2-3 in men over 40 years
- 1.5 mm ST elevation in V2-3 in women
- mm in other leads
- New onset left bundle-branch block

Part e (7 marks)

A decision is made to take this lady for urgent PCI, however she has become more unwell with acute dyspnoea and agitation. Her ECG is unchanged.

Her current vitals signs are:

BP 85/50
O₂ sats 88% on 15L/min O₂

She now requires intubation prior to leaving the Emergency Department.

Outline your plan to intubate this patient, including drugs and doses and volumes where relevant

Model Answer

Get help – at least one other senior MO and 2 nursing staff

Resus area if not already

Optimise oxygenation – sit upright, BVM with 10cm PEEP or NIV, FiO₂ 1.0

Optimise blood pressure

– small fluid bolus, 0.9% saline 250ml, max x 2 , aim for SBP >90

Vasopressor - aramine 1mg boluses, or adrenaline 10mcg boluses, or adrenaline infusion

Prepare equipment:

VL and DL, bougie, ETT 7-8, suction

Prepare drugs:

Induction with ketamine (0.5-1mg/kg) or fentanyl (1-4mcg/kg) +/- midazolam 2.5-5mg. Propofol not ideal but acceptable if very low dose

Paralysis with rocuronium 1.5-2mg/kg or suxamethonium 2mg/kg

Describe Plan A/B/C – most experienced operator.

Defib pads on patient

(for full marks must include at least one strategy to optimise O2 and BP, safe drug type/dose, at least plan A and B)

Question 2 (18 marks)

Toxic ingestions are common presentations to the Emergency Department.

Part a (3 marks)

List six (6) components of a general toxicology risk assessment.

Model Answer

- Agent
- Dose
- Co-ingestants
- Time since ingestion
- Clinical features
- Patient factors (weight & comorbidities)
- Intent of ingestion (deliberate, unintentional, non-accidental)

Part b (9 marks)

The goal of enhanced elimination is to increase the rate of removal of an agent from the body to reduce the severity and duration of clinical intoxication.

Complete the table listing three (3) methods of enhanced elimination, as well as two (2) examples of drug toxicities for which they could be used.

Model Answer

	Enhanced Elimination method	Drug 1	Drug 2
1	MDAC	Carbamazepine, Dapsone, Phenytoin	Phenobarbitone, Theophylline, Quinine
2	Urinary alkalinisation	Salicylates	Phenobarbitone
3	Extracorporeal elimination eg haemodialysis/filtration	Metformin, toxic alcohol, Salicylate, Lithium, Potassium	Valproate, Theophylline, Carbamazepine, Barbiturates, MTX

Part c (6 marks)

In certain circumstances, we can administer an antidote to counteract the effects of a toxic ingestion.

Complete the following table listing appropriate antidote including dose for the given toxins.

Model Answer

Drug class	Antidote	Dose
Organophosphate	Atropine OR Pralidoxime	1.2mg IV doubling dose q5min until end point (Pralidoxime 1g IV)
Benzodiazepine	Flumazenil	0.1-0.2mg IV up to 2mg
Anticholinergic	Physostigmine	0.5mg IV q15min up to 2mg

Question 3 (12 marks)

A 20 year old man presents to the Emergency Department requesting Post-exposure prophylaxis (PEP) following unprotected sexual intercourse with a man 48 hours prior. He has no significant past medical history and has no allergies.

Part a (5 marks)

List five (5) investigations you would perform.

Model Answer

- PCR or NAAT chlamydia – oropharyngeal swab, first pass urine, anorectal swab (can be self-collected)
- PCR or NAAT gonorrhoea - oropharyngeal swab, first pass urine, anorectal swab (can be self-collected)
- HIV serology – Ab & Ag
- Syphilis serology
- Hepatitis A antibody
- Hepatitis B – HBsAg, Anti-HBc, Anti-HBs
- Hepatitis C – Ab & PCR
- LFT & EUC

Part b (2 marks)

After taking the history, you confirm his exposure as high risk and wish to commence PEP.

Prescribe a PEP regime for this man, include drug dose & frequency.

Model Answer

2-drug regimens:

- Tenofovir 300mg with lamivudine 300mg (Daily)
- OR Tenofovir/emtricitabine (Truvada) 300mg/200mg (Daily)

3-drug regimens:

Your preferred 2-drug regimen PLUS

- dolutegravir 50mg (Daily)
- OR raltegravir 400mg (BD)
- OR rilpivirine 25mg (Daily)

Part c (5 marks)

You provide him with a take home starter pack of medication and plan to discharge him home.

List the pertinent points of your discharge plan.

Model Answer

- Importance of PEP adherence, including potential side effects
- Risk reduction practices until seronegative status confirmed
- Use of condoms
- Follow-up with GP or sexual health clinic for results, further PEP supply & ongoing testing
- Contact tracing by pt, GP or can be done anonymously
- HIV seroconversion signs and symptoms
- Vaccination against HPV, Hep A, B
- Encourage regular screening

Question 4 (12 marks)

You are the physician for an expedition team attempting to climb a Himalayan mountain (altitude 8091m). You are involved in expedition planning and treatment of the team members.

Part a (2 marks)

List two (2) patient factors that are associated with an increased risk of developing acute mountain sickness.

Model Answer

- Prior history of acute mountain sickness
- Younger age
- Dehydration
- Obesity
- Pre-existing cardiopulmonary disease
- Alcohol consumption/stimulant or other depressant drugs

Part b (3 marks)

List three (3) features of the climbing / ascent plan that are associated with an increased risk of developing acute mountain sickness.

Model Answer

- **Fast / rapid ascent** (>625m / day at >2500m)
- Ascent to higher altitude
- Strenuous physical exertion
- Sleeping at altitude

Part c (2 marks)

Prescribe two (2) medications can be used to prevent the development of acute mountain sickness, including drug name, dose, route and frequency.

Model Answer

- Acetazolamide 125mg BD (up to 500mg BD acceptable)
- Dexamethasone 2mg q6h or 4mg BD, duration not to exceed 10 days

Part d (1 marks)

Three days following the ascent through 3000m one of the climbers becomes more lethargic and tires with minimal exertion. They complain of chest pain and have a dry cough.

On assessment they are cyanotic, tachycardia and tachypnoeic with a low grade fever.

What is the most likely diagnosis?

Model Answer

High altitude pulmonary oedema (HAPE)

Part e (4 marks)

Outline your management steps for this patient.

Model Answer

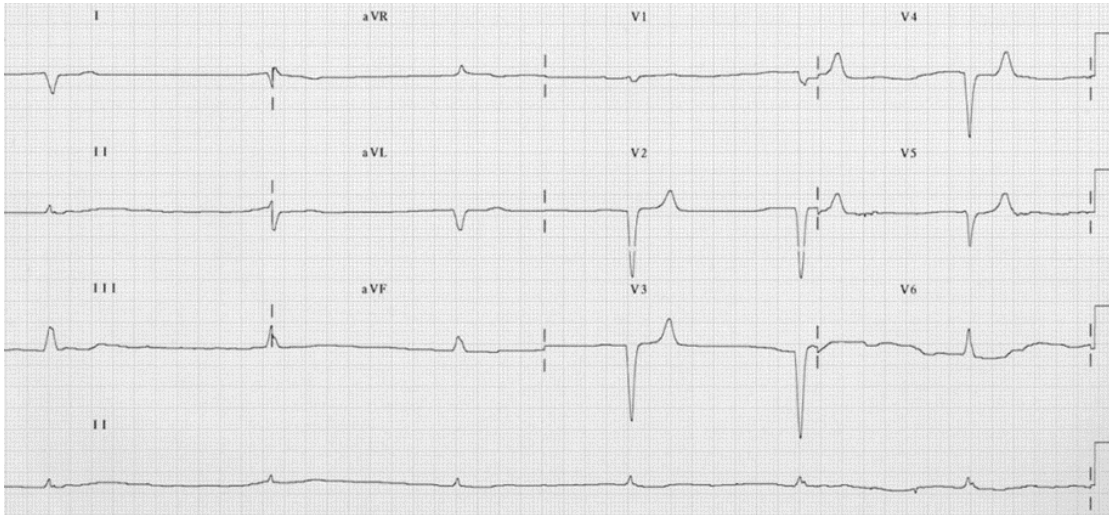
- **Descent 500-1000m or until symptoms resolve** / limit exertion
- Supplemental oxygen to maintain SpO₂ >90% - reduce hypoxic pulmonary vasoconstriction
- Keep warm – reduce cold induced sympathetic effect
- Portable hyperbaric chambers (should not delay descent)
- Nifedipine SR 60mg daily in divided doses
- CPAP or EPAP, generally not feasible but could be considered

Not sufficient evidence to support beta agonists, phosphodiesterase inhibitors, diuretics or corticosteroids

Question 5 (12 marks)

A 64 year old woman presents with lethargy. She has a background of end stage renal failure and is on haemodialysis thrice weekly.

A 12 lead ECG is performed.



Part a (2 marks)

List two (2) abnormalities on this ECG

Model Answer

- Junctional rhythm rate 30-36bpm
- Peaked T waves V2-5

Part b (1 marks)

State one immediate investigation you would perform.

Model Answer

VBG to check for hyperkalemia

Part c (9 marks)

Complete the table listing three (3) medications including dose and route with mechanism of action, onset and duration of action for treating her condition.

Model Answer

	Medication	Dose and route	Mechanism of action	Onset of action	Duration of action
1	Ca gluconate/Cl	10% 10ml IV	cardioprotective	<5mins	30-60mins
2	Salbutamol	5mg nebuliser	Intracellular shift of K	15mins	1-2hrs

3	Insulin and glucose	10units Actrapid Insulin and 50% Glucose 50ml IV	Intracellular shift of K	30mins	2-4hrs
4	NaHco3	1meq/kg IV	Intracellular shift of K	15mins	1-2hrs
5	Resonium	30g oral or rectal	Ion binding	1-2hrs	4-6hrs

0.5mark each for medication name and dose+route

1mark for MOA

0.5 each for OOA+DOA Ref:dunn online manual

Question 6 (12 marks)

A 24 year old man with a known history of epilepsy presents to the Emergency Department with left shoulder pain and limited range of motion. He has had pain for 2 weeks following a seizure episode.

AP and lateral x-rays of his left shoulder were performed.



Part a (2 marks)

List two (2) important findings on these x-rays.

Model Answer

Internally rotated head of humerus (light bulb sign of the head of the humerus).

A "light bulb sign" by itself is insufficient as it is non specific.

The candidate is expected to demonstrate the appreciation of its association with the head of the humerus.

Posteriorly placed humeral head in relation to the scapula spine.

Part b (3 marks)

List three (3) acute complications of this condition.

Model Answer

- Assoc fracture eg greater tuberosity, humeral head etc
- Reverse Bankart's / Reverse Hill sach's fracture
- Axillary or suprascapular nerve injury.
- Acute Re- dislocation
- Osteo necrosis of the humeral head.

Part c (3 marks)

List the steps involved in management of this condition.

Model Answer

- Arm is held in adduction and internal rotation
- Caudal traction is applied with arm held in adduction and internal rotation.
- Pressure is applied on the humeral head in an anterior direction OR medial aspect of the upper arm is pushed laterally OR a sheet is applied within the axilla to provide counter traction.
- Stating the "Depalma" method by itself is insufficient.

Part d (4 marks)

List four (4) factors that will influence your decision to perform procedural sedation in the Emergency Department versus the Operating Theatre to facilitate this patient's management.

Model Answer

- Duration of the dislocation being 2 or more weeks.
- Co- morbidities of the patient that would make him unsuitable for procedural sedation in ED.
- Past history of failed reduction in ED.
- Orthopaedic surgeon's preference to perform an open reduction.
- Fasting
- Pt refusal
- SA of department/resus capacity/staff skills, availability
- Associated injuries such as fracture, Reverse Hill Sachs and/ or Reverse Bankart's
- NV compromise
- Known difficult airway

At least one of the first two points to acquire full marks.

Question 7 (12 marks)

A 2 year old boy is brought in by his mother with a worsening rash on his face. She reports fever and recurrent vomiting for the last 2 days. He has been less active this morning.

His vital signs are:

Temp	39°C
HR	142/min
Sats	99% RA
Cap refill	3-4secs
BSL	3.5



Part a (2 marks)

Describe the rash in this photo.

Model Answer

- Vesicular monomorphic rash/ monomorphic blisters around perioral area
- Erythematous erosions and crusted lesions around perioral and periorbital area
- Background of dry/eczema

Part b (1 marks)

State the most likely diagnosis.

Model Answer

Eczema herpeticum with possible secondary bacterial infection (cellulitis/impetigo)

Part c (2 marks)

List two (2) investigations you would perform to confirm your diagnosis.

Model Answer

- 1-Viral swab from the blisters for culture/PCR to confirm HSV
- 2- Bacterial swabs for culture to confirm staph/strep

Part d (4 marks)

Give details of two (2) medications including dose, route and frequency that you would prescribe for this child.

Model Answer

- Acyclovir 10mg/kg IV BD (1 mark for drug 1 mark for dose/route/freq)
- Flucloxacillin 50mg/kg IV QID (unless MRSA Hx or RFs, use Vanc/Clinda)

No marks for oral antimicrobials considering child is unwell /vomiting/poor perfusion

Part e (3 marks)

List three (3) complications of this condition.

Model Answer

- Herpes encephalitis
- Herpes hepatitis
- Herpes ophthalmicus
- Bacteraemia
- Sepsis/multiorgan failure
- ARDS
- DIC
- Death

0.5 marks each

Needs encephalitis for full marks

<https://dermnetnz.org/topics/eczema-herpeticum>

Question 8 (12 marks)

End tidal carbon dioxide (ETCO₂) monitoring is becoming increasingly utilised in the Emergency Department in many clinical situations.

Part a (5 marks)

List five (5) uses for ETCO₂ monitoring in the Emergency Department.

Model Answer

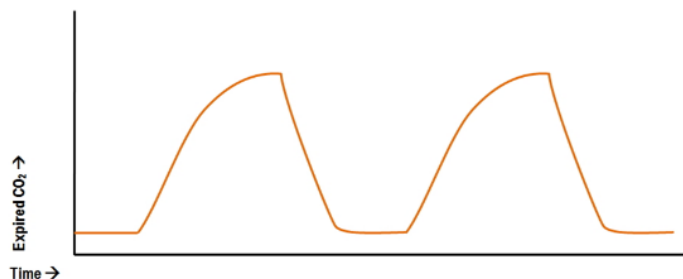
- **Confirming and monitoring placement ETT**
- **Sedation and procedural sedation**
- In cardiac arrest to suggest ROSC if ETCO₂ has an abrupt increase to a normal level 35-40 mmHg
- predict unsuccessful resuscitation ETCO₂<10mmHg after 20 minutes
- Detection of spontaneous breathing in intubated/sedated pt
- guide to compression quality: improve technique or switch providers if <10mmHg with goal >20mmHg
- ongoing monitoring ventilation pts decreased GCS eg. OD
- monitoring response to therapy in patients with respiratory distress eg, COPD, asthma

*must have bolded for full marks

Part b (3 marks)

You have just intubated a 25 year old with severe asthma.

Below is her ETCO₂ trace.



List three (3) interventions you would undertake.

Model Answer

1. Optimise asthma therapy- beta agonists- continuous nebulised salbutamol via circuit/ IV salbutamol/ Mg bolus
2. Optimise sedation/paralysis
3. Ensure asthma specific ventilation strategies- low TV, allow permissive hypercapnea

Part c (4 marks)

With treatment she is improving clinically, then the nurse alerts you to a change in her ETCO₂ trace as below.



Outline your immediate steps to address this.

Model Answer

- **Check pulse/BP and patient to ensure not in cardiac arrest**
- Check for disconnection in circuit which can be corrected
- Disconnect and manually BVM ventilate with 100% oxygen
- Check ETT not dislodged- listen for bilateral air entry/ chest rise and fall
- Check for leak- ?cuff deflated-needs to be replaced
- Pass suction catheter if suspecting an obstruction eg mucous plug
- If tube obstructed/dislodged remove immediately and replace

Ref: emdocs.net- Interpreting Waveform Capnography: Pearls and Pitfalls / Capnography in the ED

Question 9 (12 marks)

A 57 year old man arrives to your urban district Emergency Department via ambulance with acute onset respiratory distress after coughing a small volume of bright red blood.

He is able to communicate to you via a fenestrated tracheostomy tube, however is visibly dyspnoeic with tachypnoea and moderate work of breathing. Audible biphasic stridor is apparent from his tracheostomy.

His vital signs are:

SpO ₂	90% (15L O ₂ NRBM)
Pulse	110bpm
SBP	132mmHg

Part a (4 marks)

List four (4) steps you would take to improve this patient's oxygenation and respiratory status.

Model Answer

1. **Add high-flow oxygen therapy over the tracheostomy stoma**
2. Remove the speaking valve/cap
3. Remove the inner cannula (assess for obstruction)
4. Pass a suction catheter to assess for airway obstruction/secretions
5. Deflate the cuff (if present)
6. Intubate the stoma & apply positive-pressure ventilation

Part b (2 marks)

You have been able to ascertain that he has a background of atrial fibrillation anticoagulated on warfarin. He had a laryngectomy for the treatment of an aggressive SCC four months earlier.

You witness torrential haemorrhage (>500mL) from the tracheostomy stoma. The patient deteriorates, becoming pale and diaphoretic. He is drowsy and hypoxic with SpO₂ 80%.

List two (2) bedside interventions you can perform to control this haemorrhage.

Model Answer

1. Intubate stoma with a large endotracheal(/trache) tube & hyperinflate the cuff (10-50mL may be required)
2. Insert finger into stoma, applying finger pressure to the root of the neck in the sternal notch pressing anteriorly

Part c (6 marks)

In addition to the technique(s) mentioned above, describe six (6) management priorities for this patient.

Model Answer

1. Detect & correct coagulopathy
 - a. Prothrombinex 50iu/kg
 - b. +/- FFP 4u and 10mg intravenous Vitamin K
2. Optimise haemodynamics

- a. Invasive BP monitoring if able
 - b. Activate MTP
 - c. 1:1:1 transfusion
 - d. ROTEM
 - e. Physiological end-points:
 - i. Improving perfusion / shock index
 - ii. Improved mentation
 - iii. SBP>90 / MAP>65
 - iv. Lactate clearance >10% per hour
 - f. Haematological end-points:
 - i. Hb >70, PLT >100, INR <1.3, Fibrinogen >1.5
3. Optimise oxygenation
- a. Ventilate via ETT on 100% O₂
 - b. Increase PEEP as tolerated by blood pressure
 - c. In-line suction in circuit -> repeat airway suction
4. Arrange definitive treatment:
- a. Notify ENT/Interventional radiology
5. Early transfer
- a. Retrieval to tertiary referral hospital
 - b. Medical Retrieval team
6. Consider palliation / family conference

Question 10 (18 marks)

You receive an ambulance pre notification for a 28 year old woman who is 32 weeks pregnant involved in a high speed MVA. She has sustained blunt chest and abdominal injuries.

Her vital signs are:

HR 112/min
BP 114/80
RR 30/min
Sats 98% RA
GCS 14/15
BSL 4.6

Part a (10 marks)

Complete the table listing five (5) physiological changes in the mother that occur during pregnancy, and their implications on your assessment and management in the context of trauma.

Model Answer

	Physiological change	Implications on assessment/management
1	Airway oedema	Skilled staff for RSI anticipate difficult airway
2	Respiratory alkalosis	Paco2 35-40 may indicate respiratory failure
3	Expanded blood volume	Reduced oxygen carrying capacity and Hypotension a late sign
4	Resting tachycardia	Masks early signs of haemorrhagic shock
5	Relative haemodilution/low Hb	Hb less reliable indicator of blood loss
6	Reduced venous return due to IVC compression	Resuscitate in Left lateral position
7	Increased cardiac output by 30-50%	increased CPR demand
8	Decreased BP by 10-15mmHg	Decreased reserve

Part b (2 marks)

The patient deteriorates on route to the Emergency Department.

Her vital signs are:

HR	160
BP	65/40
GCS	10/15

State the indication for resuscitative hysterotomy.

Model Answer

>20/40 Gestation or fundal height at/above umbilicus

Within 15 minutes of maternal cardiac arrest or periarrest

Part c (6 marks)

List six (6) steps in performing a resuscitative hysterotomy.

Model Answer

- assemble teams (ideally x3 – maternal arrest, hysterotomy, neonatal resus)
- continue CPR and prepare for neonatal resuscitation
- liberal antiseptic to abdomen
- Vertical incision from umbilicus or xiphisternum to pubis using scalpel
- separate rectus muscles with fingers then breach peritoneum by making incision
- deliver uterus and make midline vertical incision on the uterine anterior wall
- Deliver baby followed by clamping and cutting the cord
- deliver placenta and pack uterus

Minor variations to procedure are acceptable as long as skin and uterine incision with delivery of the foetus is covered appropriately.

No marks for full aseptic precautions etc this is a time critical procedure full aseptic precautions are practically impossible

Resources

https://www.health.qld.gov.au/_data/assets/pdf_file/0013/140611/g-trauma.pdf

The Emergency Medicine Manual -Dunn

- Adelaide EM Physicians: Thinking About Perimortem C-section. <http://adelaideemergencyphysicians.com/2016/03/thinking-about-perimortem-caesareansection/>
- CoreEM (2016): Perimortem c-section. <https://coreem.net/core/peri-mortem-c-section/>
- Einav, S., Kaufman, N. and Sela, HY. (2012). 'Maternal cardiac arrest and perimortem caesarean delivery: evidence or expert based?' *Resuscitation* **83**:1191-2000.
- First 10 minutes in EM (2015): Cardiac arrest in pregnancy and the perimortem c-section. <https://first10em.com/cardiac-arrest-in-pregnancy-theperimortem-caesarean-section/>
- Parry, R., Asmussen, T., Smith, JE (2016) 'Perimortem caesarean section.' *Journal of Emergency Medicine* **33**: 224-229.
- St Emlyn's Blog (2013): Perimortem c-section. <http://stemlynsblog.org/peri-mortem-c-section-at-st-emlyns/>
- WikiEM (2011): Resuscitative Hysterotomy. https://wikem.org/wiki/Resuscitative_hysterotomy
- Video 1: Greater Sydney HEMS (2015): Resuscitative Hysterotomy Training Scenario. <https://sydneyhems.com/2015/08/18/resuscitative-hysterotomy/>
- Video 2: EmCrit (2013): All you need to know about Resuscitative Hysterotomy in 8 minutes. <https://emcrit.org/racc/peri-mortem-c-section/>

Question 11 (18 marks)

A 40 year old presents to the Emergency Department with fever. He has a history of IV drug use.

His observations are:

Temp 39.5°C
HR 120 bpm
BP 100/70
Sats 91% in RA
RR 24 bpm
GCS 15

You suspect infective endocarditis.

Part a (6 marks)

Other than IV drug use, list six (6) risk factors for infective endocarditis.

Model Answer

- Rheumatic heart disease
- Congenital heart disease
- Hx of previous IE
- Prosthetic valves
- HD pts
- Immunocompromised
- Dental infection/poor dentition
- Male
- Age >60y
- Indwelling intravascular device
- Pacemaker
- HIV
- Hx CABG

Part b (6 marks)

Complete the table listing six (6) investigations including justification that you would perform in this patient.

Model Answer

Investigation	Justification
Peripheral Blood cultures Most important test	Three sets of blood cultures preferable Preferably from different sites on the patient Volume of blood obtained >important factor - fill the bottles Identify pathogen & direct antibiotic therapy
Bedside Echo	60% sensitive for vegetations Ventricular size & function, haemodynamic severity of vegetations Valvular regurgitation
Urinalysis	Haematuria – present in about 50%

	Secondary to emboli to kidneys
CXR	No specific finding for IE Helps identify complications: multiple bilateral pulmonary infiltrates-> septic emboli, APO, Pneumonia
ECG	No specific finding for IE Helps identify complications: myocardial ischaemia CHB, AV block & bundle branch blocks, arrhythmias
CT Chest/Abdo	Looking for complications to chest & abdo – septic emboli, Abscesses, distal infarctions
FBC	WCC not sensitive to IE – can be normal, raised, depressed Haemolytic anaemia maybe present
ESR/CRP	Sensitive but not specific, elevated in >90% cases

Part c (4 marks)

List four (4) complications of infective endocarditis.

Model Answer

- Septic pulmonary embolic from valvular vegetations
- Heart failure secondary to valvular regurgitation/insufficiency, accept cardiogenic shock.
- Cardiac ischaemia secondary to valvular disease, cardiogenic shock, septic shock, arrhythmia
- Septic shock secondary to untreated infective endocarditis – may have been unwell for some time in the community
- Arrhythmia secondary to local myocardial abscess, septic shock, heart failure
- Systemic embolic to spleen &/or kidneys – another explanation for left sided chest pain (referred pain) or causing diaphragmatic irritation
- Cerebral emboli – maybe contributing to a delirium and explain why wants to DAMA.
- Joint emboli – explaining why aching all over 9although this could be due to high fever & sepsis

Part d (2 marks)

Prescribe the empiric antibiotic treatment for this patient.

Model Answer

Vancomycin 25 -30mg/kg IV as a loading dose

Flucloxacillin 2g IV 4 hourly

Gentamicin 7mg/kg if normal renal function, 4-5mg/kg IV while renal function unknown or if patient has renal impairment, can be topped up to 7mg/kg when renal function known

Vancomycin rather than benzylpenicillin as patient is an IVDU – as per therapeutic guidelines

Question 12 (12 marks)

A 30 year old man from India presents to your Urban Emergency Department with generalized abdominal pain associated with fever. He has no significant past medical history and is not on any regular medications. His GP has arranged a CT abdomen which shows moderate ascites with omental thickening.

Part a (4 marks)

Complete the table listing four (4) blood tests that you would perform on this man with rationale for each.

Model Answer

- Full blood count/ CRP- raised inflammatory markers concerning for an infection
- **Liver functions**- To assess for evidence of Cirrhosis, ascertain Serum albumin / Protein
- Renal function test- Assess for evidence of renal impairment as systemic cause for ascites
- Serum LDH- For comparison with the ascitic LDH
- Lipase- to assess for pancreatitis
- **Coags** – synthetic function, guide procedural

No marks for ammonia

You have performed diagnostic paracentesis for peritoneal fluid sampling.

Part b (5 marks)

You have performed diagnostic paracentesis for peritoneal fluid sampling.

List five (5) investigations to be sent on the ascitic fluid.

Model Answer

- Cell count
- TB PCR- must for full marks as given the details in the vignette for pt demographic and CT findings, this is a priority
- Cytology
- Albumin
- Total protein
- LDH
- Gram stain
- Culture
- Glucose
- Amylase
- Bilirubin

His serum and ascitic investigations return, and you calculate his Serum-Ascitic Albumin Gradient (SAAG) as less than 11 g/l.

Part c (1 marks)

His serum and ascitic investigations return, and you calculate his Serum-Ascitic Albumin Gradient (SAAG) as less than 11 g/l.

State the significance of this SAAG result.

Model Answer

- Low SAAG
- Exudate
- Pt does not have portal hypertension/cirrhosis
- SBP unlikely

Part d (2 marks)

List four (4) potential diagnoses in this patient.

Model Answer

- **Tuberculous / TB peritonitis**
- Malignancy
- Pancreatitis
- Nephrotic syndrome
- Bowel obstruction/infarction
- Bile leak
- Vasculitis
- Hypothyroid

Question 13 (12 marks)

A 3 year old child is brought in to the Emergency Department by her father. She sustained a 4cm laceration to her forehead after falling and hitting her head off a table. There are no concerns for non-accidental injury. Her vital signs are normal.

You decide the wound needs closure with sutures, and to facilitate this she will require procedural sedation.

Part a (6 marks)

Complete the table listing two advantages and two disadvantages of the following medications.

Model Answer

Medication	Advantage	Disadvantage
Midazolam	Multi-route (PO, IN, buccal, IM, IV) Amnesic Anxiolytic Quick onset Short acting	No analgesic effect Can product paradoxical effect after discharge Agent failure
Ketamine	Airway reflexes maintained Cardiovascular stability IM or IV Excellent analgesia & sedation	Agitation Vomiting Laryngospasm
Propofol	Short acting Effective muscle relaxation	Narrow therapeutic window Cardiorespiratory depression No analgesic effect

0.5 MARK EACH

Part b (6 marks)

A decision is made to proceed with Ketamine sedation.

Complete the table comparing routes of administration of Ketamine.

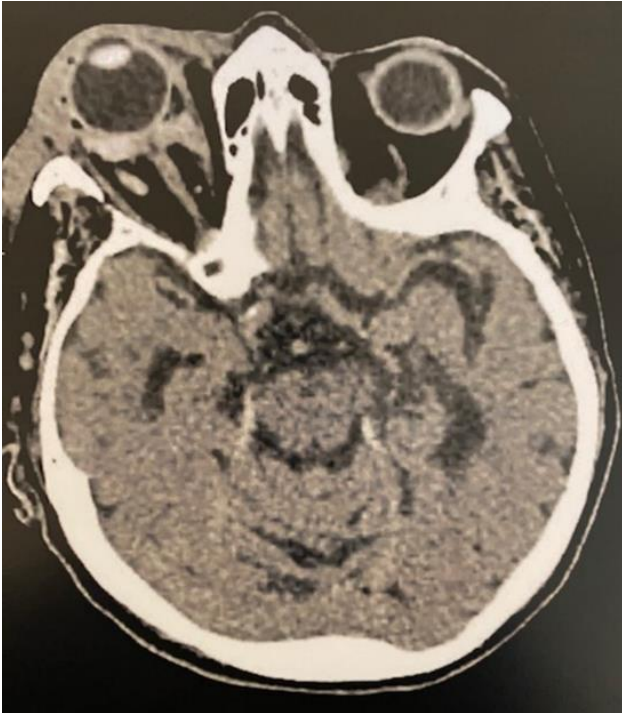
Model Answer

Route of administration	IM	IV
Initial dose	3-4mg/kg	1-1.5mg/kg
Clinical onset	3-4 mins	1 min
Time of effective sedation	15-30 mins	10-20 mins

Question 14 (12 marks)

A 52 year old man self presents to the Emergency Department with right periorbital swelling following a mechanical fall.

You have performed a CT head.



Part a (3 marks)

List three (3) abnormalities on this image.

Model Answer

- **Proptosis R eye**
- **Retrobulbar haematoma**
- Intraorbital gas
- Subcutaneous periorbital haematoma

Part b (3 marks)

He complains of severe pain in his right eye.

List three significant clinical findings you would look on examination of his eye.

Model Answer

- Decreased visual acuity
- Raised IOP > 35mmhg-40mmhg
- Restricted extraocular movements/diplopia
- RAPD

Part c (6 marks)

Your examination confirms orbital compartment syndrome. You decide to perform lateral canthotomy.

Describe six steps of performing a lateral canthotomy and cantholysis.

Model Answer

- Consent (verbal, informed)
- Consider procedural sedation
- sterile preparation
- infiltrate 2ml Lignocaine 1% in to the lateral canthus
- crush lateral canthus with haemostat (artery forcep) to reduced bleeding
- cut along lateral canthus approx. 1cm towards orbital rim with scissors
- retract lower lid downwards with forceps and identify/strum inferior crus of lateral canthal ligament
- incise inferior crus of lateral canthal ligament with scissors
- Reassess eye for improvement in visual acuity, resolution of RAPD, with IOP <40mmHg
- If no improvement, confirm cantholysis (lower eyelid freely mobile, no tendon palpable with forceps), then
- Proceed to divide the superior crus of the lateral canthal tendon

Resources

<https://aci.health.nsw.gov.au/networks/eci/clinical/procedures/procedures/554081>

<https://first10em.com/lateral-canthotomy/>

<https://dontforgetthebubbles.com/how-to-perform-a-lateral-canthotomy/>

Question 15 (12 marks)

A new antidote has been invented as an alternative treatment to N-Acetyl Cysteine for paracetamol overdose and has been recently licensed in Australia. Your drug committee request more information to decide if this drug should be stocked in your Emergency Department.

Part a (6 marks)

You decide to perform a literature review.

List six (6) specific points you need to address on literature review of this new antidote.

Model Answer

- 1) Mode of action of the drug and pharmacokinetic and pharmacodynamic properties of this new agent
- 2) **Equivalence or superiority to conventional treatment (NAC) plus is there a greater risk of harm with this new drug**
- 3) **National, international and expert recommendations including eTG / Poisons Information Centre including evidence from overseas**
- 4) Is it licenced
- 5) Demonstrate the feasibility of the drug including: (bigger or lesser risk cw NAC)
 - a. Route of administration
 - b. Frequency of administration
 - c. Complexity of administration (need to train staff etc)
 - d. Side effect profile
 - e. Storage
 - f. Easier than NAC to give
- 6) Cost effectiveness:
 - a. Cost of drug versus cost of the alternative treatment (NAC) plus other costs including
 - i. Length of stay
 - ii. Minimising expensive care including
 1. ICU stay
 2. Dialysis
 3. Ventilation etc
 - iii. Need for regular blood sampling
- 7) Use in special groups including pregnancy / paediatrics
- 8) Safety in comparison to NAC in terms of giving in a timely way, reduced drug errors, need for multiple infusions etc

Comment: I have put these as headings but all can be given a point. I think they need to specific national and international evidence and guidelines including advice from Toxicology bodies. It should be pretty common sense that this would be a minimum expectation with a new drug being used.

Also I think they need to know that they have to compare to the gold standard

It would be nice for them to say cost effectiveness with an explanation / justification so I can rejig it into a table but I think time will work against them

Part b (2 marks)

List four (4) stakeholders you would engage in this process.

Model Answer

- ICU
- Gastroenterology
- Toxicology
- Pharmacy
- Your FACEM colleagues and ED nursing staff

0.5 marks each

Part c (4 marks)

List four (4) steps you would take to assess a local need for this drug.

Model Answer

- Retrospective audit of all cases of paracetamol poisoning over a prespecified time period e.g. six months
- Review
 - o How many cases required NAC
 - o Current outcomes including
 - § Average LOS
 - § Complications including death, hepatotoxicity and complications with NAC being given that care can be improved
 - § Estimate costs of care including – level of care (ICU/ ward / home from ED), laboratory etc
 - o Estimated comparison to if treated with this new treatment and is there a cohort that could have benefited
 - o Extrapolation to a district level if required
 - o Establish a recommendation based on your literature review and local review

Following this, your findings and recommendations can be presented at a drug and therapeutics meeting for review and discussion.

This is not a guideline or policy question (therefore the points need to be specific to the question) it is all about establishing evidence and need for this antidote and involving those who might want to use it.

Question 16 (12 marks)

A 26 year old man presents one day after treading on a sea urchin at the beach. He complains of pain in his right foot and feels that there may be a foreign body in the sole of his foot.

This is an image of the sole of his foot.



Part a (1 marks)

You decide to remove the foreign bodies under regional anaesthesia in the Emergency Department.

List the nerve you would anaesthetise in this patient.

Model Answer

Tibial nerve

Part b (2 marks)

List the steps involved in performing regional anaesthesia of this nerve by landmark technique.

Model Answer

At level of medial malleolus, immediately posterior to the posterior tibial artery

Infiltrate 5-10ml of lignocaine (or long acting)

(If the artery cannot be palpated, the point of injection should be estimated at halfway between the medial malleolus and the Achilles tendon)

Part c (4 marks)

List four (4) benefits of regional vs local anaesthesia in this case.

Model Answer

- Only one injection vs multiple- hence less painful for patient
- Likely to have better analgesia with regional block vs multiple local injections
- Less likely to have LA toxicity with regional technique (smaller volume of LA needed)
- Difficult to infiltrate into thick plantar skin hence less reliable anaesthesia
- Limits the chance of a needle stick to the provider.

Part d (3 marks)

Describe your management after removal of the foreign bodies.

Model Answer

- ADT
- Analgesia
- Antibiotics- doxycycline 100mg BD PO + flucloxacillin 500mg QID PO
- Follow up to ensure no missed foreign bodies as well as no developing infections

Part e (2 marks)

List two (2) types of bacteria associated with water immersed wound infections.

Model Answer

- Aeromonas sp
- Mycobacteraemia marinum
- Shewanella putrefaciens
- Vibrio sp
- Staph aureus inc MRSA
- Strep pyogenes

Seawater-immersed wounds

For empirical therapy for localised infection of seawater-immersed wounds (including coral cuts) not associated with systemic features or involving deeper tissues, use:

doxycycline orally, 12-hourly [\[Note 1\]](#)



adult: 100 mg

child 8 years or older and less than 26 kg: 50 mg

child 8 years or older and 26 to 35 kg: 75 mg

child 8 years or older and more than 35 kg: 100 mg

PLUS EITHER

1 dicloxacillin 500 mg (child: 12.5 mg/kg up to 500 mg) orally, 6-hourly



OR

1 flucloxacillin 500 mg (child: 12.5 mg/kg up to 500 mg) orally, 6-hourly.



Doxycycline has not been associated with tooth discolouration, enamel hypoplasia or bone deposition, even in children younger than 8 years, so is increasingly used in this age group. However, use is limited by the lack of a suitable formulation. If an alternative is required for children younger than 8 years, use:

ciprofloxacin (child younger than 8 years) 12.5 mg/kg up to 500 mg orally, 12-hourly [\[Note 2\]](#) [\[Note 3\]](#).



Cefalexin is often preferred to dicloxacillin or flucloxacillin in children because the liquid formulation is better tolerated. In most cases, it can also be used for patients with delayed nonsevere [hypersensitivity to penicillins](#) [\[Note 4\]](#). Use:

Question 17 (12 marks)

A 75 year old man is brought in by his family with an acute deterioration in his mental state. He has a 2 week history of decline in his memory, poor appetite and sleep. He is withdrawn and is no longer socialising, which they attribute to the recent loss of his wife. He has no previous mental health issues, and his past medical history includes hypertension and dyslipidaemia.

Part a (4 marks)

Complete the table listing four features on history and four features on examination suggestive of a medical cause for his presentation.

Model Answer

History

- No previous psychiatric history
- Recent hospitalisation or possible infection
- Recent medication changes
- Sudden changes in behaviour
- Visual hallucinations
- Extremes of age
- New onset seizure
- Recent memory loss
- Inattention
- Disorganised thinking
- History of substance abuse

Examination

- Abnormal vital signs
- Fluctuating or significantly decreased LOC
- Focal neurological findings
- Ophthalmologic abnormalities
- Evidence of trauma
- Abnormal dermatologic manifestations

Tintinalli's Emergency Medicine: Comprehensive Study Guide 9E, Ch 286 – 287 – Psychosocial Disorders.

Part b (4 marks)

During your assessment, he expresses thoughts of self-harm with a plan to commit suicide using his firearm.

List four (4) high risk features related to suicidal ideation in patients presenting to the Emergency Department

Model Answer

- Previous attempts
- Hx of physical/sexual abuse
- Older immigrants from NESBs
- Depression
- substance abuse
- social isolation
- relationship breakdown
- Hx of mental illness

- physical illness
- chronic health issues
- functional decline
- presence of a firearm
- Plans with high lethality and low rescue opportunity
- Financial issues
- Criminal issues/in custody or prison

Tintinalli's Emergency Medicine: Comprehensive Study Guide 9E, Ch 286 – 287 – Psychosocial Disorders.

<https://www.health.nsw.gov.au/mentalhealth/resources/Publications/suicide-risk.pdf> PAGE 12

Part c (4 marks)

You are unable to identify a medical cause for the patient's presentation and have made the decision to admit him under the mental health team, however he is refusing admission and requesting to go home.

Outline the features required to determine whether the patient has capacity to make this decision.

Model Answer

A3. Salient features to demonstrate capacity in the absence of altered mental status

- Ability to receive information
- Process and understand that information
- Deliberate about a decision
- Make / articulate / defend choices with reference to one's values

Presence of stroke, psychiatric illness and dementia should not lead to presumed incapacity

Tintinalli's Emergency Medicine: Comprehensive Study Guide 9E, Ch 303 – Legal Issues in Emergency Medicine.

Question 18 (12 marks)

You are working as a consultant in a rural Emergency Department. A 30 year old woman (G4P3) who is 29 weeks pregnant presents with abdominal pain. She reports painful regular contractions. You suspect premature labour.

Part a (4 marks)

List eight (8) risk factors for premature labour.

Model Answer

- idiopathic (most common)
- previous miscarriage
- multiple pregnancy
- premature rupture of the membranes
- hypertensive disorders of pregnancy
- antepartum haemorrhage
- significant infection from any source
 - chorioamnionitis
 - UTI
 - appendicitis
- polyhydramnios
- uterine abnormalities
 - fibroids
 - bicornuate uterus
- cervical abnormalities
 - short cervix
 - cervical incompetence
- low socioeconomic status
- ethnicity
 - African
 - Asian
 - indigenous
- age <18 > 40 years
- low weight
- smoking
- stimulant use
- poor ante-natal care

0.5 mark each

List from Dunn online manual

Part b (2 marks)

Other than routine blood tests, complete the table listing and justifying two investigations you would perform for this patient.

Model Answer

POCUS for foetal well being (HR and foetal movements)

CTG for foetal well being

Vaginal swabs to detect Foetal fibronectin (98% NPV for delivery in 7 days)

Formal USS pelvis to confirm cervical length

cervical length

-> 3cm usually excludes pre-term labour

-< 3cm higher risk for pre-term labour

-< 1.5cm more strongly predictive

Part c (3 marks)

Your assessment confirms premature labour in this patient.

List three (3) medications you would prescribe for this patient, including drug doses and route where appropriate.

Model Answer

1. Analgesia -anything sensible eg opioids, nitrous

2. Tocolytics

-if < 32 weeks gestation, nifedipine is most likely to be effective in delaying delivery by 48 hours, reducing neonatal respiratory distress syndrome and reducing fetal mortality

-dose of 20 mg stat

-2 further doses at 30 min intervals if contractions persist

-followed by 20 mg three times daily (maximum daily dose 120 mg)

salbutamol infusion

-reasonably effective but more likely to need to be ceased due to adverse effects

-10 mg salbutamol diluted in 1,000 mL Hartmann's solution

-commence at 10 mL/hour

-increase by 10 mL/hour every 15 minutes until contractions stop or maternal HR > 120 bpm

salbutamol and nifedipine should not be used together due to the potential for cardiovascular adverse effects

3. Glucocorticoids

• 2 doses of betamethasone 11.4 mg IM 24hrs apart

• indicated if gestation < 37 weeks

Part d (3 marks)

List three contraindications for suppression of labour.

Model Answer

- gestation > 34 weeks
- fetal death-in-utero
- fetal malformation where palliative care only is planned
- suspected fetal compromise on US or CTG requiring delivery
- placental abruption
- chorioamnionitis
- pre-eclampsia

Ref: online manual Dunn

<https://www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/resources/policies/preterm+labour+birth+prevention+diagnosis+management+-+sa+perinatal+practice+guidelines>

Question 19 (18 marks)

A 55 year old man was seen by a junior registrar overnight after being found drowsy at home. He was reported to have ingested a substance in the garage.

The following bloods were performed overnight:

VBG

pH	7.21
pCO ₂	26
Bicarb	10
BE	-17
Lactate	23
Na	140
K	4.7
Chloride	103
Urea	5.4
Creat	52
Glucose	7.1
Ethanol level	0
Osmolality	335

Part a (4 marks)

Describe and interpret these laboratory investigations.

Model Answer

Severe high anion gap metabolic acidosis with bicarb of 10mmol/L

Expected CO₂ 23mmHg – mild respiratory component, not compensating

Anion Gap: 31.7mmHg (27 if you forget k)

Delta ratio: (15)/14 = 1 HAGMA pure

Osmolar gap: 335 – 292.5 = 42.5

Elevated lactate indicative of a lactate gap

(ethanol level negative so don't need to correct for that – I can make it positive to correct factor 1.25 if you want)

Part b (2 marks)

List four (4) culprit toxins that might account for his presentation and blood gas.

Model Answer

- Ethylene glycol (lactate is diagnostic)
- Methanol
- Acetone
- Glycerol
- Propylene glycol

Comment: I will accept toxins that cause massive lactate rises as lactate rises increase OG like metformin and MALA

I am not keen on accepting toxic alcohol in a loose term

Part c (9 marks)

List three (3) specific management priorities for the likely toxin including dosing, therapeutic end points and goal of therapy.

Model Answer

Management priority including dose if relevant *all need dose adjustment for dialysis, I do not expect this as an answer	Therapeutic end point	Goal
Ethanol (from eTG) IV: 10% 6ml/kg IV as a load then 50-100ml/hr (1-2ml/kg/hr paed to 100ml). Po: 40% ethanol 0.6g/kg po then 5-10g/hr or 1.8ml/kg load 0.2 – 0.4ml/kg/hr maintenance Or 3 x40ml shots of vodka in a 70kg adult 1 shot per hour 40ml Double dose on dialysis Fomepizole 15mg/kg load 10mg/kg bd IV If on dialysis 10mg/kg 4 hourly	For ethanol 22mmol/l-44mmol/l Fomepizole is continued until acid base disturbance okay, OG <10 and undetectable EG or Methanol levels	ADH blockade preventing downstream formation of toxic metabolites
Dialysis Ideal IHD but CVVHDF SLED PIRRT all acceptable	Well patient Normal ph hco3 >20 Until OG <10 Negative ethanol level if given for 8 hours EG level <3.23mmol/l Methanol <6.24mmol/l	To eliminate methanol and toxic metabolites Correct acidosis
Co-factor replacement Depends on the agent but	Treat 48 hours	Co factors in the metabolism of the toxic metabolites so it will

EG: Thiamine 100mg qid iv or Pyridoxine 50mg IV QID Methanol Folic acid 50mg IV 6 hourly All for 2 days	Correction of metabolic derangement Able to eat and drink with oral intake	assist conversion of things like formic acid to non toxic metabolites
--	--	---

Half mark if they give drug not the dose

They must treat with ethanol or fomepizole and dialysis to pass the question

Comment: I will not accept RSI / vasopressors etc as a management priority, but I want focused treatment for this agent

Other things they can do are benzos for seizures and IVF to optimise renal function

Occasionally dialysis can be skipped with fomepizole but that is rare and not standard ED knowledge

Part d (3 marks)

The overnight registrar had medically cleared the patient for psychiatric assessment prior to your input.

Outline three (3) steps in your management of this missed diagnosis.

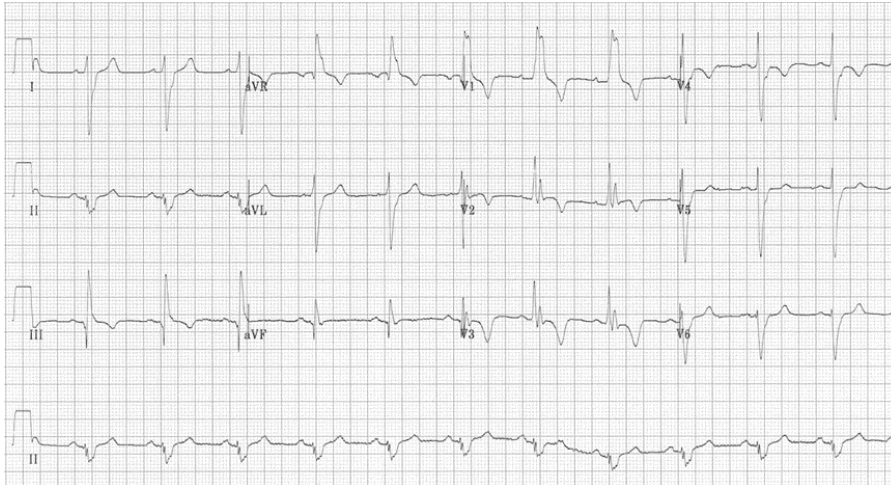
Model Answer

- An incident report and investigation regarding missed dx (not all states call them IMMS therefore I would rather incident report)
- Open disclosure and discussion with patient and family with timely review of events, notes etc
- Interview staff involved
- Assessment of systems issues contributing including busy ed, delays to bloods, access to blood gases, delays to osmolalities etc, supervision level available, triage level, early discussion with toxicology etc
- Access to treatments including antidotes, dialysis etc
- Assessment of level of training of registrar, educational support, registrar wellbeing
- Establishment of systems and interventions and report to director
- M and M
- Trainee can present at teaching

Question 20 (18 marks)

A 45-year-old woman presents to your Emergency Department with chest pain and syncope.

A 12 lead ECG is performed.



Part a (4 marks)

Describe her ECG.

Model Answer

SR~75bpm

Right axis deviation

RBBB

S1Q3T3

Deep Twi R precordial leads V1-4, III, flat aVF

Part b (6 marks)

You suspect she has a pulmonary embolism. A transthoracic echocardiogram is performed at the bedside.

List six (6) sonographic findings of acute right heart strain in the context of pulmonary embolus.

Model Answer

- R ventricular dilatation
- R ventricular hypokinesis, systolic dysfunction
- Interventricular septal flattening/bowing/"D" sign
- McConnell's sign
-0.5 marks if candidates writes only McConnell's without explanation
- Plethoric IVC
- Thrombus in pulmonary artery
- Paradoxical septal motion
- Tricuspid regurgitation
- R atrial enlargement
- TAPSE <1.6cm
- Elevated pulmonary artery systolic pressure
- 60/60 sign

Part c (1 marks)

The use of thrombolysis in submassive PE is controversial.

Name a trial investigating thrombolysis in the submassive PE group.

Model Answer

MOPETT

PEITHOS

Part d (2 marks)

A CTPA is performed which confirms a saddle embolus. She becomes increasingly dyspnoeic and diaphoretic.

Her obs are as follows:

HR	140
BP	80/40
RR	30
Sats	93% on Hudson mask
GCS	15

You decide to proceed with thrombolysis. She weighs 70kg.

Prescribe your systemic fibrinolytic therapy including dose, route and duration where appropriate.

Model Answer

Alteplase 10mg IV bolus + 90mg IV infusion over 2 hours

(Tenecteplase 40mg IV bolus)

Part e (5 marks)

The Pulmonary Embolus Severity Index (PESI) predicts 30-day outcome of patients with PE using 11 clinical criteria.

List five (5) criteria used in this scoring system

Model Answer

- Age
- Sex
- Hx of cancer
- Hx of heart failure
- Hx of chronic lung disease
- HR >110
- SBP <100
- RR >30
- T <36°C
- Altered mental status
- O2 sats <90%

Question 21 (12 marks)

A 40 year old man with newly diagnosed lymphoma presents 48 hours post chemotherapy with lethargy and weakness. He takes no regular medications.

A VBG is performed:

pH	7.21	
Bicarbonate	13mmol/L	(22-24)
CO ₂	30mmHg	
BE	-4mmol/L	
Na	134mmol/L	(135-145)
K	6.6mmol/L	(3.5-5.5)
Creatinine	270 µmol/L	(50-90)
Ca	0.5 mmol/L	(1.15-1.3)
BGL	6mmol/L	
Lactate	4mmol/L	

Part a (1 marks)

State the most likely diagnosis.

Model Answer

Diagnosis Tumor Lysis Syndrome with

- Severe Hyperkalaemia
- Low HCO₃ consistent with metabolic acidosis +/- hyperlactemia
- Severe Hypocalcaemia
- Elevated creatinine, likely AKI

Part b (2 marks)

Describe a classification system used to classify severity of this condition.

Model Answer

Cairo Bishop Classification defines LTLS when ≥ 2 laboratory abnormalities are met within 3 *days before or 7 days after the initiation of chemotherapy*: 1) 25% decrease from baseline in serum calcium, and/or 2) 25% increase from baseline in the serum values of uric acid, potassium, or phosphorous.

Table 1. Cairo-Bishop definition of laboratory tumor lysis syndrome and clinical tumor lysis syndrome

Laboratory Tumor Lysis Syndrome	
Metabolite or electrolyte	Criterion for diagnosis
Uric acid	≥ 8 mg/dL or 25% increase from baseline
Potassium	≥ 6 mEq/L or 25% increase from baseline
Phosphorus	≥ 6.5 mg/dL (children), ≥ 4.5 mg/dL (adults), or 25% increase from baseline
Calcium	$\geq 25\%$ decrease from baseline
Clinical Tumor Lysis Syndrome	

LTLS and one or more of the following: 1) creatinine $\times \geq 1.5$ ULN (age > 12 years of age or age adjusted); 2) cardiac arrhythmia or sudden death; 3) seizure

LTLS, laboratory tumor lysis syndrome; ULN, upper limit of normal.

Part c (2 marks)

List two (2) further biochemical abnormalities (**not** noted above) that would support the diagnosis.

Model Answer

- Hyperphosphataemia
- Hyperuricaemia (High creatinine and urea consistent with renal impairment)
- High lactate dehydrogenase (LDH) – indicative of high cell turnover

Part d (3 marks)

List three (3) risk factors for this condition.

Model Answer**Risk factors for developing tumor lysis syndrome**

- high tumour cell proliferation rate
- bulky disease (greater than 10 cm)
- chemosensitive malignancies
- high intensity or highly potent therapy
- increased WCC (greater than $25 \times 10^9/L$)
- increased LDH (greater than 2 x ULN)
- novel or targeted therapy, used alone or in conjunction with conventional cytotoxic agents, even in patients with low-grade disease

Malignancies associated with a higher risk of TLS include:

- Burkitt lymphoma/leukaemia
- acute lymphoblastic leukaemia
- lymphoblastic lymphoma
- diffuse large-cell lymphoma
- solid tumours with high proliferative rate and rapid response to therapy.

Additional conditions that may predispose:

- renal insufficiency or renal failure
- dehydration
- decreased urinary flow
- pre-existing uraemia or hyperuricaemia
- pre-existing hyperphosphataemia.

Part e (4 marks)

Describe your key management principles for this patient.

Model Answer

1. **hydration +/- diuretics** (contraindicated in hypovolaemia or obstructive uropathy)
 - a. IVF aggressive upto 3L
 - b. aim UO 2ml/kg/h
2. **minimise Hyperuricemia**
 - a. **allopurinol** – up to 800mg/day), OR
 - b. **urate oxidase/rasburicase**
 - c. no evidence for alkalinisation of urine (potentially promoting calcium phosphate deposition),
 - d. increasing renal clearance via dialysis
3. **metabolic and electrolyte correction**
 - a. Hyperkalaemia >6.0 mmol/L or increase in 25% from baseline
 - i. calcium gluconate only if cardiac irritability
 - ii. insulin/glucose, sodium bicarbonate, beta-agonists
 - iii. resonium, diuretics, dialysis
 - b. Hyperphosphataemia >1.45mmol/L or 25% increase
 - i. phosphate binders, dialysis

NB: Treat Hypocalcaemia only in symptomatic patients as there is a risk of precipitation with PO₄-

 - calcium gluconate indicated if significant muscle cramps, tetany, arrhythmias, seizures, hyperkalaemia
4. **support Renal Failure** (multi-factorial) – escalation to dialysis if severe renal failure, uraemic encephalopathy/pericarditis, refractory acidosis, malignant hyperkalaemia (K>6)

Question 22 (12 marks)

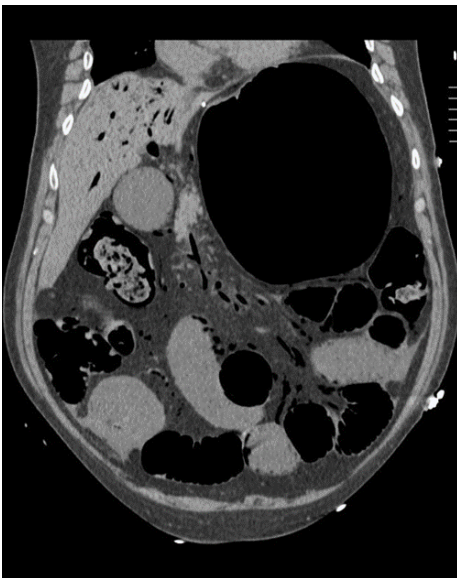
A 78 year old man presents with a 6 hour history of sudden onset of severe abdominal pain. He has a background of Atrial Fibrillation.

His observations are:

GCS	15
Temp	37°C
HR	80bpm (irregular)
BP	100/70mmHg
RR	30
Sats	98%RA

On examination his abdomen is soft but with generalised tenderness.

He has been given analgesia and CT Abdomen has been performed.



Part a (3 marks)

List three (3) abnormal CT findings.

Model Answer

- Portal venous gas
- intramural gas.
- Mesenteric venous gas.
- Gastric distension

Part b (1 marks)

State the most likely diagnosis.

Model Answer

Acute mesenteric ischaemia/ Bowel ischaemia

Part c (4 marks)

Other than AF, list four (4) risk factors for this condition.

Model Answer

- Arterial embolism (50%) , Arterial thrombosis (15-25%) Risk factors:
 - o Age>60
 - o Recent AMI
 - o Valvular heart disease
 - o Aortic atherosclerosis or aneurysm
 - o Aortoiliac instrumentation or surgery.
- Non-occlusive (due to hypoperfusion, vasospasm) (20-30%)
- Venous thrombosis (5%) uncommon and occurs in younger patients, risk factors:
 - o hypercoagulable states
 - o dehydration
 - o portal hypertension
 - o abdominal infections
 - o blunt abdominal trauma
 - o pancreatitis
 - o splenectomy
 - o malignancy in the portal region.

Part d (4 marks)

Outline your immediate management.

Model Answer

Urgent notification of surgeons for consideration for early laparotomy

Early notification of ICU

Supportive care - IV fluid resuscitation, oxygen to correct hypoxia, analgesia, NG tube for gastric decompression or if ileus present.

Broad spectrum IV antibiotics (ampicillin and gentamicin or 3rd generation cephalosporin and metronidazole)

Anticoagulant therapy (IV heparin) controversial- indicated if ischemia due to mesenteric venous thrombosis or due to cardiac embolization

Question 23 (12 marks)

A 21 year old woman presents to the ED with her newborn baby with concerns that he looks yellow. The baby was born at home the previous day.

Part a (4 marks)

List four (4) high risk factors for pathological jaundice in this baby.

Model Answer

- **Age of onset <24 hrs**
- **Output- dark urine/ pale stools**
- prematurity
- Birth- trauma, instrumental delivery- less likely with home delivery
- Feeding-poor weight gain, breast vs formula-poor feeding-leading to dehydration and increased enterohepatic circulation. Breast milk increased breakdown of conjugated BR to unconjugated BR in gut
- Family Hx- ABO/Rhesus incompatibility, spherocytosis/G6PD deficiency, prolonged jaundice, thyroid dysfunction
- Previous sibling requiring phototherapy

*Need 2 bold for full marks

Part b (4 marks)

After further history and examination you are concerned for a pathological cause of jaundice.

List four (4) serious causes that need exclusion this baby.

Model Answer

- **Sepsis**
- **Haemolysis- Isoimmunisation-ABO, Rhesus alloantibodies**
 - RBC enzyme defects-G6PD, hereditary spherocytosis, alpha thalassemia
 - haemorrhage- cerebral, intra-abdominal
 - blood extravasation-bruising/birth trauma
- Decreased excretion BR- abnormal biliary ducts eg. Intrahepatic Biliary atresia or extrahepatic biliary stenosis or atresia. Cystic fibrosis
- Decreased conjugation of BR in liver- Gilberts syndrome, congenital hypothyroidism

*Must have 3 bold for full marks (in order of frequency as cause for severe haemolysis ABO, Rh isoimmunisation then sepsis)

Part c (4 marks)

Complete the table listing and justifying four investigations you would do in this baby to help elucidate the cause and decide on therapy.

Model Answer

Investigation (0.5 mark)	Justification (0.5 mark)
FBC	Look for haemolysis, infection
Total BR	Determines therapy
Direct antiglobulin test (Coombs)	Detects AB on babies RBC as cause for haemolysis
blood film	

Ix-**FBC**, **SBR** (conjugated and unconjugated), **coombs test** (direct antiglobulin test), septic screen, G6PD screen, blood film, reticulocytes, TFTs-free T4, TSH, blood group, LFTs if conjugated BR>10%, neonatal blood group, confirm maternal blood group, CRP

-suggests infection, congenital infection screen-TORCH infections, screen inborn errors metabolism

*need bold for full marks

References

www.rch.org.au

www.health.nsw.gov.au- Neonatal-Jaundice Identification and Management in neonate >32 weeks gestation

www.health.qld.gov.au- Neonatal Jaundice

www.bettersafercare.vic.gov.au- Jaundice in neonates

Question 24 (12 marks)

A 17 year old with a known history of anorexia nervosa is brought to the Emergency Department with concerns of a significant deterioration in her condition over the last few weeks. You calculate her BMI to be 15.

Part a (6 marks)

Complete the table listing six (6) investigations you would perform with rationale for each.

Model Answer

Investigation	Rationale
VBG	Metabolic alkalosis
BSL	Assess for hypoglycaemia
EUCs	Hypokalaemia, hypochloraemia, AKI
LFTs	Liver failure
Calcium	hypocalcaemia
FBC	Anaemia, thrombocytopenia,
ECG	Bradycardia, AV block, ST depression, prolonged QT, arrhythmia

Part b (2 marks)

You decide she meets requirements for an inpatient admission. Part of her treatment will include nutritional supplementation.

Describe refeeding syndrome.

Model Answer

Occurs in setting of severe malnourishment where there is protein catabolism with total body phosphate depletion, despite normal serum phosphate.

Nutritional support with introduction of carbohydrate leads to anabolic state unmasking total body phosphate depletion causing acute drop in serum phosphate, as insulin & glucose cause massive uptake of Phos, K & Mg in to cells.

Part c (4 marks)

Complete the table listing four (4) clinical features of re-feeding syndrome by system involved.

Model Answer

System	Clinical features
CVS	Arrhythmia, cardiac failure
GI	Constipation, vomiting, liver failure
NEURO	Weakness, paraesthesia, ataxia, delirium, seizures, coma, Wernicke encephalopathy
HAEM	Anaemia, haemolysis, thrombocytopenia, reduced 2,3 DPG

RENAL	ATN
METABOLIC	HypoK, HypoMg, Hyperglycaemia, HypoPh
MSK	Rhabdomyolysis, myalgia, osteomalacia

Question 25 (12 marks)

A 26 year old woman has been on a 6 hour training run for an upcoming ultramarathon. Her partner has brought her to the Emergency Department following several episodes of vomiting, headache and confusion.

She has no past medical history, takes no medications and has no allergies.

Bloods are performed:

Na	116 mmol/L
K	5.0 mmol/l
Cl	100 mmol/L
HCO ₃	22 mmol/L
Ur	11 mmol/l
Cr	130 mmol/l
Glucose	5mmol/L

Part a (3 marks)

Describe and interpret these results.

Model Answer

Severe hyponatraemia with mild renal failure and a high normal potassium.

level of hyponatraemia is concerning.

She has signs of mild cerebral oedema c/w the hyponatraemia.

The mild renal impairment is likely to be due to an exercise induced rhabdomyolysis

= exercise induced hyponatraemia

Part b (3 marks)

List six (6) risk factors for this condition.

Model Answer

- **Excessive drinking during the period of exercise or sports event** – water, sports drinks or other hypertonic drinks (**this is the most important risk factor so must include this in their answer to pass question**)
- Exercise duration >4 hours
- Slow running or exercise pace or a very prolonged period of exercise
- Low body weight
- Female gender (may be explained by lower body weight)
- Pre-exercise overhydration
- Abundant availability of drinking fluids at the event
- NSAIDS usage
- Extreme heat or cold
- Cystic fibrosis

Part c (2 marks)

In relation to the main diagnosis, list four (4) other investigations are going to be useful.

Model Answer

- Serum Osmolality
- Urine Osmolality
- Urinary Sodium
- CK
- Urinary myoglobin

Part d (4 marks)

She deteriorates and you witness a generalized tonic clonic seizure which self-resolves.

Outline your immediate management plan including drugs and doses where appropriate.

Model Answer

-support airway and breathing

-Check blood sugar again treat if <3mmol/l

-treat hyponatremia -**100 mls of 3% Hypertonic Saline IV bolus** (3% Saline contains 513 mmol/L, so 100mls = 51.3 mmol), this will increase the serum sodium by 1-3 mmol/L

The same dose of 3% Hypertonic Saline can be repeated after 10 mins aiming for 4-5 mmol/L increase in sodium (up to 7mmol/L).

Aim is -An increase in sodium of 4-6mmol/L should resolve symptoms.

Repeat VBG to check sodium levels after administration and will need hourly sodium levels.

Increase Na by no more than 10mmol/24 hours.

Will accept 1ml/kg of 3% Hypertonic Saline increasing the Na by 1mmol/L.

Aiming to increase Na by 1-2mmol/hr for the 1st few hours. Usually an increase of 4-6 mmol/L will resolve symptoms.

Total Na required = Body Wt (kg) x TBW (0.6) x desired change in Na (mmol)

Desired change in Na = desired Na – patients Na

Question 26 (12 marks)

A 69 year old woman is brought to the Emergency Department with a four hour history of sudden onset dizziness. She has a background of hypertension and hypercholesterolaemia.

She has a GCS of 14 (E4V4M6), otherwise her vitals signs are unremarkable.

A CT brain is performed.



Part a (2 marks)

List two (2) relevant findings on this non contrast CT scan.

Model Answer

1. clot in basilar artery
2. no bleed or ischaemia

Part b (1 marks)

State the most likely diagnosis.

Model Answer

Basilar artery stroke

Part c (2 marks)

List two (2) further radiological investigations you would perform for this patient.

Model Answer

1. CT Carotid angiogram
2. CT Perfusion

Part d (2 marks)

List two (2) interventions that are appropriate for this condition.

Model Answer

- Thrombolysis if <4.5hrs
- Clot retrieval
- Catheter guided thrombolysis and clot removal

Part e (5 marks)

List five (5) other evidence based supportive strategies for managing this condition which have been shown to improve outcome.

Model Answer

1. **dual antiplatelets aspirin +clop dose**
2. **Assist swallow**
3. **ICU /stroke unit**
4. **BP control**
5. Temp control aim normothermia
6. Glycemic control aim euglycemia
7. - IDC /NGT
8. Allied health/physio
9. DVT proph eg mechanical
10. Electrolytes SIADH

Bold to Pass

<https://app.magicapp.org/#/guideline/QnoKGn/section/j2wOWL>

Question 27 (12 marks)

You are the consultant in a regional hospital when a seven-year-old child presents following a clash of heads playing soccer. There was no loss of consciousness, and he appears well, but his mother is concerned about his ear.



Part a (1 marks)

Describe the image.

Model Answer

Large auricular haematoma affecting the pinna of the right ear.

Part b (2 marks)

Outline the management for this injury.

Model Answer

Incision and drainage of haematoma

Application of a compression bolster to prevent re-accumulation

Part c (1 marks)

State a long term implication of this condition if left untreated.

Model Answer

Cauliflower ear

Part d (4 marks)

Describe the technique for a landmark-based ring-block of the ear.

Model Answer

Use lignocaine or ropivacaine in a 10 ml syringe, with a 25 gauge (orange) needle. After cleaning the area, insert the needle 1-2 cm below the ear, in line with the tragus, inserting towards the tragus in the subcutaneous tissue. Infiltrate approx. 2ml of anaesthetic whilst withdrawing the needle.

Without fully removing the needle, redirect the tip posteriorly along the mastoid to a point corresponding to the level of the tragus. Whilst withdrawing the needle, infiltrate approx. 2 ml local anaesthetic along this track.

Repeat this from an entry point approx. 1-2 cm superior to the ear, again in line with the tragus, to

inject anterior and posterior to the upper ear, with the needle inserted to the same point as on the inferior approach, in order to form a ring.

Part e (2 marks)

List two (2) techniques for reducing the pain of infiltration of local anaesthetic.

Model Answer

1. Buffering with NaHCO_3
2. Warming to room temperature

Part f (2 marks)

Prescribe an appropriate analgesic regime for this child on discharge.

Model Answer

Anything sensible including dose, route, frequency

Reference:

<https://www.emrap.org/episode/auricular/auricular>

<https://rebelem.com/auricular-hematoma-management/>