SCHHS-METRO NORTH
MOCK FELLOWSHIP SAQ EXAM
2019.1

Instructions to Candidates:

1. Examination time is 3 hours

2. Answer questions **in the spaces provided**. No marks will be given for answers written outside the dedicated space provided. **Write your full name on the front page of each booklet.**

3. Question paper is divided into three booklets:
   - Booklet One: Questions 1-9
   - Booklet Two: Questions 10-18
   - Booklet Three: Questions 19-27

4. All images are located in the props booklet

5. After the examination is completed, please leave all the materials in the room

Candidate name:_____

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BOOKLET ONE

QUESTIONS 1-9

Question 1 (18 marks)

An 81-year-old man is brought in by ambulance to your tertiary emergency department with a reduced level of consciousness. Neighbours broke into his home after not seeing him for 2 days to find him in bed, unresponsive and incontinent of urine.

On assessment his airway is patent, respiratory rate is 17 breaths/minute, saturations are 95% on 2L oxygen, heart rate is 93 bpm, BP is 117/85mmHg and temperature is 36.4 degrees Celsius. Neurological assessment reveals a Glasgow Coma Scale of 6 (E1 V2 M3); pupils are 2mm and sluggish, there is left-sided hemiplegia. His bedside glucose is 7.1

A non-contrast CT brain is performed. Two slices from CT are shown in the Props Booklet (Figures 1a and 1b):

a. List two positive and two negative findings on this single slice CT scan (4 marks)

Hyperdensity midbrain and pons consistent with acute bleed
dilatation of lateral horns – likely related to mass effect from bleed, probably Hydrocephalus
No **tonsillar herniation**
No intraventricular blood
No signs of trauma (soft tissue swelling or bony fracture) on non-dedicated limited views

b. Provide a unifying diagnosis (1 mark)

acute/subacute **intracranial haemorrhage** –spontaneous.

You learn that he has no significant past medical history and takes no regular medications. He lives alone and up to now has been independent in his activities of daily living.

The patient's brother and sister arrive and would like to know what happened to him and what his prognosis is.

c. List important information that should be included in your discussion with his relatives (5 marks)

Diagnosis: acute brainstem bleed/ bleeding on the brain
Prognosis: most likely to be a life-ending event, if survived will have severe neurological deficits.
Patient's wishes: any previously expressed wishes. Values independence
Plan: Ceilings/goals of care discussion
Expected course of illness/ disposition

Following your discussion, a decision is made to palliate the patient who seems to be comfortable and shows no signs of distress. He is accepted for admission under the palliative care team who ask you to complete his medication chart, including dose he may require on a 'as needed' (p.r.n) basis.

d. List the 'as needed' (p.r.n.) medications that should be charted for this patient with a indication for each and a dosing regimen. (8 marks)

Indication (1 mark)	**Medication (0.5 mark)**	**Dosing regime (0.5 mark)**
Pain/dyspnoea	Morphine (fentanyl)	2.5-5mg sc 30minutely (25-50mcg 30minutely)
anxiety/agitation	Midazolam (haloperidol)	2.5- 5mg sc hrly (0.5-1mg sc 3hrly)
nausea/vomiting	Haloperidol (ondansetron) (metoclopramide)	0.5-1mg sc 3hrly (4mg sl 8hrly/) (10mg sc 4hrly)
Respiratory secretions	Hyoscine butylbromide	200-400mcg sc 2hrly

Question 2 (18 marks)

An acutely aggressive 24-year-old man is brought into your emergency department by ambulance and police after being found alone on a bridge.

a). Give a stepwise approach to managing this aggressive patient with specific examples. (5 marks)

verbal de-escalation
show of force
offer oral chemical restraint – 5-10mg PO diazepam, 5-10mg PO olanzapine
physical restraint
parenteral restraint – 10mg IM droperidol, 10mg IM or 2.5-5mg IV midazolam, 10mg IM olanzapine

b). Complete the following table for the components of a mental state examination. For each component give an example of what specifically should be assessed (8 marks)

Component	**What to assess**
Appearance + behaviour:	physical appearance (cleanliness, grroming), manner of relating to clinicans/family, activity level (slow/agitated)
Speech:	spontaneous/not, fuency, rate, volume, tone
Mood:	Predominant mood over last weeks, 0-10 scale
Affect:	observed emotional state: type, range, reactivity, appropriateness
Thoughts:	stream, form, content
Perception:	altered bodily experiences, passivity phenomenon, hallucinations
Cognition:	LOC, orientation, attention, memory, ability
Insight and judgement	Insight into perception disrders, (problem-solving)

c). List 10 risk factors that are associated with a high risk for suicide (5 marks)

Male gender
Marital status – separated, divorced, widowed
Unemployed/retired
Chronic illness/pain
Psychiatric diagnosis – depression, bipolar, schizophrenia, substance abuse
Social background – socially isolated, indigenous or refugee background
Suicidal ideation
Multiple previous attempts
Access to violent, lethal method
Clear plan
Act performed in isolation/precautions taken to avoid discovery
Final acts – wills, insurance, giving away property
Unwilling to seek help
Precipitant - stressor

Question 3 (12 marks)

Your registrar asks your advice about the clinical decision rules for imaging in paediatric head injury management. They have just seen an 18-month old girl who has been brought in by her mother after she fell off a low couch and hit her head on the coffee table one hour ago. The mother is concerned because she seems quieter than normal and has vomited once on the way in to hospital. On assessment, the child is alert, and is happily playing with her Mum's phone. She has a small frontal haematoma, equal reactive pupils and no focal neurology.

a). Detail the main differences between research evidence behind the PECARN , CHALICE and CATCH clinical decision rules. (4 marks)

PECARN prospectively validated
CATCH , CHALICE uses 'rule in ' criteria (decides who NEEDS CT)
PECARN uses 'rule out' criteria (decides who NOT to CT)
PECARN has highest point sensitivity
CATCH , CHALICE more specific but less sensitive

After taking a detailed history and completing your assessment, you decide that the child does NOT require a CT brain.

b). The mother is asking for a CT scan of her daughter's head as she is worried about concussion. List the important facts that should be mentioned in this conversation (4 marks)

Not required as per best evidence
CTB performed to diagnose injury that requires neurosurgical intervention
Concussion managed conservatively
Risk of radiation: lifetime cancer mortality risk from a single head CT is about 1 in 1,500 in a 1 year old; 1 in 10,000 in a 10 year old
Risk related to sedation if required

d. State your management plan for this patient (4 marks)

Observation period- ED SSU with hourly neuro obs

If any deterioration- CT
If remains well, discharge
Discharge advice on ongoing management
Return to ED advice

References:

Babl et al. 2017, 'Accuracy of PECARN, CATCH, and CHALICE head injury decision rules in children: a prospective cohort study', Lancet, Volume 389, Issue 10087, P2393-2402.
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Question 4 (12 marks)

A 74year-old man is brought in by ambulance to your regional emergency department after a falling down three steps onto his right hand. It is a closed and isolated injury. His right wrist x-rays are shown in the Props Booklet (Figures 2a and 2b).

a) List the abnormalities seen (3 marks).

Peri-lunate dislocation: radio-lunate articulation maintained with carpus dislocated posteriorly.
Radial styloid #
Ulnar styloid #

b) List two short-term and two long-term potential complications of this injury (4 marks).

Short-term complications	**Long-term complications**
Severe pain	Chronic pain Early arthritis
Neurovascular compromise – median nerve injury	Chronic carpal instability (DISI and VISI) Decreased grip strength and stiffness common

c) List your management priorities (3 marks)

Analgesia (likely to require intravenous opiates such as morphine 2.5-5mg IV aliquots)
Urgent consultation with orthopaedics/hand for urgent attempt at closed reduction (i.e. in ED under procedural sedation or with Bier's block).
Orthopaedic follow-up – admission for ORIF.

d) What other factors need to be considered in this patient prior to discharge?(2marks)

Likely dominant hand- will need assistance
Reason for fall
Need for aged care/allied heath assessment

Safety for discharge
Discharge advice/f/up

Question 5 (12 marks)

A 3-year-old boy is brought in by his mother after ingesting an unknown quantity of liquid paracetamol. He had been playing quietly in his room for 10 minutes and was found with the empty bottle that previously was around three quarters full. The time of ingestion was 30 minutes prior to presentation.
The entire 200ml bottle of paracetamol contains 10g of paracetamol. The child weighs 14kg.

a). What is your approach to decontamination of this child? (1 mark)

Decontamnation is not indicated in well children <6yo with isolated liquid paracetamol ingestions as they have rapid absorption.

As part of your risk assessment you calculate the possible dose of paracetamol ingested.

b). What is the threshold ingested dose of paracetamol (in mg/kg) at and above which a serum paracetamol level should be measured ? (1 mark)

200mg/kg of liquid paracetamol

You decide this child DOES require a paracetamol level to be checked.

c). How long after ingestion will you check a paracetamol level in this child? (1 mark)

2 hours for a well child <6yo with an isolated accidental liquid paracetamol ingestion

The child's parents are appropriately concerned for their child and want to ensure there is no further risk to the child from accidental ingestions in the home. They ask you more questions about dangerous ingestions in children.

d). List 4 medications that may be life threatening if a small child ingested one or two pills. (4 marks)

Sodium channel blockers
diphenoxylate/ atropine
Calcium channel blockers
Theophylline SR
Sulfonylureas

Recreational sympathomimetic drugs
Opiates

After completing the appropriate testing, you have decided this child needs treatment with N-acetylcysteine. Soon after commencing the appropriate first infusion, the child develops wide spread erythematous flushing and wheeze.

e). List 5 steps in your immediate management. (5 marks)

Stop the N-acetylcysteine infusion
Give bronchodilator: salbutamol 2.5mg nebulized with O2 6L/min via nebulized mask – aim O2 sats >94%
Give antihistamine : certirizine 2.5mg – 5mg PO
Give prednisone: 1mg/kg PO
Once wheeze and rash has settled, restart acetylcysteine infusion at SLOWER rate and carefully monitor.

REFERENCES:

- Guidelines for the management of paracetamol poisoning in Australia and New Zealand https://www.mja.com.au/sites/default/files/issues/203_05/Guidelines_paracetamol_Aus_NZ_2015.pdf
- https://litfl.com/two-pills-can-kill/

Question 6 (12 marks)

A 23-year-old male is brought to your urban district Emergency Department. He has been unwell for the last two weeks with fever and a cough, which began after working in flood clean up on the North Queensland coast. He has a background of well controlled asthma and has no allergies.

A senior registrar has commenced therapy but has called for your assistance. The patient is currently receiving a nebuliser. He is alert but intermittently combative with the nebuliser.

His initial vital signs are:
Pulse 130 bpm
BP 100/65 mmHg
Cool peripheries
SaO_2 73% on 6L oxygen via Nebuliser Mask
Temp 38.5
BSL 6.9

Auscultation reveals bilateral crackles and minimal wheeze. A CXR is performed and is shown in the Props Booklet (Figure 3)

a). List and justify four (4) potential anti-infective choices based on potential microbiology for this patient. (4 marks)

Ceftriaxone 1g IV once daily: Coverage for typical severe community acquired pneumonia, principally pneumococcus.
Azithromycin 500mg IV once daily: coverage for atypical CAP, including mycoplasma and legionella given cruise.
Linezolid 600mg IV bd, OR Vancomycin 1g IV once daily (dosing modification): coverage for MRSA in a post-Influenza MRSA pneumonia
Oseltamivir 75mg oral bd: coverage for severe influenza.
Meropenem 1g IV tds: coverage for Melioidosis given travel to Northern Australia

Marking criteria: must cover Meliodosis.

Despite initial therapy, the patient fails to improve. You are concerned he has developed Acute Respiratory Distress Syndrome (ARDS).

b). List six (6) non-respiratory causes of ARDS in any patient. (3 marks)

Trauma

Burns
Pancreatitis
Aspiration
Massive Transfusion
Fat Embolus
Near Drowning
Non-respiratory Sepsis
Lung contusion

c). State your escalating approach to oxygenation in this patient. (5 marks)

Bronchodilators: Given asthma history ; Salbutamol 5mg neb, continuous Atrovent 500mcg (burst q20mins or q4h) + Hydrocortisone 200mg stat.
Step-wise increase in supplemental oxygen: NRB 15L -> HFNC 1-2L/kg max 50L/min and maximal FiO2.
Commenced NIV with BiPAP ; initial setting EPAP 6, PS 12. FiO2 1.0
DSI for pre-oxygenation: carefully titrated ketamine to facilitate NIV pre-oxygenation; remain upright position until intubation.
Intubation : experienced operator; preferably Sz 8.0 ETT to allow bronchoscopy.
Ventilate using ARDSnet approach : Vt 4-6ml/kg, FiO2 1.0. ; Target plateau pressure <30mmHg with permissive hypercapnoea

Question 7 (12 marks)

A 70-year-old woman presents to your Emergency Department with sudden loss of vision in her left eye. This happened 2 hours prior to her presentation and is painless. There is no history of trauma. She is assessed by one of your junior doctors who is concerned about a possible vascular cause. She asks you to help her differentiate a retinal vein occlusion from a retinal artery occlusion.

a). Compare and contrast the two conditions by filling in the table below. (10 marks)

Condition	**Central Retinal Artery Occlusion**	**Central Retinal Vein Occlusion**
Major Risk Factors/Causes (2 marks)	Atherosclerotic emboli Infective emboli (Infective endocarditis) Vasculitis – SLE/GCA	Hypertension Diabetes Glaucoma Hypercoagulability
Fundoscopy findings (1 mark)	Pale fundus Cherry red fovea	Retinal haemorrhages Tortuous, engorged retinal veins
ED investigations (2 marks)	Inflammatory markers (if vasculitis suspected) Embolic work-up – TTE/Carotid dopplers	BSL IOPs Coag profile (if young)

b). List two other causes of painless unilateral vision loss. (2 marks)

Vitreous humour haemorrhage
Retinal detachment

Question 8 (12 marks)

A 36-year-old lady is brought in by her husband who is concerned that she is 'not herself'. Her GP has been investigating her for irritability, weight loss, palpitations and fatigue. The following tests are available:

TSH 0.2mlU/L (0.4-5mlU/L)
T4 20mcg/dL (5-11mcg/dL)

a). Provide a diagnosis and list four (4) possible causes . (5 marks)

Blood results consistent with hyperthyroididsm and clinical picture of thyrotoxicosis
Primary- Grave's disease, toxic multinodular goitre, toxic adenoma
Thyroiditis- radiation, post-partum
Drug induced- Lithium, amiodarone
Central hyperthyroidism- pituitary adenoma, ectopic thyroid tissue

On assessment she appears restless and anxious. A set of vital signs are performed; her heart rate is 160 bpm, BP 91/57 mmHg, temperature 38 degrees Celsius.

b). List six (6) differential diagnoses that must be considered. (3 marks)

Thyroid storm
Sepsis
Heat stroke
Drug withdrawal
Neuroleptic syndrome
Sympathomimetic ingestion
Malignant hyperthermia

You conclude that her current symptomatology is caused by her thyroid disorder.

c). List and prioritise the medical treatments required, with a justification (4 marks)

Treatment	Justification
b-blocker - IV propranolol 0.5mg to 10mg, then 40-120mg qid po	decreases morbidity and mortality, inhibits peripheral conversion T4to T3, antagonises the effects of thyroid hormones and decreases the sensitivities to catecholamine
Thyroid blocking drugs propylthiouracil 900-1200mg po, then 200mg q4h	- prevents hormone synthesis by by blocking iodination of tyrosine and inhibits peripheral conversion T4 to T3
Iodine (lugols iodine) 60 drops daily in divided doses Lithium if allergic to iodine	- prevents hormone synthesis by by blocking iodination of tyrosine and inhibits peripheral conversion T4 to T3
Corticosteroids- Hydrocortisone 100mg IV qid	inhibit peripheral conversion T4 to T3
correct fluid loss, electrolyte abnormalities, cool hyperthermia	Supportive measures-
Avoid NSAIDS (displace T4 from binding proteins), treat precipitating cause	

Question 9 (12 marks)

A 34-year-old primigravida female, presents to your ED at 34/40 gestation. She has been having regular painful contractions for the past hour, occurring at 3-minute intervals. She reports ruptured membranes about 30 minutes ago and is feeling the need to push.

Your hospital does NOT have an obstetric or neonatal service. The nearest tertiary centre is 220 km away.

a). Complete the table below listing three (3) medications and three (3) pieces of equipment you will prepare to manage this patient in your ED. (6 marks)

Medications	**Equipment**
Oxytocin 10 Units IMI	Delivery pack with cord clamps
Betamethasone 11.4mg IMI OR Dexamethasone 10mg IV	Neonatal resuscitaire with Neopuff or similar positive pressure ventilation device
Tocolytic agents: Salbutamol nebs 5mg or IV infusion Nifedipine oral 20mg q30 minutely (up to total of 3 doses) OR Also accept Antibiotics, given PPROM Ampicillin 2g & Gentamycin 5mg/kg IV	Ultrasound to check fetal HR and position Towels, Suction etc.

A male infant is born shortly after arrival with an uneventful delivery. At 1 minute, his APGAR score is 6.

APGAR SCORE	
Appearance	**Peripheral cyanosis only**
Pulse rate	**> 100**
Reflex irritability	**Grimace, weak cry when stimulated**
Tone	**Some flexion**
Respiration	**Slow irregular breathing**

b). List 6 measures that will need to be instituted in the immediate post-delivery period for this neonate. (6 marks)

Dry and stimulate the infant
Warming (radiant heat +/- wrap in polyethylene bag)

Positive pressure ventilator support with Neopuff (or similar device) using room air
Maintain open airway
Suctioning secretions from oropharynx
Check BSL early and replace glucose if BSL < 3.0
Antibiotics – Ampicillin 50mg/kg and Gentamycin 5mg/kg IV (as most likely cause for preterm labour is infection)
Vitamin K

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BOOKLET TWO

QUESTIONS 10-18

Question 10 (18 marks)

A 26-year-old man presents to triage with a chest wound following an altercation at a local discotheque (see image in the Props Booklet; Figure 4).

He is immediately laid down on a trolley and transferred to the resuscitation bay where he arrests as the monitoring is being attached.

a) Describe your immediate management for this patient. (2 marks)

Finger thoracostomy: on the right (formalise to tube thoracostomy when able)
Needs intubation, if tube not immediately placed.
IV expansion: Blood if available , N/saline otherwise

Marking criteria: Some candidates may recommend a resuscitative thoracotomy. That would be an inappropriate, excessive response to a right sided, mid-axillary stab wound.

After your interventions, the patient achieves ROSC. Due to ongoing bleeding, you activate the hospital Massive Transfusion Protocol (MTP).

b). List two other indications apart from trauma for the in-hospital activation of the Massive Transfusion Protocol (MTP). (2marks)

Actual or anticipated 4 units RBC in < 4 hrs, + haemodynamically unstable +/– anticipated ongoing bleeding
Major obstetric, gastrointestinal or surgical bleeding

c). Complete the following table for parameters to monitor during a massive transfusion, and their desired target (8 marks)

Haematological	Ca2+ >1.1mmol/L
	Platelets >50 x10^9/L
	PT/APTT <1.5 x normal
	INR <1.5
	Fibrinogen > 1.0g/L (>2.5g/L for PPH)

Acid-Base	pH >7.2
	Base excess < -6
	Lactate <4mmol/L
Temperature	Temp >35°C

Marking criteria: Candidates should include elements from all sections.

d). State the post resuscitation cares required. (6 marks)

Prevent further cardiac arrest	**Re-evaluate ABCD frequently**
	Confirm Airway position and patency
	Lung protective ventilation strategy: SpO2 94-98% (avoid hyper or hypo-oxia), PACO2 35-45 mmHg
	Ensure patency of ICC
	Minimum volume resuscitation: Blood rather than crystalloid, **Permissive hypotension (SBP 80mmHg)**
	Sedation & analgesia (ketamine 1mg/kg/hr IV)
	BSL: 4-10mmol/L (Normo-glycaemia)
Define & treat underlying pathology:	**Trauma call/urgent surgical assessment : OT if unstable / maybe CT if stable**
Limit secondary insult:	Normothermia (~36°C)

Marking criteria: Candidates should include frequent re-evaluation, permissive hypotension, and surgical involvement/expedited theatre

Ref:
ANZCOR Post-Resus therapy 2016
National Blood Authority. Patient Blood Management Guidelines: Module 1 – Critical Bleeding/Massive Transfusion. [cited 2011 Jun 30].

Question 11 (18 marks)

A 58-year-old female is brought to your emergency department complaining of being bitten on the hand by a brown coloured snake three hours previously. The ambulance service has applied a pressure immobilisation bandage.

a). List the clinical assessment features that would suggest envenomation in this case. (4 marks)

Neurotoxicity- paralysis (presynaptic- does not improve with AV), progressive descending paralysis, ptosis, facial and bulbar involvement- paralysis extraocular muscles, respiratory muscles and peripheral weakness
Myotoxicity- muscle pain, tenderness and weakness, increased CK and myoglobinuria
Systemic symptoms- nausea, vomiting, headache, abdominal pain, diarrhoea, diaphoresis, apnoea
Cardiovascular effects- sudden collapse, cardiac arrest, dizziness, hypotension, LOC
Coagulopathy- local site bruising/bleeding, intracrainial/gastrointestinal/genitourinal haemorrhage
Other- renal failure (MAHA), local pain, swelling, tissue injury

Her initial coagulation profile is shown below.

GENERAL COAGULATION		Specimen: Blood	
INR	>10.0 C	Platelets	169
Prothrombin Time	>100 H		
APTT	>200 C		
Fib (derived)	< 0.4 C		
Fib (clottable)	< 0.4 C		
DDimer	>128.00 H		

b). Define the abnormality shown. (1 mark)

Venom induced consumptive coagulopathy- inc INR/PT, inc d-dimer. Low/unrecordable fibrinogen.

The advice from the toxicologist is to perform a venom detection kit (VDK) test.

c). List three (3) options for sample acquisition and state the role of a VDK. (4 marks)

Swab- best option if available
Urine- option if can-not swab site site, or if cleaned
Blood- not reliable option
To asses for type of antivenom not confirmation of envenomation. Only use if snake type not able to be identified on geography/clinical syndrome/snake expert

d). Complete the following table listing the absolute and relative indications for antivenom administration. (6 marks)

Absolute	**Relative**
Hx sudden collapse, cardiac arrest or seizure	systemic sx (vomiting, headache, abdominal pain)
Abnormal INR	Abnormal aPTT
Evidence of paralysis with ptosis and/or opthalmoplegia	CK > 1000U/L
	Leucocytosis/lymphopaenia

e). List three other considerations regarding the administration of antivenom (3 marks)

Only give IV ; Dilute 1:10 with NSaline and infuse over 15 minutes
In cardiac arrest/life threatening effects- slow IV push
1 vial AV for adults (and kids)
No need for premedication administration- but must be administered in critical care area, hypotension in <5%, anaphylaxis

Serum sickness – rx steroids 50mg/d for 5/7 if occurs (not premed)
FFP speeds recovery, but risk of blood products so only administer if coagulopathy and active bleeding

Question 12 (12 marks)

A 2-month-old girl is brought in to ED by her very worried parents. They describe an episode just after feeding where she seemed to stop breathing and went floppy and blue around the lips. It lasted approximately 20 seconds and resolved after they picked the baby up and blew at her face. The baby cried and has been behaving normally since.

a). What is the clinical term used to describe this child's presentation? (1 mark)

BRUE – brief, resolved, unexplained event

b). List 4 differential diagnoses for this presentation. (4 marks)

Normal physiological response: laryngospasm, gagging
Inflicted injury: (shaken baby, drug overdose, Factitious illness by proxy or intentional suffocation)
Infection : Pertussis, septicaemia, pneumonia, meningitis,
Airway obstruction: congenital abnormalities, infection, hypotonia
Abdominal: intussusception, strangulated hernia, testicular torsion
Metabolic problems: hypoglycaemia, hypocalcaemia, hypokalaemia, other inborn errors of metabolism
Cardiac disease: congenital heart disease, arrhythmias, vascular ring, prolonged QT.
Respiratory: inhaled FB
Toxin / Drugs: accidental or non-accidental
Neurological causes: head injury, seizures, infections, cerebral malformations etc.

c). List 4 criteria that would stratify this event as low risk. (4 marks)

age >60 days
gestational age ≥32 weeks and postconceptional age ≥45 weeks

occurrence of only 1 BRUE (no prior BRUE ever and not occurring in clusters)
duration of BRUE <1 minute
no cardiopulmonary resuscitation by trained medical provider required
no concerning historical features
no concerning physical examination findings

On completion of your history and assessment you are satisfied that this is a LOW RISK presentation.

d). List 3 further investigation or management steps you will perform prior to discharge home. (3 marks)

Educate caregivers about BRUEs, and the low risk for infants with these characteristics.
Offer resources for training in cardiopulmonary resuscitation (CPR).
Arrange for a follow-up check with a medical provider within 24 hours to identify infants with evolving medical concerns that would require further evaluation and treatment.
A brief period of in-hospital observation (eg, one to four hours – or even overnight given time of presentation) with continuous pulse oximetry and serial observations.
12-lead electrocardiogram with attention to QT interval
Testing for pertussis (especially for infants with suggestive symptoms). Respiratory virus testing, such as for respiratory syncytial virus, is reasonable if a rapid testing method is available. However, this testing is not required in these low-risk infants, who by definition have no respiratory symptoms and are >2 months of age.

References:

- https://www.uptodate.com/contents/acute-events-in-infancy-including-brief-resolved-unexplained-event-brue?search=BRUE&source=search_result&selectedTitle=1~23&usage_type=default&display_rank=1
- https://www.rch.org.au/clinicalguide/guideline_index/Brief_Resolved_Unexplained_Event_BRUE/

Question 13 (12 marks)

You have just started working as a junior consultant on a temporary contract in a metropolitan emergency department, hoping that your contract will become permanent. You are helping in the resuscitation of a patient where the team leader in this resuscitation is one of your senior FACEM colleagues who has worked at this emergency department for over 20 years, is an ACEM examiner and is very well respected.

The patient is a 9-year-old male with Duchenne's muscular dystrophy who has pneumonia and is in respiratory failure. Your colleague has told the team that the decision has been made to intubate this patient. He asks the nurse to draw up ketamine and suxamethonium (succinylcholine) for the intubation.

a) What is your response to the choice of these drugs? (1 marks)

Concern that giving suxamethonium (succinylcholine) to a patient with a muscular dystrophy could result in suxamethonium-induced hyperkalaemia that may be life-threatening.

b) How would you communicate this to your senior colleague? (2marks)

Communicate directly to your senior colleague
outline your concerns and reasons behind them

c) State two barriers to effective communication with your colleague in this situation? (2 marks)

Many different answers but must include hierarchy effect
+ one other (e.g. junior consultant; in vulnerable position re employment, senior colleague poor response to being challenged; organisation very hierarchical)

d) List the next steps of your communication strategy in this situation should your senior colleague not respond favourably to your initial communication? (2 marks)

Any answer that outlines a graded assertiveness communication strategy that will stop the error from being made.

e) List 3 principles of harm minimisation: (3 marks)

error is inevitable
harm is **not** an inevitable consequence of error

find out what is wrong, not who is wrong
the person who has made the error is the person : least likely to make it again, most likely to provide the solution, most likely to prevent others from making the same error
most team errors are communication errors

f) What is the study of human factors? (2 marks)

the study of how people interact with complex systems (two-way)
how problems with those interactions lead to errors and breakdowns in safety

Question 14 (12 marks)

A 78-year-old woman presents to your tertiary hospital with nausea, vomiting, loose bowel motions and malaise. She has a background of atrial fibrillation, hypertension and type II diabetes. Her current medications include: Candesartan 16mg daily, apixaban 2.5mg bd, dapagliflozin 10mg od, lercanidipine 10mg daily, bisoprolol 10mg daily, simvastatin 40mg daily and linagliptin-metformin 2.5mg-1g I bd. She has not taken any over the counter medications.

Her observations on arrival are: BP 141/72, HR 90, RR 28, saturations 93% on RA, temperature 35.2 degrees Celsius. She is alert and oriented with a clear chest and soft-non-tender abdomen. Arterial blood gas and renal function are performed; the results are shown below:

FiO2	0.21	
pH	6.75	(7.35-7.45)
pCO2	24mmHg	(32-48)
pO2	86 mmHg	(83-108)
Bicarbonate	3 mmol/L	(22-32)
Sodium	132 mmol/L	(135-145)
Potassium	6.4 mmol/L	(3.5-5.2)
Chloride	102 mmol/L	(95-110)
Glucose	15.7 mmol/L	(3.0 -7.8)
Lactate	15.0 mmol/L	(0.5-2.2)
Urea	14.6 mmol/L	(3.0-8.0)
Creatinine	237 µmol/L	(40-90)

a). Analyse the above results, listing the major abnormalities and their clinical implication. Include calculations where relevant. (7 marks)

Abnormality	**Interpretation**
Profound acidaemia	Metabolic with bicarbonate$^-$ of 3
Mildly low pCO2 (24)	Expected CO2= 1.5 x $HCO3^-$ + 8 = 12.5. **inadequate respiratory compensation**
High anion gap	= Na^+ - (Cl^- + $HCO3^{--}$) = 27 **Delta ratio** = change in AG/change in HCO3- = 15/21 = 0.71. Predominantly HAGMA + element of NAGMA **HAGMA due to combination of metformin, lactate and uraem**ia.
Hyperkalaemia	**corrected to ~3.4 (**Correcting for pH = ~0.5 K+ change for every 0.1 of pH) Predominantly due to acidaemia, ± contributed to from AKI
Elevated lactate	Type B – in this setting most likely **B2 (drugs**) secondary to metformin

Mild hyponatraemia	Correcting for hyperglycaemia = 132 + (15.7-5)-3 = **135 = in normal** range
Urea 14.6 and creatinine 237 = acute renal failure	**Urea : creat ratio = 60 = acute renal injury** (not just pre-renal) No prior history of renal failure and current medication list suggest AKI

b). Give the most likely underlying aetiologies of the major acid-base abnormality. (1 mark)

Metformin-associated lactic acidosis + Acute renal failure impairing excretion of metformin and also contributing to acidaemia

c). List your management priorities. Give drug doses and end points where relevant. (4 marks)

Correct critical acidaemia: initially 1mEq/kg 8.4% sodium bicarb (50-100 mL)
Urgent haemodialysis, likely in ICU
Fluid resuscitation: start with 1L Hartmann's and reassess perfusion/urine output.
Treat underlying precipitant: hypothermic – culture and consider empiric antibiotics such as piperacillin/tazobactam 4.5g IV.
Oxygen, titrate to sats >94%
Treat hyperkalemia (relative hyperkalemia is secondary to acidosis therefore correction of acidosis should be priority)

Question 15 (12 marks)

An 8-year-old girl is brought to the emergency department following a bicycle accident. She was wearing a helmet but no other specific safety gear. The child states she crashed into a fallen tree and was impaled on a stick. She is alert and distressed. When asked how long the stick was she indicates it was the length of her forearm and as thick as her thumb.

Her vital signs are:
Pulse 110 bpm
BP 105/70 mmHg
Cap refill 3 sec
Resp rate 24 breaths/min
SaO2 92% on 6L oxygen via non-rebreather mask

Examination reveals a 10cm laceration to the right lateral abdomen at the level of umbilicus (see picture in Props Booklet; Figure 5).

a) List eight potential injuries from the described mechanism.(4 marks)

Thoracic:	Haemothorax
	Pneumothorax
	Pulmonary contusion or laceration
	Diaphragmatic perforation
	Bronchopleural fistula
	Cardiac contusion or laceration (unlikely given clinical state)
Abdominal:	Hollow viscous perforation
	Solid organ penetration (Liver, Kidney, unlikely splenic)
	Vascular injury (IVC, abdominal aorta)
	Ureteric laceration
Pelvic:	Bladder perforation
	Uterine laceration
	Ovarian injury

Marking criteria: Must have at least one injury each from chest, abdomen, pelvis. Any sensible injury acceptable.

b). List four(4) ways in which the paediatric abdomen is different to the adult abdomen. (4 marks)

Small size of patient allows single impact to injure multiple organs.
Abdominal wall is relatively thin
Ribs are more pliable, providing less protection.
Liver and spleen take up a larger proportion of the abdominal cavity.
Diaphragm is more horizontal, pushing liver and spleen further into abdominal cavity.
Bladder is an intra-abdominal organ in small children.

c). State your management of this patient in the ED, including relevant investigations.(6 marks)

Seek and treat immediate life threats: haemo-pneumothorax and hypovolaemia.
Minimal volume resuscitation: End point: Cap refill < 2sec; PRC 10ml/kg aliquots
Analgesia: Parenteral most appropriate in this patient Fentanyl 1mcg/kg q10 min until analgesia Morphine 0.1mg/kg q 15 min until analgesia Ketamine 0.2mg/kg repeat x2 if required
Investigations: Radiological: CXR (portable) +/- CT(chest/abdo/pelvis) if stable to define injury
Investigations: Bloods: VBG – for lactate; Cross match
Urgent notification to General/Trauma Surgeons: High risk penetrating abdominal injury; Requires OT for laparotomy.
IV Ab's: Ampicillin 50mg/kg qid + Gentamicin 5mg/kg od + Metronidazole 12.5mg/kg bd
NBM +/- NGT
Check immunisation for ADT and manage accordingly

Marking criteria: Paediatric Trauma Service Guidelines, LCCH (2016) p26 states: N/Saline as the initial fluid in 10ml/kg aliquots; Blood products (10ml/kg) to be given after saline resuscitation.;I think it reasonable to start with either.

Question 16 (12 marks)

A 42-year-old female presents with fever five days after induction chemotherapy. Other than her malignancy she has no medical problems but does suffer from a rash when given penicillins.

Her vital signs are as follows:
HR=110
BP=100/60
T=39.0
Sats=98% RA
RR=24

You assume she is neutropenic and decide to treat empirically.

a). List two (2) options for the preferred antibiotic monotherapy for this patient. (1 mark)

Cefepime 2g iv OR
Ceftazidime 2g iv OR
Meropenem 1g iv

ETG: https://www.eviq.org.au/clinical-resources/oncological-emergencies/123-immediate-management-of-neutropenic-fever#management

b). List three (3) risk factors for tumour lysis syndrome (3 marks)

High tumour proliferation rates
Large tumour burden
Sensitivity to chemotherapy
Haematological malignancy
Bulky disease (>10cm diameter)
Leukocytosis (>25x10^6)
Pre-existing renal impairment
Pre-existing hyperuricaemia

Jonathan Wagner and Sanjay Arora, Oncologic Metabolic Emergencies, Emergency Medicine Clinics of North America, 2014-08-01, Volume 32, Issue 3, Pages 509-525,

c). List three (3) metabolic features of tumour lysis syndrome other than renal impairment and hyperuricaemia (3 marks)

Hyperkalaemia
Hyperphosphataemia
Lactic acidosis
Hypocalcaemia

Dunn, Tintinalli

There is a prolonged wait for the patient to get seen by the oncology team and you are concerned that she will deteriorate if her hyperuricaemia goes untreated.

d). List two (2) interventions to treat hyperuricaemia secondary to tumour lysis syndrome in the ED. (1 mark)

Allopurinol OR Rasburicase
Iv hydration (must have)

The oncology registrar finally comes down to see the patient. The nurse attending to the patient comes to find you as the patient complained that the oncology registrar was abrupt and dismissive towards her and the patient is now crying.

e). How will manage this situation? (4 marks)

Speak to patient: apologise, elaborate, reassure that you will investigate and follow up with them
Speak to registrar: inform of patient's complaint, give opportunity to explain/apologise
Document complaint in notes, risk management system
Inform oncology consultant, ED director
Complete the complaint process : investigate, take actions etc

References:

Dunn
Jonathan Wagner and Sanjay Arora, Oncologic Metabolic Emergencies, Emergency Medicine Clinics of North America, 2014-08-01, Volume 32, Issue 3, Pages 509-525
Tintinalli

Question 17 (12 marks)

A 60-year-old man presents with a syncopal episode whilst at work. He is unable to describe any preceding symptoms and recalls upon waking up his colleagues standing around him. He is currently asymptomatic.

His ECG is shown in the Props Booklet (Figure 6)

a) List 4 abnormalities found on his ECG (4 marks)

Bradycardia at approximately 45bpm
Irregular rhythm/Sinus Arrhythmia
Left Axis Deviation/Left Anterior Fascicular Block
1st degree AV block
Right bundle branch block
Bifascicular block

must state Bifascicular block OR both Right bundle branch block with Left Anterior Fascicular block to score any marks

After your initial assessment your patient deteriorates and becomes markedly bradycardic.

His formal vitals are:

GCS	13
HR	28 bpm
BP	70/40 mmHG
SaO2	88% on room air
RR	28breaths/mon
Temperature	36.5 degrees Celsius

b) List 2 reversible causes of his bradycardia (2 marks)

Drugs; B-Blockers, Calcium Channel Blockers (not the dihydropyridines), digoxin, amiodarone, Clonidine, Organophosphates
Electrolytes; Potassium
Ischaemia
Myocarditis

Hypothyroidism

c) List 6 steps in management for this patient (6 marks)

Place patient on 15L O2 via non-rebreathing mask, aim SaO2 >94%
Atropine IV 600mcg every 3-5 minutes to max total dose of 3mg. Aim for HR > 60 and BP >90mmHg or MAP >65mmHg
2nd line drug therapy either Adrenaline IV infusion (2-10mcg/min). Aiming for HR> 60 and BP >90mmHg or MAP >65mmHg OR Isoprenaline IV infusion (2-5mcg/min). Aiming for > 60 and BP >90mmHg or MAP >65mmHg
Correct under lying causes; optimise electrolytes K > 4 Mg >1
Specific toxicology therapy: B-Blockers/Calcium Channel blockers; high dose insulin, glucagon, Digoxin; Digibind
Ischaemia; PCI/Thrombolysis
Failure to respond to pharmacotherapy will require external cardiac pacing at 70bpm aiming for both electrical and mechanical capture at BP >90mmHg or MAP >65mmHg. Analgesia with pacing; fentanyl IV 25mcg aliquots q5 mins to comfort; Sedation with pacing; midazolam IV 1mg q5mins to comfort
Admission under cardiology for consideration of pacing wire/pacemaker

REFERENCES

- ECG from Dr Smith's ECG blog. Jan 30th 2016
http://hqmeded-ecg.blogspot.com/2016/07/symptomatic-bradycardia-so-called.html

- Dunn et al. The Emergency Medicine Manual Online. Update 25th feb 2019
Bradycardias

- Life In The Fast Lane, Bradycardia.
Dr Chris Nickson. Updated May 31st 2012
https://lifeinthefastlane.com/resources/bradycardia-ddx/

- Australian Resuscitation Council
Guideline 11.9 Managing Acute Dysrhythmias

Question 18 (12 marks)

A 23-month old boy is brought in by his mother after ingesting an unknown quantity of her iron tablet thirty minutes ago. The child was found with 3 tablets remaining from a bottle that was previously around half full.

a). Complete the following table for the dose-related risk assessment of iron (4 marks)

Elemental iron dose (mg/kg)	**Effect**
<20	Asymptomatic
20-60	GI symptoms
60-120	Systemic toxicity anticipated
>120	Potentially lethal

One hour later, the child starts vomiting profusely and you are concerned he has had a significant ingestion of iron.

b). Complete the following table listing four (4) investigations you would perform and the corresponding result that would confirm significant iron ingestion. (4 marks)

Investigation performed	**Result confirming significant ingestion**
Abdominal Xray	Multiple tablets with >40-60 mg/kg total elemental iron
Serum iron concentration	Rising levels, serum iron concentration at presentation and at ~4 hrs >60-90 micromol/L
Blood gas	HAGMA
LFTS and Coags	Hepatic failure
UEC	Renal failure

c). List two (2) methods of decontamination that are used in iron overdose and state when they would be used. (2 marks)

Whole bowel irrigation indicated for confirmed ingestions > 60 mg/kg (difficult and potentially hazardous in small children)
Surgical or endoscopic removal of tablets if lethal ingestion (e.g. >120mg/kg) or WBI not feasible

Clinical features and investigation results confirm significant iron poisoning with systemic toxicity. You consult with the on-call toxicologist who recommends starting chelation therapy.

d). State the drug and dose of the chelation therapy used in significant iron toxicity. (1 mark)

Desferrioxamine i.v.i. 15-40 mg/kg/hr

Candidate name:_____

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BOOKLET THREE

QUESTIONS 19 - 27

Question 19 (18 marks)

A 62-year-old female is brought into the resuscitation area of your department by ambulance. She woke from sleep this morning and felt dizzy and short of breath. She has a past medical history of end-stage renal failure secondary to diabetic nephropathy and has haemodialysis through a vas-cath three times a week. She has a left breast mastectomy for cancer 12 months ago and has a left above knee amputation from complications of her diabetes.

On assessment, her vital signs are:
Temperature 36.5 degrees Celsisus
BP 120/80 mm Hg
HR 43 bpm regular
SaO_2 95% RA
RR 16 breaths/min

a). List 5 potential cause of her shortness of breath given the above history and justify each cause (5 marks)

Cause	**Justification**
Pulmonary Oedema	Dialysis pt – susceptible to fluid overload
PE	Past Hx Ca also relatively immobile AKA – increase risk VTE
Infection (Pneumonia / others accepted)	Immobility – relative immobile and immune compromise diabetes
IHD / AMI	Bradycardiac ; diabetic patients can have AMI with no chest pain
Pericardial effusion/tamponade	ESRF ? uraemic and risk of large pericardial effusions

Other sensible answers will be accepted

b), List four (4) investigations that may help delineate the diagnosis and justify each (4 marks)

Investigation	**Justification**
ECG	Features of AMI / ischaemia -delineate HR 43/ Strain pattern – PE features s1q3t3
CXR	Features of oedema / infection
CTPA	If considering PE
ECHO	Features of RC strain (PE) Pericardial effusion
Caridiac biomarker (TNI)	Elevated troponin (borderline TNI unhelpful given ESRP but massively elevate would be

	suggestive for AMI)

A venous blood gas is taken on room air and the results shown below.

FiO2	0.21
pH	7.31
PaCO2	46
PaO2	20
HCO3-	22
Na	143
K	7.9
Anion gap	21
Glucose	24.5
Lactate	6.5

You are about to give the patient calcium resonium when she has a PEA arrest, ALS is commenced.

c). List the specific treatment of hyperkaleamic cardiac arrest in this patient. (4 marks)

Protect the heart: give 10 mL calcium chloride 10% IV by rapid bolus injection or 30ml of calcium gluconate
Shift potassium into cells: Give glucose/insulin: 10 units short-acting insulin and 25 g glucose IV by rapid injection. Monitor blood glucose.
Give sodium bicarbonate: 50 mmol IV by rapid injection (if severe acidosis or renal failure).
Remove potassium from body: Consider dialysis for hyperkalaemic cardiac arrest resistant to medical treatment. Several dialysis modalities have been used safely and effectively in cardiac arrest, but this may only be available in specialist centres.[28] Consider use of a mechanical chest compression device if prolonged CPR is needed.

Modifications to cardiopulmonary resuscitation (ERC from ILCOR Guidelines 2015)

ILCOR recommends modification to the ALS algorithm in certain special situations.

d). Give five (5) examples of and a recommendation/ modification to the ALS algorithm for each example. (5 marks)

Special situation	Recommendation/Modification to ALS
Hypoxia	Early effective ventilation with supplemental oxygen
Trauma	Prioritise sequence of life-saving measures: hypoxia, tension ptx, tamponade, mTP. Chest compressions should not delay the treatment of reversible causes
PE	Fibrinolysis + prolonged CPR
After major cardiac surgery	Re-sternotomy within 5 minutes
VT/VF during cardiac cath	3 stacked shocks; mechanical CPR devices
Submersion	Prioritise oxygenation and ventilation
Hypokalemia	Rapid potassium + mag infusion
Hypothermia	Do not delay intubation Check for signs of life for up to 1minute Withhold drugs until>30 degrees then double interval VF: 3 shocks then delay until >30
Tocins	HDIT, intralipid, ECMO

See ILCOR/ERC guideline 2015:

Question 20 (18 marks)

You are the consultant in charge of an urban district emergency department. You have just assessed a 42-year-old male who has sustained an isolated head injury from a bicycle accident.

a). List five (5) acute complications of head injuries (5 marks)

Impact apnoea
↑ICP
Intracranial h/toma (EDH/SDH/ICH /contusion)
Diffuse axonal injury
Skull fractures
Cranial nerve injury
CSF Leak
Neurogenic cardiac dysfunction/APO
Haemorrhagic shock (neonates)
Aspiration pneumonia
Seizures

You decide to electively intubate him.

b). List four (4) indications for intubation in the emergency department, for any patient. (4 marks)

Airway protection/maintenance
Ventilation support
Oxygenation support
Neuroprotection
Control of the combative patient

Facilitate safe transfer of a patient
Expected clinical course

You successfully intubate this patient. While securing the tube, you notice he has become hypotensive to 80/50mmHg.

c). Complete the following table for potential causes for post-intubation hypotension in ANY patient and state your immediate management for each cause listed. (5 marks)

Cause	**Immediate Management**
Acidosis	Hyperventilation, bicarbonate administration
Anaphylaxis	Adrenaline iv
Pericardial tamponade	Decompress
Breath stacking	Disconnect tube, compress chest, alter ventilator settings, bronchodilators
Hypovolaemia	IV fluid bolus
Induction agent effect	Supportive management – fluid, pressors
Tension PTX	Finger thoracostomy
Electrolyte abnormalities	Identify and correct

Post-intubation, he is taken to CT for trauma imaging. CT brain shows an acute subdural haematoma.

d). List the indications for surgery in patients with acute subdural haematomas (4 marks)

- haematoma thickness >10 mm
- > 5mm midline shift regardless of GCS
- GSC < 8
- drop in GCS ≥ 2 points

- development of papillary inequality

Question 21 (12 marks)

A 34-year-old woman self-presents with fever, headache, body aches and generalised malaise. She takes no regular medications and has a reported penicillin allergy (rash as a child). Her observations are as follows: RR 18 breaths/min, saturations 97% on RA, BP 100/55, HR 115 bpm, temperature 39.5 degrees Celsius. She is GCS 15/15. Weight approximately 60 kg.

A Chest X-ray is performed and is shown in the Props Booklet (Figure 7).

a) List two positive and one negative findings on this Chest X-Ray and provide a unifying diagnosis for this patient (3 marks)

Sternotomy wires
Circular opacity in region of valve consistent with valve replacement or repair.
Multiple small rounded opacities in both lung fields suspicious for septic emboli.
No confluent consolidation seen

b) Provide the most likely diagnosis for this patient (1 mark)

suspicion of infective endocarditis (most likely secondary to IVDU) / infection of prosthetic valve also possibility

c) List five other criteria required to make a formal diagnosis? (5 marks)

Duke's: 2 major/1 major+ 3minor/5minor
2 positive blood cultures with organisms consistent with IE (major)
Endocardial involvement on ECHO -mass/abscess/new valve regurg (major)
ECHO concerning for IE (minor)
Vascular phenomena -emboli, skin lesions (minor)
Immunologic phenomena- Osler's nodes, Roth spots(minor)
Risk factors: IVDU/ heart condition (minor)

d) What is the empiric treatment recommended for this patient? (3 marks)

Gentamicin 5mg/kg (300mg IV)
Vancomycin 30mg/kg (1.8g)
Cephazolin 2g IV

Question 22 (12 marks)

You are the DEMT and have received an email from the Head of Internal Medicine which states that one of the inpatient registrars has accused one of your ED registrars of being persistently rude and derogative towards them .

a). State two (2) methods you would use to gather more information prior to talking to the emergency registrar: (2 marks)

Interview colleagues (other consultants, nursing staff) discretely to obtain witness accounts if possible
Meet/phone call with Medical Director to ascertain more details: Ask for specific dates and examples rather than generalized statements

b). List four (4) things to consider when talking about the allegation with the Emergency Registrar. (4 marks)

Private location, free from distractions
Show genuine empathy for a colleague
Enquire about physical/mental health issues
Enquire about social stressors
Listen to their side of the story and document
Explain that their alleged behavior is inappropriate and cannot continue (even if they deny it)

After talking to the Emergency Registrar, you discover they are experiencing significant personal stress due to a close family member being diagnosed with a terminal illness.

c). How would you manage this situation? (4 marks)

Refer to GP or Employee Assistance Program for ongoing support
Ask about Social supports
Ask about drugs/alcohol/self-harm/suicidal ideation
Ability to work
Mandatory reporting requirements

Offer them leave, be flexible with leave
Ensure the Emergency Department Director is aware of the situation

You implement the above interventions.

d). List two (2) steps required to finalize this complaint. (2 marks)

Provide discrete feedback to Medical Director and Head of Internal Medicine in a timely fashion, ensuring the Emergency Registrar's confidentiality is maintained.
Follow up with the Emergency Registrar
Document the complaint and the outcome
Consider implementing 360 feedback for all emergency registrars as part of your feedback processes

Question 23 (12 marks)

A 48-year-old man presents to your regional Emergency Department with 24 hours of dysphagia and fevers, and new respiratory distress. He has no past medical history and is not on any medications. On arrival, he is sitting upright and is reluctant to lie back on the bed. He is having difficulty swallowing his secretions and also has a mild stridor with a hoarse voice.

His vital signs are:
BP 140/80 mmHg
HR 90 bpm
SpO2 99% RA
Temp 37.8'
RR 24

The nearest tertiary centre is a 2 hour drive away by road. You obtain a lateral neck x-ray, shown in the Props Booklet (Figure 8).

a). State the likely diagnosis and name the relevant positive finding on this radiograph (2 marks)

Acute epiglottitis
Thumb-printing sign of epiglottis

b). What is the most common causative organism for this patient's diagnosis? (1 mark)

Strep pneumoniae

c). What would be your anti-microbial of choice for this patient? (1 mark)

Ceftriaxone *or* Cefotaxime 1g IV

The patient develops worsening stridor and distress within 20 minutes of arrival at your department. He is becoming increasingly agitated and his oxygen saturations start to drop. You make the decision to intubate the patient in the ED. There is no anaesthetist available.

d). Complete the following table, listing the issues you might face during the intubation of this patient and how you would address these problems. (8 marks)

Factor	Anticipated problem	Proposed solution

Positioning	Pt unable to lie flat	Pre-oxygenate in upright position
Laryngoscopy	Large epiglottis likely to distort view	Use of straight (Miller) blade Hyper curved blade may improve view
Tube delivery	Laryngeal inlet may be narrowed or soiled with pus	Use of more narrow bore ETT or bougie
Failed airway plan	Unlikely to be able to ventilate through LMA	Have equipment and landmarks ready for a surgical cricothyroidotomy.

Note: There are clearly other issues that may arise. I am happy to give marks for these, but they must be accurately described and addressed

Reference : eTG, Dunn

Question 24 (12 marks)

A 60-year-old woman presents to your Emergency Department complaining of a severe gradual onset headache, blurring of her vision and new onset confusion.
Her vital signs are:

GCS 13	(E3V4M6)
RR	20/min
SaO2	96% in room air
HR	60
BP	190/130mmHg
Temp	37.0C

You diagnose her with Hypertensive Encephalopathy.

a) List 4 differential diagnoses, other than Hypertensive Encephalopathy, you would consider for this woman's presentation (4 marks)

Intra-cranial haemorrhage (traumatic or atraumatic); sub-dural haematoma, extra-dural haematoma. *Do not accept subarachnoid haemorrhage*
Meningo-encephalitis
Other intra-cranial infection; abscess, cerebral toxoplasmosis
Space-occupying lesion; Primary or secondary neoplastic lesion
Carotid artery dissection
Haemorrhagic CVA *Do not accept stroke or CVA*
Migraine
Hypoglycaemia
Toxicological; CO poisoning

b) What is the definition of a Hypertensive Emergency? (1 mark)

Systolic Blood Pressure >180 or Diastolic Blood Pressure >120 AND End-organ dysfunction.

c) What is the definition of a Hypertensive Urgency? (1 mark)

Systolic Blood Pressure >180 or Diastolic Blood Pressure >120 WITHOUT end-organ dysfunction

d) Complete the following table with 4 drugs you could use to treat this woman's hypertension including route, a pro and a con for each (4 marks)

Drug/Route	Pro	Con
Nitroglycerin SL Top	Fast onset Doesn't require intravenous line	Can cause headache Tachyphylaxis Do not use with sildenafil Reflex tachycardia
Nitroglycerin IV infusion	Titratable Rapid onset *Must use different pro/con if uses both IV and other formulation of GTN*	Can cause headache Tachyphylaxis Do not use with sildenafil CI with Aortic stenosis
Magnesium IV infusion	Relatively safe Familiarity	Risk of hypermagnesia Time of onset Less predictable effect
Hydralazine IV	Rapid onset Familiarity	Reflex tachycardia Urinary retention
Sodium Nitroprusside IV infusion	Rapid onset/offset Titratable	Requires central access Toxic metabolite Avoid light
Beta-blockers: Metoprolol IV Esmolol IV Labetolol IV	Rapid onset Titratable Familiarity	Bradycardia *only accept bradycardia as pt has HR of 60
Phentolamine IV	Rapid onset	Tachycardia/risk arrhythmia GI upset
Nimodipine IV infusion (1mg/hr)	Pronounced reduction in BP Titratable	Tachycardia Headache Nausea

*do not accept oral drugs

e) State your treatment goal for this woman's hypertension (2 marks)

Decrease MAP by 15-25%
Within 1-2 hours

References

Tintanelli's Emergency Medicine 7th Edition; Chapter 61 Systemic and Pulmonary Hypertension
Textbook of emergency Medicine 4th Edition, Peter Cameron, Chapter 5.9 Hypertension
UpToDate, Drugs used in treatment of hypertensive emergencies; Elliot and Varon
2013 ACEP clinical policy

Critical issues in the Evaluation and Management of Adult patients in the Emergency Department with asymptomatic Elevated Blood Pressure (February 2013)
https://www.acep.org/patient-care/clinical-policies/asymptomatic-elevated-blood-pressure/

Question 25 (12 marks)

You are the consultant in charge of the paediatric section of a rural emergency department. A 5-year-old boy presents via the ambulance following an accident with a home barbecue, thirty minutes ago. The ambulance reports the family was cooking lunch on the barbecue which was set up inside the house due to rainy weather when the gas bottle exploded and started a fire.

On assessment the boy has considerable soot on his face and there is severe swelling to his cheeks, lips, and eyelids.
His vital signs are:

SaO_2	89% on 15L oxygen via non-rebreather
Pulse	120 bpm
Cap refill	3 seconds
Resp rate	28 breaths/min

You decide to intubate the patient for airway protection. You perform a rapid-sequence induction but are unable to visualise the cords using video laryngoscopy. You are unable to ventilate the child with a bag-valve mask or a laryngeal mask airway. The on-call anaesthetist is on the way but is still more than ten minutes away.

a). State your immediate management. (5 marks)

Declare critical situation: (1 mark) Can't intubate, can't ventilate scenario. Child under 8 years old so needs jet insufflation.
Perform Cannula Cricothyroidotomy: (2 marks) Extend the neck (shoulder roll) + Stabilise larynx with non-dominant hand + Access cricothyroid membrane with a dedicated 14/16 gauge cannula + Aim in caudal direction Confirm position by air aspiration using a syringe filled with saline
Perform jet insufflation: (2 marks) Connect to either an adjustable pressure limiting device, set to lowest delivery pressure OR a 4Bar O_2 source with flowmeter (match flow L/min to child's age) and Y-connector. Cautiously increase inflation pressure/flowrate to achieve adequate chest expansion. Wait for full expiration before next inflation. Maintain upper airway patency to aid in expiration

Marking criteria: Must recognise that the child is too young for a surgical airway, though these have been described and successful in the paediatric age group.

b). List three (3) causes of impaired oxygenation in this patient, and their causes. (3 marks)

Cellular hypoxia: Carbonmonoxide; Cyanide, (Methaemoglobinaemia)
Bronchospasm: Secondary to fumes and minute particles.
Atelectasis and airway obstruction: Smoke particles causes hypersecretion, inflammation, and mucosal sloughing.

Lung contusions and alveolar trauma: Blast injuries.

The anaesthetist arrives and successfully intubates the patient.

c). List your ventilator settings with a justification for this patient. (4marks)

FiO_2 1.0: aim SaO2 94-98%
PEEP 5 cmH_2O PS 10 cmH_2O : May develop parenchymal damage giving ARDS picture
TV 6ml/kg: Permissive hypercapnoea
Plateau pressures <30cmH20: minimise baroutrauma

Ref: **https://www.inkling.com/read/cameron-textbook-adult-emergency-medicine-4th/section-3/3-11-burns**

https://das.uk.com/guidelines

Question 26 (12 marks)

You have been tasked to retrieve a 42-year-old female from a rural base hospital to a tertiary referral centre 400km away. The estimated flight time is 75 minutes. She was brought into ED after a polypharmacy overdose 90 minutes ago and is presumed to have ingested:

- Paracetamol 15 tablets x 500mg (7.5 grams)
- Olanzapine 25 tablets x 10mg (250mg)
- Diazepam 5 tablets x 5mg (25)

Her observations are;

SaO2	92%RA	
BP	100/60 mmHg	
Pulse	110 bpm	
RR	22breaths/min	
GCS	10	E2V4M4

a). State how you would manage this patient to enable safe transportation. For each decision provide a justification. (8 marks)

Decision	Justification
Intubate and ventilate - drugs/doses required - Any reasonable choice	Airway protection due to predicted sedation Agitated patient is a safety risk on a flight
Ongoing sedation - Any reasonable choice	Minimize complications during transfer
Ongoing Relaxation - Vecuronium 10 mg IV PRN	Minimize complications during transfer e.g tube dislodgement/chewing on tube
IV fluids	Maintenance + bolus for predicted hypotension
Cardiac monitoring with defibrillation pads on	Possibility of arrhythmia/QT prolongation
2x IV access with long extensions (more than 2 preferred)	Easier drug administration
Vasopressors prepared and ready to give - drug/dose required - Any reasonable choice	Predicted hypotension
NG tube insertion	Decompress stomach
IDC insertion	Patient care on long flight, decompress bladder

b). Complete the following table for the dose-related clinical effects that you would anticipate from an Olanzapine overdose. (4 marks)

Dose	**Clinical features**

Answer

TABLE 3.55.1 Dose-related risk assessment: Olanzapine

Dose (adult)	Effect
<40 mg	Therapeutic sedation and antipsychotic effects
40–100 mg	Mild to moderate sedation with possible anticholinergic effects
100–300 mg	Sedation with intermittent marked agitation
>300 mg	Increasing sedation progressing to coma likely to require intubation Hypotension secondary to peripheral alpha blockade

Reference:

The Emergency Medicine Manual - Dunn et. al.
The Toxicology Handbook - 3rd edition

Question 27 (12 marks)

A 62-year-old man is brought in by ambulance to your tertiary hospital after a low-speed dirt bike accident. He was riding up a hill, hit a mound, and fell backwards onto his left chest and shoulder. He did not lose consciousness and mobilised at the scene.
On assessment, he is alert and talking. His respiratory rate is 20 breaths/minute with shallow respirations, his SaO_2 is 92% on room air; BP is 130/80, his heart rate is 95 bpm, his GCS is 15 and his temperature is 36.2 degrees Celsius. His abdomen is soft and non-tender.

A chest x-ray is performed and is shown in the Props Booklet (Figure 9)

a. List three positive and two negative findings on this Chest x-ray.(5 marks)

Multiple left-sided rib fractures including displaced fractures of 5th and 6th Ribs posterolaterally.
Comminuted # of the mid-third of the left clavicle with 13mm craniocaudal offset
Patchy airspace opacification at the left lower lobe – likely contusion.
No significant haemo- or pneumothorax
No subcutaneous emphysema
Cardiac contour appears normal

b. List and justify two further investigations you would request for this patient. (4 marks)

Investigation	**Justification**
CT chest	**Further define injuries seen and evaluate for subtle PTx, HTx, mediastinal haematoma, radiological flail.**
ECG	Cardiac contusion (dysrhythmia or ST segment changes)
FBE, UEG, LFT, lipase, G&H, coags	Evaluate Hb (and baseline), G&H in case of transfusion
Blood gas	Early signs of hypoventilation secondary to rib # pain (raised pCO2).

You decide he needs admission for analgesia and observation, however he refuses to stay.

c. List the medico-legal requirements necessary for him to be declared competent to make this decision (4 marks)

Cognitive capacity: understand the condition, treatment options, potential outcomes, likelihood
Able to accept/retain/paraphrase info, explain consequences, reasons for their decision
Mental state: not altered by medical conditions+ Not impaired by alcohol/drugs + MMSE>20
Age : adult – given in stem

Ref: Dunn (admin)