



NSW Faculty
TRIAL FELLOWSHIP EXAMINATION
Royal Prince Alfred Hospital 2015.1

WRITTEN EXAMINATION
Short Answer Questions

- *30 Questions*
- *180 minutes (No reading time)*
- *Answer all questions*
- *Write your answers on this question paper.*
- ***Write your name on the top of the first page of each answer.***

Question 1 Answer

Dr Ien Ly

A 3½ year old boy accompanied by mum presents to ED with painful left leg and ongoing limp left leg for last four days. According to mum there is no history of fall or trauma. On examination, he is holding left leg in slight flexion and is unable to weight bear. You decide to do a pelvic X-ray. His observations are:

Pulse 95bpm BP 90/60mmHg RR 22/min Sats 97%air Temp 37.1C



1. Describe the abnormality on the XR (1 mark)

- *avascular necrosis of the left femoral head*

2. What is the most likely diagnosis? (1 mark)

- *Perthes disease*

3. List 8 causes of atraumatic limp in a child this age (4 marks)

- *Perthes disease*
- *transient synovitis*
- *septic arthritis*
- *osteomyelitis*
- *Stills disease*
- *juvenile ankylosing spondylitis*
- *Ewing sarcoma*
- *Leukaemia*
- *vaso-occlusive – sickle cell crisis*

NB any 4 options to score 4/4

4. List 4 assessment parameters are the most useful for suspected septic arthritis in a child with a painful hip (4marks)

- *non-wt bearing,*
- *fever 38.5oC,*
- *WCC > 12,000/mm,*
- *ESR >40mm*

NB Kocher criteria 1999

Probability of septic arthritis

1 / 4 – 3%,

2/ 4 – 40%,

3/ 4 – 93%,

4/ 4 – 99%

Question 2 Answer

Dr Ien Ly

An 84 year-old female attended your ED after allegedly taking 38 tablets of Paracetamol 16 hours ago (total 16 grams). Observations are stable and her GCS is 15.

1. What is the pathophysiology of paracetamol toxicity (1 mark)

- *Hepatotoxicity results from one of paracetamol metabolites N-acetyl-p-benzoquinoneimine (NAPQI). NAPQI depletes the liver's natural antioxidant glutathione and causes hepatic necrosis when stores are exhausted, which leads to liver failure.*

2. List investigations you would perform and why (2 marks)

- *serum paracetamol - to establish risk of hepatotoxicity*
- *LFTs – transaminitis reflects hepatotoxicity beyond 8 hours*
- *Coagulation/ INR – hepatotoxicity days 1-3*
- *ECG – conduction abnormalities from co-ingestion*
- *BSL – hypoglycaemia may occur*
- *VBG – metabolic acidosis may indicate worse prognosis*
- *EUC – high Cr may indicate worse prognosis*

3. State 3 elements required to demonstrate competence (3 marks)

- *Listen and understand the risk and benefit of alternatives, including consequences of refusal*
- *retain the information*
- *be able to make a free choice/ come to a decision*

4. She refuses treatment and wants to discharge herself. Upon assessment, you find that she lacks capacity. List your important actions (5 marks)

- *detain under duty of care (or mental health act)*
- *clearly document assessment of competence and mental state*
- *treat with NAC*
- *seek and treat any co-ingestion*
- *psychiatry referral*

Question 3 Answer

Dr Ien Ly

A diabetic patient arrives to the ED and requires fluid resuscitation. He has bilateral below knee amputations. Several attempts to establish IV access failed. You decide to go with the IO route.

1. List 3 alternative anatomical sites that are available for intraosseous access? (3 marks)

- *greater tubercle of the humeral head (axillary vein)*
- *sternum – upper 1/3 (internal mammary and azygos veins)*
- *femur (femoral vein)*

2. What is the clinical indication for intraosseous access? (1 mark)

- *emergent or urgent situation where venous access cannot be obtained quickly*

3. List 4 contraindications for IO insertion (2 marks)

- *fracture or previously punctured bone*
- *ipsilateral vascular injury – fluid extravasation*
- *osteoporosis – iatrogenic fracture*
- *cellulitis, burns or osteomyelitis overlying insertion site – secondary infection*

4. List the 4 main complications associated with intraosseous use? (2 marks)

- *fracture*
- *compartment syndrome*
- *osteomyelitis (0.6%)*
- *growth plate injury*

NB fat micro-emboli also acceptable answer

5. List 4 diagnostic studies that can be obtained via intraosseous access that accurately equates to iv collection (2 marks)

- *glucose*
- *Hb*
- *Sodium*
- *urea, creatinine*
- *pH*
- *PCO2*
- *culture*

NB any 4 from the above list scores 2 points, score 0 if includes WCC, K, AST, ALT, ionised calcium

Question 4 Answer

Dr Ien Ly

A 25 year old male was assaulted with a baseball bat. He had a witnessed LOC for 5 minutes and GCS was 10 when paramedics attended. On arrival to the ED, he had a generalised seizure following which he became agitated and combative with a GCS of 8. His left pupil is dilated and he has already vomited at scene and the ED.



1. Describe the 4 abnormalities on this CT (2 marks)

- *midline shift*
- *acute left subdural haemorrhage*
- *acute right extradural haemorrhage*
- *left frontal intracerebral haemorrhage*

2. List 9 important initial steps in this patient's initial primary survey, including end points where appropriate (6 marks)

- *secure the airway/ intubate*
- *C-spine immobilisation*
- *maintain normoxaemia PO2 100mmHg*
- *ventilate to maintain PCO2 35-40mmHg*
- *secure IV access, crystalloids to maintain MAP >65mmHg, SBP > 90mmHg*
- *inotropes noradrenaline once fluid deficit corrected to maintain MAP>65*
- *maintain normoglycaemia*
- *normothermia*
- *phenytoin loading dose to minimise early seizures/ secondary brain injury*

NB score 2 marks for each 3 steps named

3. Describe the methods of reducing intracranial pressure in this patient and the rationale of each method (2 marks)

- *hyperventilation – temporary vasoconstriction at the expense of cerebral perfusion prior to theatre*
- *mannitol – 0.25 1.0g/kg – osmotic gradient, can be detrimental with disrupted blood brain barrier or cardiovascular instability*
- *hypertonic saline*
- *head elevation 30 degrees*
- *optimise cerebral venous drainage*

NB need to describe 4 methods to score 2 marks

Question 5 Answer

Dr Ien Ly

A 45 year-old female has long standing low back pain was discharged the preceding day by a JMO in your ED with a diagnosis of malingering. She now presents to the ED with a sudden and severe lower back pain radiating down the legs. In the department she was unable to control herself and was incontinent of urine.

1. What 6 features would suggest cauda equina syndrome? (3 marks)

- *sciatica*
- *variable motor and sensory loss both lower limbs*
- *urinary incontinence*
- *bowel dysfunction*
- *saddle anaesthesia*
- *bilaterally absent ankle reflexes*

need to score 2 correct answers for each 1 mark

2. List the essential test to aid the assessment of a patient with suspected cauda equina syndrome (1 mark)

- *MRI*

3. You investigate and find that the JMO did not examine the patient, wrote no notes and was heard by the ED RN to tell the patient that there is nothing wrong with them and they should not have come to the ED, again. You are the JMO's supervisor. Outline your approach to this situation (4 marks)

- *Arrange to speak with the JMO privately*
- *Assess if any drugs, alcohol, mental health issues with the JMO and if concern escalate to ED Director and or medical board*
- *Educate that not appropriate was of handling this situation*
- *Document record of conversation*
- *Inform JMO that patient may complain – should contact medical defence and write contemporaneous notes*
- *Review departmental protocol for JMO supervision*

4. Outline the immediate steps in the management of this patient (2 marks)

- *bedrest with pressure relieving mattress*
- *bladder scan/ urinary catheter*
- *analgesia*
- *neurosurgical review discectomy/ laminectomy*

Question 6 Answer

Dr Ien Ly

An 18 month-old boy is brought by his worried mother to the ED with a rash and spots in his buccal cavity. He is also pyrexial (T 38.9°C).



1. What changes are shown and what is the diagnosis? (2 marks)

- *Koplik's spot*
- *measles*

2. List 2 acute complications of this condition (2 marks)

- *otitis media (2.5%)*
- *bronchopneumonia (4%)*

NB encephalitis also reasonable

3. What laboratory findings would be expected with this diagnosis (3 marks)

- *leucopaenia*
- *thrombocytopaenia*
- *raised measles IgM*

3. In the ED, the child starts fitting. They are placed on their side with oxygen given by mask. An iv is placed. Outline your immediate management including drug doses (3 marks)

- check blood glucose and if low give 5ml/kg = 50ml of 10% glucose
- Give midazolam 0.15mg/ kg = 1.5mg iv (or diazepam 0.25mg IV/IMIntravenous/ PR)
- paracetamol for fever 150mg

Question 7 Answer

Dr Ien Ly

A 29 yr old female presents to the ED with lower abdominal pain. Observations are stable, blood tests are within normal range and her pregnancy test is negative.

1. Which 4 risk factors suggest pelvic inflammatory disease? (2 marks)

- *multiple sexual partners*
- *high frequency sexual intercourse*
- *first sexual intercourse at a young age*
- *cervical instrumentation*

2. When should treatment be initiated? (2 marks)

- *clinical signs – uterine/ adnexal tenderness, cervical motion tenderness*
- *no other cause can be found – empirical treatment on minimal diagnostic criteria*

3. What are the 4 main indications for hospital admission? (2 marks)

- *clinically severe PID with temp >38oC*
- *failure to respond to 24-48hrs of outpatient therapy*
- *oral inappropriate – poor compliance or vomiting*
- *surgical emergencies cannot be excluded – ectopic pregnancy/ appendicitis*
- *co-morbidities – diabetes mellitus, immunodeficiency*
- *complications – tubo-ovarian abscess, Fitz-Hugh Curtis syndrome*

NB any of the above 4 scores 2 marks

4. What discharge topics should be discussed with the patient? (4 marks)

- *sexual practice – safe sex*
- *risk of infertility*
- *public health referral*
- *partner treatment*

Question 8 Answer

Dr Ien Ly

A 35 year-old female is brought to the ED by her husband. She has not been feeling well and is becoming irritable, agitated and is constantly sweaty. She is known to have hyperthyroidism and last week underwent surgery. Examination reveals a HR 144 bpm and T 38.4°C.

1. What three clinical features are most relevant to assess for thyroid storm? (3 marks)

- *temperature >37.8°C*
- *tachycardia out of proportion to the fever – cardiovascular collapse*
- *CNS disturbance in 90%* (Dunn)

2. List 4 specific drugs that would be used to treat this patient and outline their mechanism of action. Provide doses where appropriate. (4 marks)

- *propylthiouracil – 900mg loading, 300mg maintenance daily, reduces iodination in the thyroid gland, but does not reduce release, reduced conversion of T4 to T3*
- *Lugol's iodide – inhibits release from thyroid gland, give >1hr after PTU*
- *Propranolol – most important vs morbidity and mortality - 60-80mg q 4hr – treats fever, tachycardia, tremor immediately, inhibits T4 to T3 conversion*
- *Hydrocortisone – 100mg q 6 hrly - inhibits T4 to T3 conversion*

3. Apart from supportive measures such as ivi fluids, correcting fluid or electrolyte imbalance, external cooling, outline options for refractory thyroid storm (3 marks)

- *peritoneal dialysis*
- *plasmapheresis*
- *charcoal haemoperfusion*

Question 9 Answer

Dr Ien Ly

A patient presents to the emergency department after sustaining multiple lacerations to the sole of the foot from oyster shells after walking on the beach. You wish to perform a regional block to the plantar aspect of the foot.

1. Name the 3 nerves involved and their cutaneous distribution (3 marks)

- *posterior tibial – most of the sole and heel*
- *sural – posterolateral sole*
- *saphenous – small area, medially over arch*

2. Where would you insert LA to anaesthetise these regions (3 marks)

- *posterior tibial – upper border of medial malleolus, between posterior tibial artery and Achilles tendon*
- *sural – fanlike distribution, superficial, lateral to Achilles tendon*
- *saphenous – superficially, between medial malleolus and tibialis anterior tendon*

4. What other issues must be addressed in the treatment of this injury prior at discharge (4 marks)

- *infection prophylaxis – skin commensals, vibrio eg doxycycline if not pregnant*
- *tetanus update*
- *aftercare and follow up advice*
- *documentation, certificates for work etc*

Question 10 Answer

Dr Ien Ly

A 25 year-old male involved in a motorbike accident was brought to the ED at a tertiary level centre. A trauma series was performed with a normal CXR and C-spine Xray. The following radiological imaging was undertaken.

Vital signs are: RR 20 sat 99% on room air HR 115 BP 80/50 GCS 15



1. List the abnormalities on this Xray (2 marks)

- pubic symphysis diastasis – APC or VS injury
- contrast leakage consistent with urethral rupture

2. What clinical signs are associated with this injury on examination (1 mark)

- *high riding or boggy prostate*
- *blood at the urethral meatus*
- *perineal or scrotal haematoma*

NB need all 3 to score 1 mark

3. Give the 4 most likely causes of hypotension in this patient (2 marks)

- *pelvic venous or arterial haemorrhage*
- *intra- abdominal haemorrhage*
- *spinal shock/ injury*
- *long bone fracture*

NB need all 4 to score 2 marks, 2-3 scores 1 mark, 0-1 scores 0

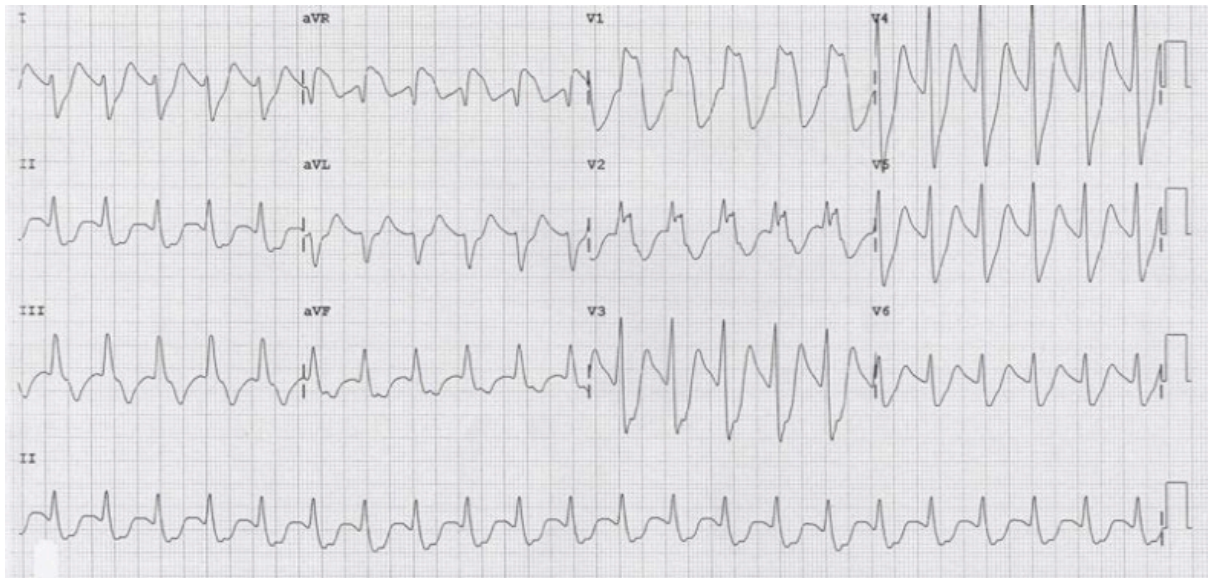
4. List the immediate management priorities in treating this patient's hypotension (5 marks)

- *pelvic immobilisation – external binder/ sheet, minimal pelvic movements*
- *resuscitation - massive transfusion protocol – blood/ platelets/ FFP 1:1:1, cryoprecipitate, tranexamic acid*
- *FAST scan – angiography and laparotomy if positive; angiography if –ve and readily available*
- *urgently notify theatres/ interventional radiology/ orthopaedic surgeon/ trauma surgeon/ anaesthetist/ blood bank/ prepare staff and equipment for transfer – monitors, IV access, drugs for intubation/ analgesia*
- *maintain normothermia – warm fluids, external radiant heater*

Question 11 Answer

Dr Mechelle Smith

A 38 year-old female was brought to the ED by her husband. She was agitated but is now drowsy and her GCS is 13. Her husband reports that his wife had been under considerable stress at work recently. An ECG was performed.



1. You note a wide complex tachycardia. Describe the other important findings on ECG (2 marks)

- *Na block – terminal R wave aVR, increase R/S ratio >0.7 in aVR (1)*
- *Prolonged QT (1)*

2. What is the likely diagnosis (1 mark)?

- *TCA overdose or other Na blocking drug (1)*

3. Her GSC decreases to 10 and you decide to proceed with intubation.

HR 120

BP 95/70

Sats 98% on NRM

RR 30

Temp 36.8 degrees

NS 500mls bolus is started. What medications would you give during the next 5-10 minutes prior and during the intubation? (5 marks)

- *Bicarb 100mmol iv*
- *Thiopentone 100-300mg ivi or propofol 70-140mg*
- *Suxamethonium 100mg or rocuronium 50mg*

- *Ongoing sedation eg propofol infusion or midazolam/morphine*
- *NGT with activated charcoal 50g*

4. After intubation she has a generalised seizure. What medications would you give at this point (2 marks)?

- *Midazolam 3-5mg ivi*
- *Bicarb 100mg iv*

NB failure to give bicarb is an entire question fail score 0

Giving phenytoin is an entire question fail as this is a Na blocker score 0

(Toxicology handbook 113-117 and 357-361,)

Question 12 Answer

Dr Dane Chalkley

You are working at a rural ED located near an Australian ski field. You receive a 27 year old man who has fallen into a frozen lake while hiking. He has arrived to your resuscitation room 30 minutes after submersion. His core temperature is 27.4 °C

1. Define hypothermia and hypothermia severity? (2 marks)

- *Hypothermia – Core temperature <35 °C*
- *Mild 32-35 °C*
- *Moderate 28-32 °C*
- *Severe <28 °C*

2. What features of hypothermia are demonstrated on an ECG? (2 marks)

- *Bradycardia*
- *no P waves/ AF*
- *Osborn J waves, widened QRS*
- *Prolonged QT*

3. His rhythm on the monitor changes to VF. ACLS algorithm is started with breaths and compression, but no cessation of VF after 3 rounds of defibrillation and 1mg of adrenaline iv. How will you differ your resuscitation compared to the usual ACLS algorithm? (4 marks)

- *Pulse check up to one minute*
- *No iv adrenaline until ≥ 30 degrees and then double the usual interval*
- *3 attempts at defibrillation until ≥ 30 degrees*
- *Consider prolonged resuscitation*

4. What are the 2 main types of warming and 2 give examples of how each can be achieved? (2 marks)

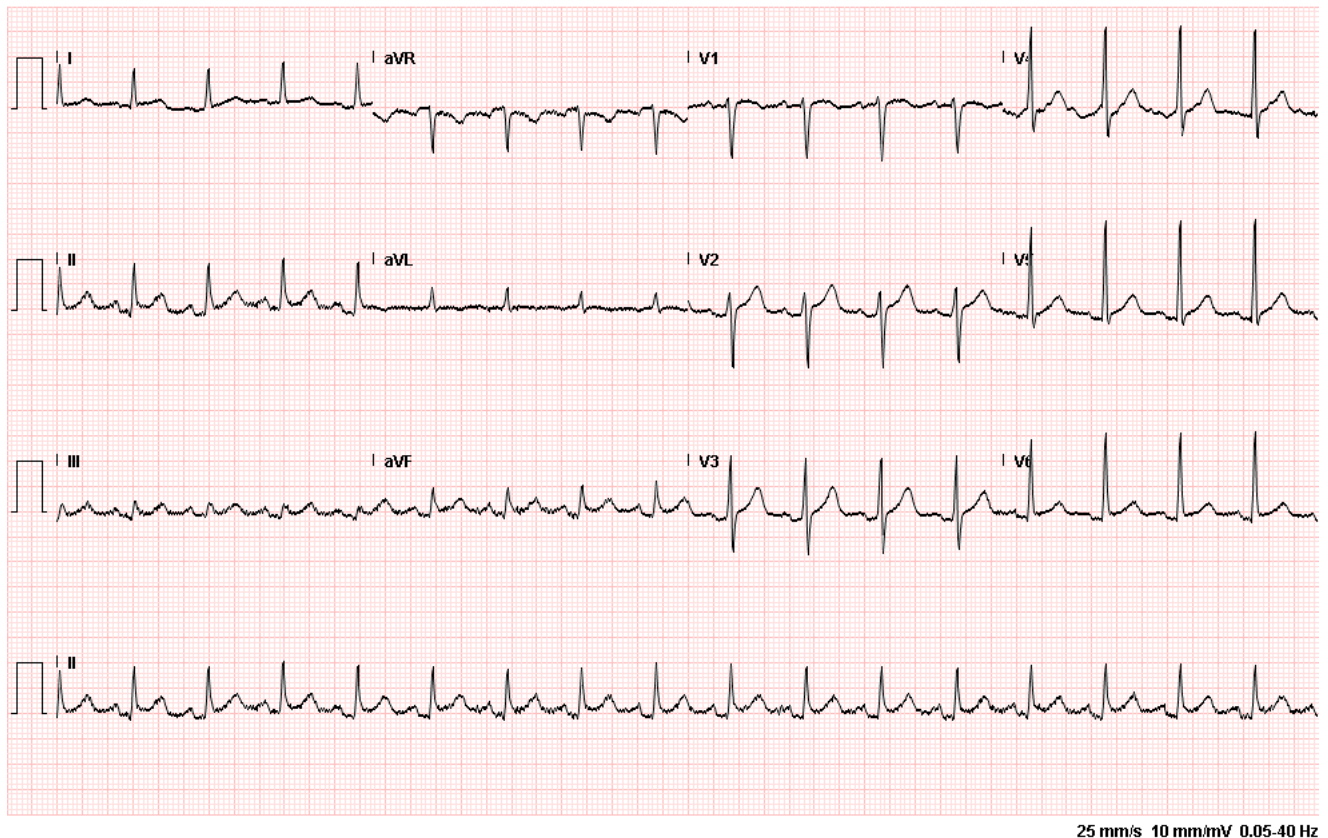
- *Passive eg*
 - *Bair hugger*
 - *Warm blankets*
 - *Overhead heater*
- *Active eg*
 - *Warmed ivi fluids*
 - *Warmed gases*
 - *Gastric, bladder, peritoneal or pleural lavage*
 - *ECMO not likely available*

Dunn 1039-1044

Question 13 Answer

Dr Mechelle Smith

It is 1600 on Saturday afternoon. A 75 year old woman with a background of CRF on peritoneal dialysis and diet controlled diabetes presents with retrosternal chest pain radiating to neck and both arms which started 60 minutes previously. She is well functioning in the community and her only medications are irbesartan, calcium and vitamin D. She has no allergies. She is vitally stable and the following ECG is performed:



1. What are the diagnostic features on the ECG? (1 mark)

- *STE inferior leads*
- *STD aVR associated with q wave*
- *Widespread PR depression except elevation in aVR*

2. If you were working at an urban major referral hospital with 24 hour on-call PCI capabilities, would you activate the PCI team – they have no access to the ECG and will act on your recommendation and outline your reasoning? (2 marks)

- *Yes, clinical picture of STEMI with ECG possible STEMI*

3. If you were working at a rural emergency department would you give thrombolysis considering that at this time the availability of transfer to PCI is 3 hours (2 marks)

- *No, ECG has features of pericarditis which is a contraindication to thrombolysis*

5. List 10 features (4 history, 3 ECG and 3 other investigations) that would increase the diagnostic possibility of STEMI over pericarditis (5 marks)

- *Older age group*
- *Risk factors for ACS*
- *Short duration of pain*
- *Dull pain, not pleuritic*
- *Anatomically contiguous ST and J point elevation*
- *PR depression absent*
- *ECG changes rapidly with alteration of pain*
- *Biomarkers abnormal*
- *Pericardial effusion rarely present in acute STEMI*
- *Coronary angiography normal*

Dunn p404

Question 14 Answer

Dr Mechelle Smith

Your registrar asks you for advice. A 50 year old female has presented following a collapse and is now increasingly confused . Her only injury is a minor abrasion to her forehead.

You have the following blood/urine results thus far:

Patient weight 65kg

Glucose 16.4

Na 111

K 4.2

Urea 7.2

Creatinine 102

Hb 13.1

WCC 12.2

Plt 175

Urine Osmolality 125

Urine Na 42

1. What is her calculated Na? (1 mark)

- *114-115 mmol/l*

2. What is her calculated osmolality (1 mark)

- *$2Na + Glu + U = 245 \text{ mmol/kg}$*

3. What are 12 criteria for SIADH on history, examination and investigations? (6 marks)

- *hyponatraemia*
- *hypotonicity*
- *urinary Na >20mmol/l*
- *urine osmolality > plasma osmolality or > 200mosm/kg*
- *euvolaemia or normovolaemia*
- *normal renal function*
- *normal hepatic function*
- *no cardiac disease/ CCF*
- *no thyroid disease*
- *absence of drugs affecting renal water handling*
- *correction of Na with fluid restriction*
- *normal cortisol*

4. She remains confused and then has a seizure. What is your specific treatment and endpoints. (2 marks)

- *3% NS 60-70ml/hour for 4 hours*
- *Aim increase Na by 0.5 to 1 mmol/ hour*

Question 15 Answer

Dr Mechelle Smith



1. What is this device ? (1 mark)

- *Laryngeal Mask Airway*

2. Describe 2 clinical situations when you might consider using this device in ED? (2 marks)

- *Cardiac Arrest*
- *Failed intubation*

3. How can you confirm the placement of this device? (3 marks)

- *It should rise when cuff inflated*
- *Air entry to both lung fields*
- *Capnography*

4. Describe clinical situations when this device would be inappropriate/ contraindicated. (5 marks)

- *Non-fasted patients*
- *Morbidly obese patients*
- *Pregnancy*
- *Obstructive or abnormal lesions of the oropharynx*
- *Increased Airway resistance and decreased lung compliance*

Question 16 Answer

Dr Mechelle Smith

A 22 year old female medical student is brought in by ambulance following a short seizure at home. She has recently returned from her elective in Malawi. Her student friends are unsure if she took any of her medications because they gave her nightmares. She is now drowsy and not orientated. You call public health and they do not suspect Ebola.

1. Name the most likely causative organism (1 mark)

- *Plasmodium Falciparum may cause cerebral malaria with coma, fits, oculogyric crisis and focal neurological signs. Diarrhoea, cardiac failure, pulmonary oedema and shock may occur. Deterioration can be rapid.*

2. A BSL is normal. What other initial blood tests will you arrange immediately and what would you expect for each? (4 marks)

- *blood for thin and thick film – view malaria parasites*
- *FBC - malaria may cause anaemia, neutropenia and thrombocytopenia*
- *VBG Metabolic acidosis pH <7.3 indicates severe malaria or EUC with ARF indicates severe malaria*
- *PCR falciparum*

3. Public health calls back as there has been 5 cases of Ebola confirmed in Malawi in the clinic the medical student was at. Outline the important issues. (5 marks)

- *Ensure patient in isolation and wearing a mask*
- *Notify ED/ ID/ ICU/ hospital staff/ executive (not media)*
- *Ensure all staff who will care for patient follow PPE procedure for suspected Ebola patients – impervious mask, impervious gown, hood, gloves, face mask*
- *Contact tracing - ensure public health involved in follow up contacts*
- *Ensure patient continues to have treatment for malaria – admit ID/ isolation room*

Question 17 Answer

Dr Mechelle Smith

A 70 kg 26 year old man is involved in a house fire in an enclosed room. He has burns to the whole of his head, the ventral aspects of both arms and 3% on his chest.

1. What are the signs that would alert you to an airway problem in this patient? (4 marks)

- *Singed nasal hair*
- *carbonaceous sputum*
- *facial burns*
- *hoarse voice or stridor*

2. Calculate the % burn (1 mark)

- *Using rule of nine's 9 (head) + 9 (both arms) + 3 = 21%*

3. What fluid would you chart (type and amount) each hour for the first 8 hours – show your calculation? (3 marks)

- *$4 \times 21 \times 70 = 5880 \text{ ml}$*
- *Give 2940 ml over 8 hours*
- *Approx 367ml/ h of Hartmanns*

4. What analgesia would you give and by what route? (1 mark)

- *5-20 mg of intravenous morphine by 5mg titrated dose for pain and response*

NB reasonable alternatives eg iv or intranasal fentanyl with correct dose for the route

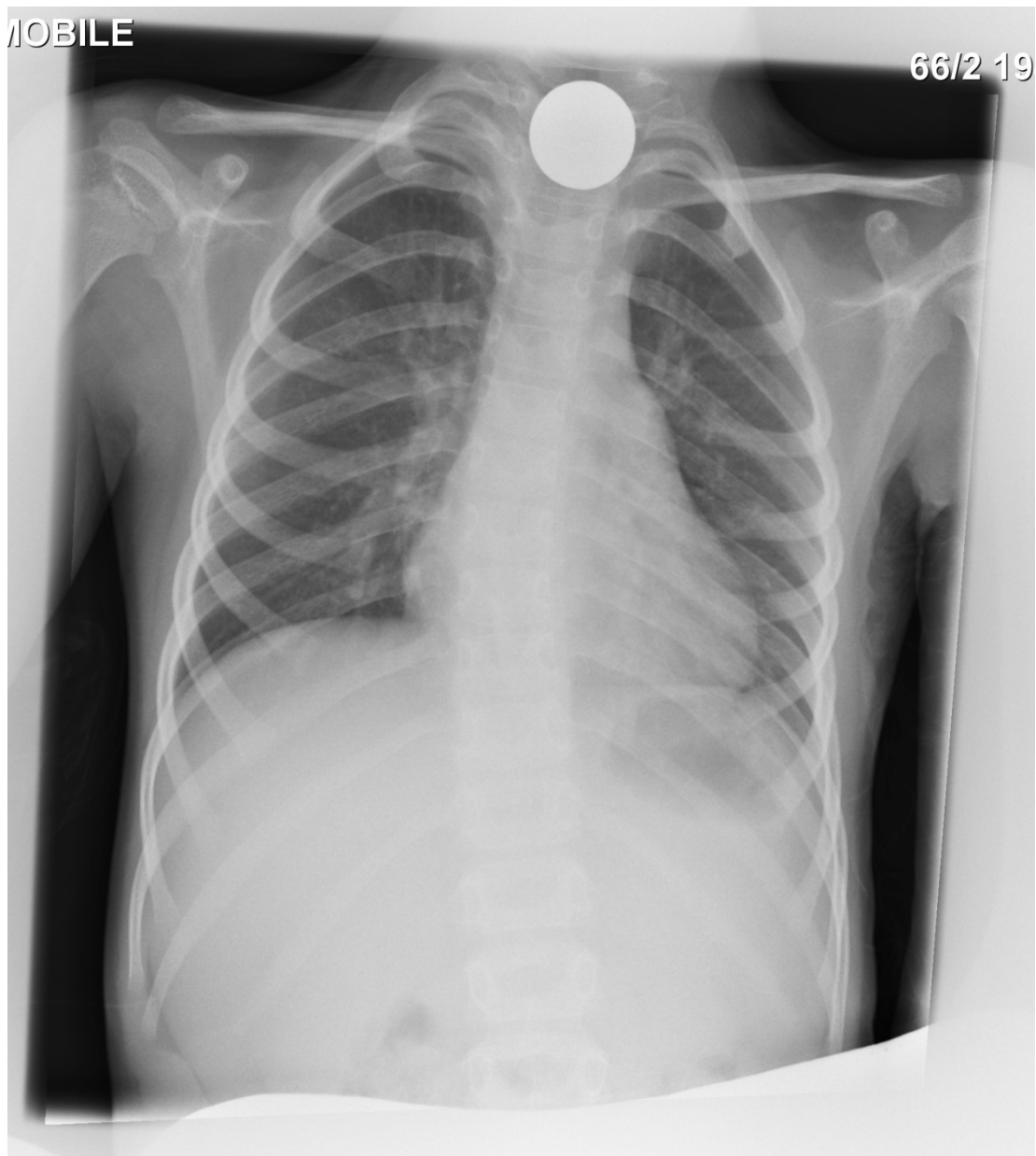
5. What would you aim his urine output to be? (1 mark)

- *>50 ml/hr*

Question 18 Answer

Dr Mechelle Smith

A 2 year old boy is brought into the ED by his mother after swallowing his older sister's earring. He is drooling.



1. What in the history would alert you to the presence of a foreign body? (3 marks)

- *choking episode, difficulty in breathing*
- *drooling,*
- *coughing*

2. You review the Xray. Do you think the FB is in the trachea or oesophagus and why? (1 mark)

- *Oesophagus as it is at the level of C6 cricopharyngeus where a foreignbody often sticks*

3. Where in the oesophagus might a foreign body become lodged? (3 marks)

- *T4 Aortic arch,*
- *T8 where the aorta crosses the oesophagus*
- *T10 GOJ*

4. Describe 3 instances where this FB would need to removed urgently (3 marks)

- *If foreign body suspected button batteries*
- *complete impaction*
- *abdominal pain or obstruction*

Question 19 Answer

Dr Mechelle Smith



A 19 year old girl is brought in by her friend after an episode of collapse. They had been taking ecstasy and dancing all night. She has a temperature of 39 degrees, HR 140bpm, BP 190/110. She appears dehydrated, agitated and has a resting tremor. She is catheterised with the above urine.

1. What is the likely diagnosis? (1 mark)

- *Serotonin syndrome leading to rhabdomyolysis*

2. What is the most important electrolyte result you would want to know before starting treatment and why? (2 marks)

- *Potassium, in view the patient may require intubation and ventilation and you would want to avoid use of suxamethonium*

The laboratory ring you with an urgent Na result of 112mmol/l

3. Name four further steps in the ED management including drug doses and route where appropriate. (4 marks)

- *Active cooling*
- *Midazolam 3-5mg IV (or diazepam 5mg) for agitation/convulsions/ HT*
- *0.9% saline intravenous aim to increase Na 6mmol/l in 4 hrs*
- *NaHCO₃ 50mls 8.4%*

4. Name 3 clinical signs in this patient that would best correlate with serotonin toxicity (3 marks)

- *Spontaneous clonus*
- *Inducible or ocular clonus*
- *Hyperreflexia*

Question 20 Answer

Dr Mechelle Smith

A 42 year old man fell off his bicycle when travelling at 20km/h. He complained of left forearm pain. He had the following X Rays taken.



Q1. What are the abnormalities on the XRay? (2 marks)

- *transverse fracture through the mid shaft of the left radius, which is associated with 100% dorsal displacement and shortening of 1.5cm*
- *distal radius is angulated 15 degrees in the palmar direction*
- *distal ulnar-carpal joint is dislocated with dorsal displacement of the ulnar head*

Q2. List the 2 most likely nerve injuries (2 marks)

- *ulnar nerve*
- *interosseous branch of median nerve*

Q3. Your registrar decides to perform procedural sedation. Outline your checklist. (6 marks)

- *consent*
- *assessment of patient – fasting status, allergies, meds, MP, ASA*
- *check airway equipment – CO₂, airway, mask, ETT, laryngoscope, suction*
- *iv with fluids running*
- *medications labelled*
- *monitoring – sats, BP, ECG, CO₂*

Question 21 Answer

Dr Mana Ittimani

Q1. A 57 years old male presented to ED with a sudden onset red painful right eye. You suspect a diagnosis of acute glaucoma

1. What are the features of acute Glaucoma on examination? (4 marks)

- *Fixed semi dilated pupils*
- *Hazy cornea*
- *shallow anterior chamber*
- *increased intraocular pressure*

2. How does glaucoma cause blindness? (1 mark)

- *High intraocular pressure causes direct optic nerve damage*

3. List the 5 most relevant topical medications used in primary open angle glaucoma and explain why they are used: (5 marks)

- *Prostaglandin analogues (e.g. Latanoprost): increase aqueous outflow: first line*
- *Beta blockers e.g. Timolol; Reduces aqueous humour production by blocking Beta receptor: first line*
- *Alpha2 agonists: e.g. apraclonidine; increase aqueous outflow and decrease aqueous production: second line agent.*
- *Carbonic anhydrase inhibitors topical e.g. Brinzolamide, decrease aqueous production ; second line agent*
- *cholinergics (miotics) e.g. Pilocarpine 2%: Contracts ciliary muscle and facilitate drainage of aqueous humour/ causes miosis (3rd line agent)*

Question 22 Answer

Dr Mana Ittimani

A 32 year-old alcoholic diabetic male presents with a painful facial swelling from a tooth abscess which has been getting worse over 2 days. He is of no fixed address and has been unable to get to a dentist. His vital signs show a HR: 110bpm, BP 120/75; RR 24 with saturation of 94% and aural temp of 38.5 degrees C. His neck and throat are tender to palpation and are swollen. He has difficulty opening his mouth and is unable to protrude his tongue. His tongue appears displaced superiorly and anteriorly.

1. What is the likely diagnosis? (1 mark)

- *Submandibular space infection (Ludwig's angina)*

2. What are the 2 serious complications of this diagnosis? (2 marks)

- *can lead rapidly to a threatened airway*
- *can lead rapidly to septic shock*

3. List your top 3 treatment priorities (3 marks)

- *Secure the airway early. Prepare for difficult intubation/surgical airway. Consider Options for airway management include which include awake fiberoptic intubation, creating a surgical airway (tracheostomy or cricothyroidotomy), inhalational induction, and awake blind nasal intubation*
- *Give antibiotics early*
- *Surgical drainage of any collection of pus*

4. List the antibiotics that may be useful and state the rationale for your choice. (4 marks)

- *Need to cover gram pos, gram negative and anaerobes*
- *metronidazole 500mg IV every 12 hours AND benzylpenicillin 1.2g IV every 6 hours*
- *For patients with non-immediate hypersensitivity to penicillin: cephazolin 2g IV every 8 hours*
- *For patients with immediate hypersensitivity to penicillin: clindamycin 450 mg IV every 8 hours OR lincomycin 600 mg IV every 8 hours*

Question 23 Answer

Dr Mana Ittimani

A 32 year old lady who is 36 weeks pregnant presented with headache, drowsiness and her observations and results are as follows:

Pulse 110 bpm

BP180/110mmhg

RR24/min

Sats 96%air;

Hb 9gm/dl

WCC $8 \times 10^9/L$

PLT $34 \times 10^9/L$

LFT: AST 120 u/L, ALT 135 u/L,

LDH 750 u/L

1. What is the diagnosis? (2 marks)

- *Pre-eclampsia with HELLP variant (haemolysis, elevated liver enzymes and low platelets)*

2. What 2 anti-hypertensive drugs would you consider to treat her blood pressure? (2 marks)

- *Labetalol 10 mg IV followed by IV infusion 1-2mg/min*
- *Hydralazine IV – second line (Hydralazine remains the drug of choice for women with asthma or congestive heart failure)*

NB nifedipine an alternative option

3. You have paged the PICU doctor and obstetrician to your resuscitation room, however, your patient starts to have a seizure. What are the first four things you would do? (4 marks)

- *Left lateral position and support airway/administer Oxygen*
- *check BSL and treat if low*
- *Magnesium Sulphate 4-6Gram IV (over 5 min) followed by maintenance infusion 1G/hr*
- *Midazolam 3-5mg IV PRN to control seizures*

4. What are the 4 signs of maternal toxicity with magnesium sulphate which would predict either respiratory or cardiac arrest? (2 marks)

- *Loss of patellar reflexes*
- *Respiratory rate < 10*
- *Slurred speech, weakness, feeling extremely sleepy, double vision*
- *Muscle paralysis*

Question 24 Answer

Dr Mana Ittimani

A 4 year old male is brought to your emergency department by his parents because he is having difficulty breathing. You notice there is an audible wheeze, RR 36 and he is able to speak in sentences.

1. List 6 features of acute severe asthma (2 marks)

- *increased RR >40/min*
- *increased work of breathing with moderate to severe accessory muscle use*
- *marked tachycardia (HR>140 bpm) but beware relative bradycardia for age.*
- *oximetry in room air <90%*
- *inability to talk in full sentences*
- *drowsiness or confusion*

NB need 6 to score 2, 3-5 to score 1 and 0-2 to score 0

2. .List the medications you would use initially including dose in this child if you identified the features of moderate severity asthma prior to being able to place an iv (4 marks)

- *oxygen ; to maintain sats O₂ >94%; consider High flow Oxygen*
- *salbutamol 100 micrograms Metered Dose Inhaler (MDI) & Spacer 6 puffs each 20 minutely x 3 OR salbutamol continuous nebs 5mg/ml undiluted*
- *Ipratropium (Atrovent) 4 puffs MDI with salbutamol or 250 microgram neb Ipratropium*
- *Oral prednisolone (1 mg/kg daily) if not vomiting or Hydrocortisone IV 4mg/kg*

3. What are the signs of salbutamol toxicity? (4 marks)

- *Tachycardia*
- *Tachypnoea*
- *metabolic acidosis with high lactate*
- *hypokalaemia also a potential problem requiring monitoring*

Question 25 Answer

Dr Mana Ittimani

A 22 year old male with known cerebral palsy presented to ED with a seizure. He complains of worsening headache and is known to have VP shunt. His observations are stable and GCS15.

1. List the 3 most likely causes of worsening headache in this man? (2 marks)

- *developing hydrocephalus due to shunt blockade (shunt malfunction or infection)*
- *intracranial trauma OR infection (either answer acceptable)*

2. How do you interpret shunt function after locating and pressing the chamber? (2 marks)

- *Difficulty compressing the chamber indicates distal flow obstruction*
- *slow refill, defined as refill requiring >3 seconds after compression, generally indicates a proximal obstruction*

NB compression is inaccurate in identifying shunt obstruction

3. What 2 radiological investigations will you arrange for a suspected blocked VP shunt. Explain your rationale for each (2 marks)

- *shunt series of plain from skull to abdomen (for ventriculoperitoneal shunts) will identify kinking, migration, or disconnection of the shunt system.*
- *Brain CT is required to evaluate ventricular size. Comparison with previous CT scans is needed, because many patients with shunts have an abnormal baseline ventricular size..*

3. The neurosurgical registrar asks you to perform a shunt tap. Outline the steps (2 marks)

- *Consent/ explain to patient*
- *Locate site over the valve system*
- *PPE with sterile gloves and gown*
- *Sterile field with antiseptic*
- *A 23-gauge needle or butterfly attached to a manometer is inserted into the reservoir*

4. What are the possible outcomes of the shunt tap and what is their significance? (2 marks)

- *If no fluid returns or flow ceases, a proximal obstruction is likely.*
- *The opening pressure should be measured while the reservoir outflow is occluded. An opening pressure of ≥ 20 cm H₂O (normal 12 ± 2) indicates a distal obstruction, whereas low pressures indicate a proximal obstruction.*

Question 26

Dr Mana Ittimani

The concerned parents of a 2 day old infant present for review at your emergency department. They have noted that there is marked yellowing of the skin. You note that the yellow discolouration extends from the head to the trunk but not to the arms or legs.

1. List 6 differentials you would consider for this neonate. (3 marks)

- *Rhesus haemolytic disease or ABO incompatibility*
- *congenital spherocytosis*
- *G-6-PD deficiency*
- *Infection/ sepsis*
- *Hypothyroidism*
- *biliary atresia.*

Score 0.5 marks for each reasonable diagnosis upto 3 marks, but score 0/3 if has physiological jaundice on the differential which usually presents late

2. List the most relevant investigations which you would consider in the ED. (5 marks)

- *serum bilirubin - conjugated and unconjugated*
- *FBC and blood film; reticulocyte count*
- *Coomb's test*
- *TFTs*
- *Blood culture*

3. List the most important steps if the conjugated bilirubin level is greater than 15% of the total (measured level at 15microM/L). What would be the next appropriate investigation and why? (2 marks)

- *Abdominal ultrasound for possible biliary atresia*

Question 27

Dr Mana Ittimani

A 25 year old male presented to your ED after taking an overdose of 150 tablets of aspirin 300mg.

1. List three specific clinical features of salicylate toxicity that you might expect him to develop? (3 marks)

- *Hyperventilation*
- *Tinnitus*
- *Deafness*

3. A VBG is performed. What would you expect? (3 marks)

- *HAG metabolic acidosis*
- *Lactic acidosis*
- *respiratory alkalosis*

4. What reasons would you consider haemodialysis? (4 marks)

- *Serum salicylate >4.4mmol/l (>60mg/dl)*
- *Severe acidaemia*
- *Renal failure*
- *Altered mental state eg requiring intubation for salicylates*

Question 28

Dr Mana Ittimani

A 52 year-old female is presenting to the ED with a 3 day history of feeling generally unwell with nausea and abdominal pain. She is afebrile (T 36.7°C), HR 78 and BP 85/50mmHg

Blood results are as follows:

Na 126mmol/L

K 5.7 mmol/L

Glucose 2.3mmol/L

Calcium 2.6mmol/L

1. What is your provisional diagnosis for this woman? (2 marks)

- *Addison's disease with Addisonian crisis*

2. List the 2 main pathophysiological causes for this presentation? (2 marks)

- *adrenal gland failure*
- *HPA axis failure eg*

3. What other blood investigations will be helpful in confirming your diagnosis? (2 marks)

- *Cortisol level*
- *ACTH Short Synacthen test*

4. List four management steps and rationale behind each.(4 marks)

- *Hydrocortisone 100mg IV ;To replace steroids*
- *IV N/Saline 1L 1 hour; Fluid Resuscitation*
- *Dextrose 10% 500ml; Correct Hypoglycaemia*
- *Fludrocortisone; Replace mineralocorticoid*

Question 29

Dr Mana Ittimani

A 5 year old boy has been brought to your emergency department after a road traffic accident. He has had a blood transfusion commenced by the retrieval service for haemorrhagic shock. The second unit has already been commenced.

1. What is the definition of massive transfusion in this child? (2 marks)

- *Transfusion of more than 40 mls/kg (blood volume of children older than a neonate is approximately 80 mls/kg).*

2. List eight potential complications of massive transfusion for this child (4 marks)

- *hyperkalaemia*
- *hypocalcaemia*
- *Acid base derangement and lactic acidosis*
- *Dilutional thrombocytopenia*
- *disseminated intravascular coagulation*
- *Systemic hypothermia*
- *Transfusion reactions*
- *TRALI: transfusion related acute lung injury*

3. If he was to have a cardiac arrest. What are the 4 likely causes (4 marks)

- *Hypoxia*
- *Tension pneumothorax*
- *Tamponade*
- *Hypovolaemia from blood loss*

Question 30 Answer

Dr Krishnan Eswaran



A 2 year old boy weighing about 20 kg was brought to your regional ED by his mother having accidentally swallowed hydrochloric acid kept near a BBQ. The ingestion took place 20 minutes prior to arrival

1. What are 5 features would alert you to impending airway compromise? (5 marks)

- *Dysphonia*
- *stridor*
- *hoarseness of voice*
- *Respiratory distress*
- *Throat pain*

2. How would you decontaminate this ingestion? (1 mark)

- *Rinse the mouth with water*

3. What are the indications for endoscopy within the first 24 hours? (4 marks)

- *Persistent vomiting*
- *Oral burns*
- *Drooling*
- *Abdominal pain*

NB entire question fail if allows child to eat/ drink