Answers book

PAH SAQ Trial exam 2019.1

Guide for marking

- Answers are a rough guide only
- They have not been prepared with the same rigorous oversight as the questions
- There will be many acceptable answers that have not been included in the answer template
- Use your judgement to identify critical errors of omission or commission
- pass mark is given after question number
- items in bold are essential to score a pass for that Q – ie 50% of the mark for that Q

First book	75/114
Second book	77/115
Third book	79/115
Total	**231/344**

Q1 (13/17)

1.

dislocation C4 on 5

Anterolisthesis C4 on 5 approx 25%

Widening of interspinous space (or loss of continuity at ligamentum flavum)

Loss of any of the spinal 'lines'

Significant Anterior soft tissue swelling at C4/5

2.

Respiratory status (accept oxygenation or ventilation or testing (spirometry, FEV1) → respiratory insufficiency secondary to loss of diaphragmatic innervation)

Neurologic status - * - conscious state, signs of anterior or posterior cerebral ischaemia carotid or vertebral dissection

Neurologic status - UL neurologic exam weakness from cord injury/haematoma

Cardiovascular status – risk of neurogenic shock – hypotension with vasodilation

Priapism – evidence of major cord injury

Bulbocavernosus reflex – absence suggests spinal shock. Presence allows classification of cord injury severity (ie ASIA status – complete vs incomplete)

3.

Elbow flexors – C5

Elbow extensors – C7

Knee extensors – L 3

Ankle plantar flexors: - S1

Q2 (7/12)

1.

Rupture of membranes – pooling amniotic fluid in vagina or history sudden gush fluid

Regular contractions- progressive intensity

Increasing low back/pelvic pain

Cervical dilatation/shortening

Fetal descent into pelvis

2.

CTG trace showing regular contractions

Ferning of amniotic fluid on microscopy

Vaginal fluid pH >6.5

Fetal Fibronectin level

3.

Tocolytics: Nifedipine PO 20mg /terbutaline s/c 0.25mg

Steroids: betamethasone IM 11.4mg

Antibiotics – Amp/Gent/Flagyl

Neuroprotection: $MgSO_4$ 4gm over 20min

Transfer to obstetric centre

Q3 (10/15)

1.

Main abnormality: HAGMA

Justification: AG = 135 – (102) = 33

Most likely cause: Lactate (liver failure – impaired Cori cycle) or toxins

2.

Main abnormality: acute renal failure (intrinsic)

Justification: urea: creat ratio <100

Most likely cause: hepatorenal syndrome or toxins (CK, Mb etc)

3.

Main abnormality: Synthetic liver failure

Justification: Albumin and globulin both decreased

Most likely cause: Acute fulminant liver failure

4.

Main abnormality: Acute severe hepatitis

Justification: ALT/AST elevated >> membrane bound enzymes (GGT/ALP)

Most likely cause: Toxic hepatitis (paracetamol toxicity)

5.

Glucose – in liver failure exclude as cause of decreased consciousness

Paracetamol level – detectable paracetamol (>10) supports paracetamol toxicity as cause

Hepatic USS – Excludes structural cause ie CBD obstruction, PSC

Hepatitis serology

Q4 (9/13)

1.

Connective Tissue disease – ie Ehlers Danlos

Hypertension

Bicuspid aortic valves

Coarctation of the Aorta

Pre-existing aneurysmal dilatation

Old

Male

2.

Stanford A: involves ascending aorta

Stanford B: involves ONLY descending aorta (ie distal to left subclavian)

3.

Analgesia – titrated fentanyl 25mcg IV to comfort

Slow HR – IV B-blocker – esmolol or metoprolol 2.5mg repeat to HR <60

Blood pressure Control – GTN/Hydralazine once HR slow to BP <110mmHg

Immediate CTS attendance for definitive Rx in theatre

4.

Aortic Incompetence from aortic root dissection

Tamponade from pericardial extension

Iatrogenesis from excess BP/HR management

Branch vessel dissection – pseudohypotension (ie brachial artery involvement

Q5 (6/10)

1.

Spiral fracture of left humerus (diaphysis)

Fracture consistent with physical child abuse; inconsistent with age

2.

Thorough exam for other signs of abuse/neglect (max 2 marks for other signs abuse)

- Other fractures
- Burns
- Bruising/bite marks

Developmental assessment for growth retardation and developmental milestones

Exam for other features of primary bone disorders/renal disease

3.

Analgesia – paracetamol 15mg/kg, ibuprofen 10mg/kg

Immobilisation in plaster (given age)

Admission for further investigation of fracture and social circumstances

Notification of child protection authorities

Q6 (6/10)

1.

Antibiotics: Ampicillin 2gm + Gentamicin 5-7mg/kg

Fluids: 20mls/kg crystalloid; aim MAP >65 or SBP >100

Analgesia: Morphine 2.5mg IV repeated to comfort

2.

E. Coli

Klebsiella

Proteus Mirabilis

Pseudomonas

Enterococci

3.

Urine micro – confirm UTI

Urine Culture – guide subsequent Ab therapy

Renal tract imaging (USS renal tracts) for structural abnormality given unusual demographic for pyelo (male)

Chem20 to exclude renal impairment to guide gentamicin dosing

Blood Cultures – evidence of sepsis – will confirm bacteraemia and guide Rx

Q7 (6/10)

1.

BMI <12 or <75% IBW

Systolic BP <80

HR <50 or >120

Postural Tachy >20bpm or Postural Hypotension >20mmHg

Temp <35.5 or >38

BGL <3

Sodium <125

K <3

Hypophosphataemia

Hypomagnesaemia

Neutropaenia <0.7

ECG abnormalities

2.

Hypophosphataemia

Hypokalaemia

Congestive Cardiac Failure

Peripheral Oedema

Rhabdomyolysis

Seizures

Haemolysis

Q8 (9/13)

1.

Wound over palmar aspect DIPJ

Erythema extending to thenar eminence

Oedema of index finger, extending to palmar space and thenar eminence

Flexion of index finger – consistent with tenosynovitis

2.

Infective Tenosynovitis (do not accept cellulitis)

3.

Imaging (USS) to exclude foreign body

Imaging USS to exclude soft tissue collection requiring drainage (tendon sheath abscess)

Wound swab m/c/s to guide therapy (ie identification of MRSA)

BSL to guide strict glycaemic control in diabetic with stress response

Others acceptable if well justified

4.

IV Antibiotics – Piperacillin/Tazobactam 4.5gm tds (diabetic)

Analgesia – titrated morphine 0.1mg/kg to 5mg, repeat to comfort

IV Fluids – age 14 – HR 90 – likely just maintenance fluid requirements – 125 mls/hr of crystalloid, BSL will guide dextrose or non-dextrose containing

IV Insulin lnfusion – daily dose /24 /hr to maintain euglycaemia

Immobilisation or elevation of affected limb – splinting

Orthopaedics/Hand Surgery for OT for drainage

Q9 (9/13)

1.

Marked Respiratory Alkalosis (CO_2 19)

Differential:

Pain

Hypoxia

Anxiety

Sepsis

2.

HAGMA

HAGMA – Anion Gap = 137 – (98 + 18) = 21

Delta ratio 9/6 = 1.5

(for this will accept both conclusions of pure HAGMA and possible concomitant met alkalosis from vomiting)

Lactic acidosis

- Hypoperfusion
- Liver failure

With low Ca, pancreatitis a big DDx

3.

CXR	?Subdiaphragmatic free air indicating perforated viscus
Lipase	Evidence of pancreatitis
Chem20	Exclude renal failure given marked hyperlactataemia, exclude evidence of fulminant hepatitis
COAGs	Synthetic liver failure (staging of severity of liver disease)

Many others likely acceptable

Q10 (19/28)

1.

STEMI preceding cardiac arrest

STEMI on post-ROSC ECG

New LBBB on post ROSC ECG

2.

widespread ST depression

ST Elevation in aVR

3.

Global ischaemia – likely secondary to prolonged arrest

(note: not consistent with LMCO given absence of cardiogenic shock)

4.

Subarachnoid haemorrhage (Fisher IV; WFNS V given GCS 3)

5.

Loss of grey-white differentiation

Tonsillar herniation

Obstructive Hydrocephalus

Loss of sulci - increased pressure/diffuse oedema

6.

Tube displacement – RMB intubation on CXR – relocate to appropriate location >3cm above carina

Inadequate sedation/dyssynchrony- patient triggered breaths – increase sedation +/- paralysis

Bronchospasm – wheeze, hyperinflation/incomplete expiration – bronchodilator Rx (salbutamol 5mg nebules)

Tube obstruction – no chest expansion, inability to bag, pass suction catheter- suction or change tube

Tension PTX – hyperinflated chest, difficult to bag, hypotension, distended neck veins – decompression and ICC insertion

Anaphylaxis – rash, swelling, wheeze – IM adrenaline 0.5mg, stop inciting agent

Neurogenic pulmonary oedema – diffuse crackles bilaterally/CXR with APO – increase PEEP and pressure limits

Q11 (7/11)

1.

Hypoxia

Ventilatory failure requiring Positive Pressure Ventilation (either NIV or Intubation)

Need for operative intervention (eg ankle operation)

Progressive pneumothorax or development of haemothorax

2.

Morphine (or other) PCA ie 1mg bolus, 5 min lockout C/I: Severe renal failure, hypercapnoea

NSAIDS; ibuprofen 400mg tds: C/I: Renal Impairment

Paracetamol 1g QID – chronic liver disease

Oxycodone 5mg prn – oversedation from other opiates eg PCA

Q12 (8/12)

1.

Hypotension

Rhabdomyolysis

Coma

Seizure

Pulmonary Oedema

Renal failure

Hyper/Hyponatraemia

2.

Cold IV Fluids (ie 4deg saline)	first line invasive, use if not invasive methods insufficient
Cold water bladder lavage	unconscious, intubated, has IDC suitable for lavage
Intubation and paralysis	coma with shivering
ECMO	unresponsive shock / arrested patient

Q13 (7/9)

1.

Left sided pneumothorax

2.

Visible lung edge

Absence of lung markings at left apex

3.

Observation +/- with high-flow O2 and repeat CXR

- Stable patient
- Minimal pain
- Close follow up
- Responds well to simple analgesia

Needle Aspiration

- Progression/ failure of conservative Rx
- Pain refractory to simple analgesia

Small bore ICC insertion/ Pleurocath

- Hypoxia
- Increasing size pneumothorax
- Recurrent primary pneumothorax

Primary VATS / pleurodesis

- Access to appropriate speciality
- Work related requirement – eg pilot
- Recurrent PTx

Q14 (7/11)

1.

No clinical signs of envenoming

No lab signs of envenoming

Patient in monitored, witnessed area

Local access to antivenom

2.

Ptosis R eye

Lateral deviation of Rt eye

3.

Rt 3rd CN palsy indicating neurotoxicity

4.

Tiger

Taipan

Death Adder

(sea snakes)

Q15 (8/12)

1.

Generalised (not focal)

Less than 15 mins in duration

No more than one in 24 hours

Neurologically normal post ictal

Developmentally normal child

2.

BSL	**all patients, History of intercurrent illness, poor intake Hx metabolic problems, poor return to normal alertness**
Blood Culture	Signs of sepsis/ toxicity
CXR	Focal findings concerning for LRTI or Hx of aspiration during seizure
Lumbar Puncture	Clinical features of CNS infection – meningism, confusion
Urine	common cause fever in 2yo girl, mandatory this patient

3.

Clear plan for follow up

Ability to access health care urgently in case of deterioration

Has safe means of getting home

Parental understanding of condition and when to seek review

Parental understanding of long-term implications of febrile seizure

Parental plan for first-aid in event of recurrence

Q16 (7/11)

1.

Failure to achieve birth weight/ gain weight

History of fevers

Not waking for feeds

Bilious vomiting

Absence of/abnormal bowel motions

Inability to effectively feed

Lots of others….

2.

Bulging fontanelle – suggests raised ICP – diff includes hydrocephalus, intraventricular haemorrhage, CNS infection

Hepatomegaly – suggests possible congenital heart disease with CCF

Jaundice – suggests metabolic syndrome or structural hepatobiliary disease

Hernias – may indicate bowel involvement

Bruising – suggess haematologic disorder or possible abuse

Other signs abuse – eg philtrum

Fingers / toes / penis for hair tourniquet

Eyes – corneal injury

Many others OK if relevance explained

Q17 (7/12)

1.

Macular rash

Discrete erythematous lesions of multiple sizes

Target lesions

Involving palms

2.

Infectious – Mycoplasma, HSV

Malignancy

Drugs – Antibiotics (Cephalosporins, Erythromycin)

Anticonvulsants (Carbamazepine)

3.

Syphilis – serology, primary chancre, secondary generalised rash

Gonococcaemia – Hx unprotected sex, vagnial discharge, symptoms PID, urine PCR

Hand, Foot and Mouth (Coxsackie) – mouth lesions, sole foot lesions, contact with others with disease

Others might be OK

Q18 (7/10)

1.

Iritis	Perilimbic Inflamm, Cells and Flare in ant chamber, synechiae
Glaucoma	Raised IOP
Corneal Abrasion	Defect with fluorescin uptake on slit lamp
Dendritic Ulcer	Dendritic Ulcer on Slit Lamp
Infective Conjunctivitis	Discharge, conjunctival erythema,
Episcleritis/Scleritis	Diffuse or sectoral inflammation
Allergic conjunctivitis	cobblestone appearance to lid conjuctiva

Q19 (14/19)

1.

Injury: Tension Pneumothorax

Confirmation: CXR/E-FAST/Clinical signs

Management: Decompression with ICC placement

Injury: Massive Haemothorax

Confirmation: CXR

Management: Decompression with ICC, Volume resuscitation

Injury: Cardiac Tamponade

Confirmation: E-FAST, large effusion of pericardial view

Management: Thoracotomy (in ED only if arrests)

Injury: Visceral Laceration – ie liver/spleen/kidney

Confirmation: CT with Active haemorrhage on CT(A) + free fluid

Management: Surgical/Embolisation

Injury: Great Vessel Injury (IVC/Aorta)

Confirmation: CT (Angiography)

Management: surgical

Injury: Cord Injury with neurogenic shock

Confirmation: Neurologic signs and CT Evidence of Spinal Laceration

Management: Manage shock with fluids/noradrenaline, surgical involvement

2.

Blood Only

Matched components 1:1:1 PRBCs:Plts:FFP

Aim for maintenance of cerebral perfusion, SBP approx. 80

Identify and correct Trauma Induced Coagulopathy (ie ROTEM guided fibrinogen replacement)

TXA

Q20 (6/12)

1.

Evidence of anaemia with thrombocytopaenia (NOT pancytopaenia)

Most likely cause would be HUS in this clinical setting

2.

Blood film – look for schistocytes to confirm haemolysis

Blood Culture – identify sepsis as cause of HUS ie E coli

Haptoglobin – reduced confirms haemolysis

Chem20 – identify associated uraemia HUS

Bilirubin / LDH – raised in haemolysis

Lots of others – urine for haemoglobinuria

Ultrasound abdomen for splenomegaly (diff includes hypersplenism)

Viral serology for other causes of megakaryocyte stuff (ie parvovirus serology)

Q21 (7/10)

1.

Commence CPR 15:2 – 2 rescuers, 100/min

Apply 100% O2 via BVM / intubate OK

IV access and fluid bolus O.9% saline 20ml/kg (or similar) (200ml)

IV adrenaline 10mcg/kg (12 month old approx. 10kg – accept 100mcg)

Seek and treat hypoglycaemia with IV 5ml/kg 10% dextrose (ie 50ml 10%)

IV antibiotics OK – ceftriaxone / cefotaxime – 50-100/kg

2.

Allows parent to see all treatment being provided

In case of unsuccessful resuscitation, allows initiation of grieving process

3.

Can worsen staff grief around events of highly emotive resuscitation

Potential for interference with resuscitation from parents unless dedicated staff member caring for parent

Q22 (9/12)

1.

Inferior STEMI – ST Elevation III > II

Posterior Involvement with early R waves, ST depression and upright T waves V 2-3

Likely RV involvement with 'relative ST elevation' in V1 compared to V2 (ie lack of ST depression)

Accelerated Junctional rhythm with rate 78/min and evidence retrograde P waves in ST segment

2

Inferoposterior STEMI with RV involvement

Meets criteria for reperfusion

3.

Aspirin 300mg PO

Fluid load 10-20ml/kg aiming SBP >100 or MAP >65

Second antiplatelet in appropriate dose

Heparin load (5000u or similar) + bolus

Analgesia Fentanyl 25mcg repeat to comfort

Activate cath lab

Note rate currently 78/min – chronotherapy not currently indicated

Fail – if gives GTN

Q23 (10/16)

1.

Left foot 'Lisfranc' injury (widening of space between 1st and 2nd metatarsal base)

2.

Lateral dislocation of midfoot

Compartment syndrome of foot

Early OA and non-union/loss of function

Loss of arch – inability to walk

3.

System – STRUCTURE ie staffing/work areas/ specialty support

- Inadequate senior staff numbers to provide supervision
- Poor training of supervising staff regarding common missed injuries
- Lack of on-site or timely radiology review

Process – Workflow and supervision/rostering; process and protocol

- Policy regarding senior review prior to all discharge
- Policy regarding senior review of all xrays prior to review
- Lack of notification from radiology of abnormal reports
- Lack of education for junior staff

Individual- Junior doctor specific issues

- Lack of awareness around training
- Performance issues (ie professional concerns around self-care, MH etc)
- Not following/adhering to local protocols around supervision/seeking review etc

Solutions – anything sensible directly addressing the stated cause

Q24 (7/11)

1.

ECG changes – ST segment elevation of depression

Positive troponin

Recurrent unstable pain

Ongoing tachyarrhythmia (ie rapid AF) for active management (ie infusions)

Syncope of suspected electrophysiological origin

Resolved malignant arrhythmia (ie VT)

2.

Clear documentation from ED documenting decision making and rationale

Patient understanding and awareness of plan

Basic investigations initiated

Clinical safe parameters (vital signs, pain etc)

Medications charted for next 4 hours (including prns)

Indications of triggers mandating urgent review

3.

Thank them for feedback

Pledge to investigate; feedback

Audit of some type – review error rate to determine if there is a problem with system

Review case documentation

Discuss case with staff involved

Q25 (8/11)

1.

Evidence of pancytopaenia and leukopaenia implying severe (marked) neutropaenia

In context of patient presentation is consistent with febrile neutropaenia

2.

Piperacillin/Tazobactam 4.5gm – broad spectrum Ab with gram +ve /-ve AND anaerobic cover

- Will cover staph, pneumococcus and intestinal organisms as well as pseudomonas

Gentamicin 5mg/kg (or similar) – gram neg cover

- Will cover gram negs including E. Coli, Pseudomonas

Vancomycin 30mg/kg

- Will cover MRSA/MSSA from in-dwelling line

3.

Clear infection at PICC site (surrounding skin or pus on aspiration)

PICC line displacement (ie line partially removed)

Leaking/fractured line

Cultures from PICC +ve >2 hrs earlier than systemic cultures

severe sepsis/ shock with clinical suspicion of line infection

Q26 (9/12)

1.

Edentulous patient

Facial dysmorphism

Beard/Facial Hair

Obese

Snoring/Sleep Apnoea History

2.

Mallampati score II/IV

3-3-2 rule (short in any of these)

Upper Airway Obstruction

Impaired Neck Mobility

3.

Optimise positioning – elevate occiput with pillow – indication: hyperextension/flexion leading to possible upper airway obstruction

Two-person technique – indication – inadequate seal/leak with one-person BVM

Oropharyngeal/Nasopharyngeal adjunct – suspected upper airway obstruction from oedematous or just large soft tissues

Sedation (ie Propofol) – laryngospasm

Paralysis and endotracheal intubation – failure to respond to above measures

Q27 (9/12)

1.

Diagnosis - Pancreatitis

Findings on Exam – soft abdomen, epigastric tenderness, relieved sittingup

Key Investigative Finding – Elevated Lipase

Diagnosis - Acute Cholecystitis

Findings on Exam – Murphy's positive / RUQ peritonism

Key Investigative Finding – Thickened GB wall (>3mm) +/- pericholecystic fluid on USS

Diagnosis – Ruptured AAA

Findings on Exam – pulsatile mass

Key Investigative Finding – Aneurysm on bedside USS, free fluid on CT(A) abdomen

Diagnosis – Cholangitis

Findings on Exam – RUQ tenderness, soft abdomen

Key Investigative Finding - Obstructed CBD on USS (>4mm or >age/10 mm) with loss of tapering

Diagnosis – MI

Findings on Exam – soft, non-tender abdomen

Key Investigative Finding – ECG STEMI