
2019.2

**South Australia
&
Northern Territory
Trial SAQ Exam**

Booklet 3

SAQs 19 – 27

SAQ 19 (12 marks)

You are the consultant in a tertiary hospital. A 6-year old girl has been hit by a car and has arrived in your resus room. Estimated weight is **20kg**.

Airway and breathing are adequate, and the C-spine is protected with manual in-line stabilisation.

There is no obvious significant external haemorrhage. She has significant left-sided bruising with chest wall tenderness, abdominal tenderness and abdominal distension.

She has abrasions to her head and limbs but no obvious long bone fractures.

Vital signs are:

RR	34/min,
SpO2	Poor trace
HR	150/min,
BP	75/55 mmHg
Cap refill	5 seconds, cold and mottled extremities,
GCS	13 (E3, V4, M6)

a) What are your four (4) **immediate** actions regarding circulation? Give details regarding age appropriate equipment and doses. (4 marks)

- Two large bore iv cannulas ideally in upper limb within 60 to 90 seconds of arrival, 18-20 G / largest that can be inserted. Or / If unable to gain iv access: IO access appropriate size needle e.g. EZIO 15 mm needle (3 - 39 kg), antero-medial surface tibia (alternatives distal femur, distal tibia or humerus)
- Obtain blood or marrow sample for laboratory studies - venous gas, FBC, ECU, LFTs, Lipase, Glucose, X-match, extended coagulation/ROTEM
- Commence fluid resuscitation: 10 - 20 ml/kg of warmed Sodium Chloride 0.9% OR warmed blood and blood products if immediately available
- Tranexamic Acid 15 mg/kg
- Insertion of arterial line
- Estimated or anticipated blood loss > ½ blood volume

b) List four (4) target values for **biochemistry parameters** in a massive transfusion. (2 marks)

- pH > 7.2
- lactate < 4 mmol/l
- ionised calcium > 1.1 mmol/l
- normal potassium

c) Assume thromboelastometry (TEG or ROTEM) is **unavailable**. List four (4) transfusion targets, products AND volumes you would transfuse in this child, if there is ongoing critical bleeding? (4 marks)

Transfusion target	Product	Volume
Hb>70	Packed RBC (O negative unless type specific immediately available)	10-20ml/kg
PLT > 50	Platelets	10-15ml/kg
Fibrinogen > 2 g	Cryo	5 ml/kg
PT/APTT <1.5 x normal	FFP	10-15 ml/kg
TXA within 3 hours of injury		15 mg/kg iv over 10 min, then infusion 2 mg/kg/h

SAQ 20 (11 marks)

You are working in a rural ED. A 6-year-old boy has been sent in by the GP. He has been generally unwell with a recent febrile illness and discoloured urine.

Parents deny any previous episodes of discoloured urine. The child has no relevant previous medical history.

The observations are as follows:

HR 100 bpm

T 37.2 °C

BP 135/85 mmHg

Sats 98% room air

On examination the child looks tired but otherwise well.

His chest is clear, heart sounds normal and ENT examination is unremarkable. The abdomen is soft and non-tender with no masses felt. There is no joint swelling and no rash.

He has some healing skin sores on his leg and he is a little puffy around the eyes.

a) A urine sample shows dark reddish-brown blood in the urine, which on microscopy appears to be from the upper urinary tract. List three (3) disease entities/conditions which will produce this type of haematuria. (3 marks)

- Post strep glomerulonephritis
- IgA glomerulonephritis
- Membranoproliferative glomerulonephritis
- Vasculitis e.g. HUS
- Tumour- Wilms etc
- Alport Syndrome
- Interstitial nephritis- drugs, infections, autoimmune disease

List four (4) specific features from your **history** in this child which would help you narrow down your diagnosis? (4 marks)

- Family history
- When was fever?
- Nature of illness – sore throat
- Recent medications including antibiotics
- Rash – suggestive of Henoch Schonlein
- Diarrhoea and abdominal pain
- Previous episodes

b) What is the most likely diagnosis in this child given the description above? (1 mark)

Post streptococcal glomerulonephritis

c) List three (3) further investigations you would request to help confirm the diagnosis and explain how they might help. (3 marks)

- Urine microscopy and culture – may identify infective cause
- ASOT – as evidence of recent streptococcal infection
- Complement – suggests autoimmune cause, low in post strep, normal in IgA
- Skin/ throat culture – evidence of streptococcal infection
- Renal biopsy – will determine type of GN present
- FBC for platelet count – reduced in HUS/TTP, increased in HS

SAQ 21 (13 marks)

A 10-day old baby boy is brought into the ED flat and not feeding for 24 hours. He has been vomiting for 12 hours. On examination he has dry mucous membranes, and is only whimpering when bloods are taken. Estimated weight is **4kg**.

A venous blood gas is shown below:

pH:	7.28	
pCO ₂ :	28	mmHg
pO ₂ :	76	mmHg
Na :	128	mmol/L
K:	7.1	mmol/L
Chloride:	88	mmol/L
Bicarb :	13	mmol/L
Base Excess:	-6	
Glucose :	2.2	mmol/L

a) List the three (3) most important blood gas abnormalities (3 marks)

- **Severe hyperkalaemia**
- **Hypoglycaemia**
- Partially compensated metabolic acidosis
- Mild hyponatraemia

- b) Other than congenital adrenal hyperplasia, list five (5) differential diagnoses in this child (5 marks)
- 2 ml of clotted blood (serum tube) for analysis of cortisol and 17 hydroxyprogesterone.
 - 2ml of blood in EDTA tube for plasma renin activity and ACTH levels - this should be sent on ice to the core lab
 - A sample of urine (aim for 5-10ml if possible) for a urinary steroid profile and urinary sodium level
- c) You suspect congenital adrenal hyperplasia. List two (2) **SPECIFIC** pathology tests you would request to confirm this diagnosis. (2 marks)
- Dehydration
 - Renal failure
 - Sepsis
 - Malrotation
 - Inborn error of metabolism
 - Heart failure
- d) List three (3) treatments you would initiate in this baby **INCLUDING** doses (3 marks)
- 10% dextrose 2-5mls/kg
 - IV fluids – 10 mls per kilo normal saline
 - **FIRST LINE** Steroids – stress hydrocortisone 25mg initially then 5-10 mg 6 hourly
 - **OPTION BUT NOT NECESSARY** Mineralocorticoid replacement - Fludrocortisone 0.05-0.1 mg daily
 - **OPTION BUT UNLIKELY TO BE NEEDED** 10% calcium gluconate 0.5 mls/kg or insulin 0.1 units/kg/hr with 10% dextrose 5-10mls/kg/h

SAQ 22 (11 marks)

A 78 year old man presents with acute painless visual loss in the R eye an hour ago. He has a history of cataracts and hypertension for which he takes candesartan.

a) List three (3) risk factors for retinal detachment (3 marks)

- High myopia
- Cataract surgery
- Recent eye trauma
- Past history of detachment
- Connective tissue disease

b) The posterior chamber is not clearly visible due to a cataract. List six (6) investigations that may help establish a diagnosis, with reasoning (6 marks)

- (6 marks, 1/2mark for each) **bold** mandatory for pass.
- **ECG > ? embolic source (esp AF) in CRAO**
- **ESR/CRP > ? TGA**
- FBE > Hyperviscosity/platelets
- Coags > ? coagulopathy
- Glucose > ? diabetes in CRVO
- Ultrasound > ? detachment vs vitreous h'age
- CT/CTA or carotid ultrasound > ? embolic source in CRAO

- c) List two (2) treatments for central retinal artery occlusion that may be used, with rationale. (2 marks)

Treatment:	Rationale:
Ant. chamber paracentesis	Reduce IOP > dislodge clot
Hyperbaric O2	Reduce retinal ischaemia

- Ocular massage: dislodge embolus
- carbogen: vasodilate retinal vessels
- tPA: lyse clot

SAQ 23 (12 marks)

A 22-year-old woman presents to your emergency department with right-sided lower abdominal pain. Her last menstrual period was two (2) weeks ago and her pregnancy test is negative.

Her vital signs are

Temp	37.5°C
HR	110 bpm
BP	130/ 80 mmHg
RR	20/min

a) List three (3) features on history that would favour a diagnosis of PID over acute appendicitis. (3 marks)

- Absence of pain migration
- Bilateral abdominal tenderness
- Absence of nausea or vomiting
- Purulent vaginal discharge

Ref - Dunn 6th edition Vol 2 Pg 689

b) List five (5) gynaecological causes for this patient's pain, other than PID (5 marks)

- Ovarian torsion
- Ruptured ovarian cyst
- Haemorrhagic cyst
- Mittelschmerz
- Fibroid complications (red degeneration, bleeding, torsion)
- Endometriosis
- Adenomyosis

Ref - Tables from Cameron and Tintinalli

c) List two (2) findings each for the imaging modalities below that would be consistent with the diagnosis of PID in this patient. (4 marks)

USS	<ul style="list-style-type: none">• Normal ultrasound• Fluid in the pouch of Douglas• Thickening (> 5 mm) or increased vascularity of the fallopian tubes• The presence of a tubo-ovarian abscess / complex adnexal mass
CT Abdomen	<ul style="list-style-type: none">• Obscuration of pelvic fascial planes• Cervicitis• Oophoritis – fat stranding• Salpingitis – fat stranding• Thickening of uterosacral ligaments• Simple or complex pelvic fluid/ abscess collection

Reference: Tintinalli 7th edition Pg 718

SAQ 24 (14 marks)

A 42 year old Asian man presents to your ED with onset of acute severe epistaxis.

He is bleeding anteriorly and posteriorly from both nostrils despite good first aid measures for the last 20 minutes. His BP is 170/95 mmHg and HR 105 bpm.

a) List four (4) likely causes of epistaxis in an adult patient? (4 marks)

- Hypertension
- Bleeding diathesis: primary or acquired – eg von Willebrand, ITP; liver disease
- Alcohol
- Medications: antiplatelets and anticoagulants
- Recreational drugs : cocaine, methamphetamines
- Trauma: localised nasal or maxillary fractures, mucosal trauma from nose-picking, FB, CPAP, nasal oxygen delivery
- Infection/Inflammatory: sinusitis, vestibulitis, URTI, allergic rhinitis
- Congenital vascular anomalies: hereditary haemorrhagic telangiectasia/Osler-Weber-Rendu, AVM, Sturge Weber,
- Neoplasia: angiofibroma, nasopharyngeal carcinoma, Kaposi's sarcoma, SCC

b) Outline five (5) treatments of epistaxis in this patient you will consider (5 marks)

- Appropriate first aid measures – local pressure, ice pack, sitting upright
- Silver nitrate or electro-cautery.
- Uni- or bi- lateral packing with nasal tampon – Merocel or Rapid Rhino. BIPP and ribbon gauze +/- Foley catheter for significant posterior bleeds.
- Referral for specialist assistance (severe, difficult to control bleeding)
- Cannulation and resuscitative IV fluids if required
- Antihypertensive agents if required
- Topical tranexamic acid application if on anti-platelet agents.

c) List five (5) concerning features on history OR examination for a malignant cause of epistaxis?
(5 marks)

- Unilateral nasal blockage +/- discharge
- Local oral features – eg ill-fitting dentures or loose teeth and buccal soft tissue swelling
- Localised lymphadenopathy
- Hearing loss
- Trismus
- Neuralgia
- Risk factors for nasopharyngeal malignancy - alcohol, tobacco, race – SE Asian, Chinese predominance

SAQ 25 (16 marks)

A 21-year old male presents to the Emergency Department with concerns he is being chased by “bikies”. It is his first ED presentation. He is moderately agitated but alert and orientated.

His vital signs are

BP 115/70 mmHg

HR 80 bpm

Temp 36.9 C

a) List six (6) features of your history and examination which make you more likely to consider primary psychosis as your diagnosis. (6 marks)

- History
 - Age of onset (Schizophrenia - 75% is 15-25 years old)
 - Family history of schizophrenia
 - Alcohol and/or drug intoxication/abuse
 - Onset – subacute (acute e.g. drug induced)
 - Impaired social/occupational functioning
- Examination
 - Appearance and behaviour – restless/agitated, neglected/dishevelled, mannerisms or stereotypes
 - Thought disorder – lack of logical thought processes, tangential, circumstantial
 - Emotions – inappropriate affect, emotional blunting
 - Hallucinations – predominantly auditory, occurs despite normal LOC
 - Insight – lack off
 - Judgment – impaired
 - Delusions – most commonly multiple different types, rather than single

b) The Mental Health Team asks you if you have done a “medical clearance”. List two (2) reasons why it is important to perform a medical assessment of this patient? (2 marks)

- Determine if a medical illness is causing the presentation
- Determine if there is a concurrent acute medical illness requiring immediate/urgent treatment
- Determine if there is a chronic medical condition which requires management
- Determine if there are side-effects of the patient’s current treatment requiring immediate/urgent management

c) The patient is getting increasingly agitated. Attempts at de-escalation are unsuccessful. For safety measures you decide to use further restraint measures. Please fill in the table below (8 marks)

Type of restraint	Advantages	Disadvantages
Chemical	<ul style="list-style-type: none"> • Both sedating and anxiolytic • Antipsychotic treatment (in psychosis) • Multiple routes • Can de-escalate i.e. not require physical restraint • Less risk of physical injury 	<ul style="list-style-type: none"> • Airway compromise/aspiration • Can require one-one monitoring • Decrease ability to carry out assessment due to sedation • Unexpected drug reactions • Slower time to control than physical restraint
Physical	<ul style="list-style-type: none"> • Self/staff/others protection • Safe(r) access to im/iv drug administration • Last resort option • Gains immediate control once team assembled 	<ul style="list-style-type: none"> • Risk to both patient and staff (airway, injuries, sympathomimetic response) • Requires appropriate training • Min 5-6 people • Requires degree of chemical restraint too • Ongoing one-one monitoring

SAQ 26 (17 marks)

A 50-year old man presents with abrupt involuntary movements of his right arm and leg.

- a) Which two (2) descending pathways are responsible for voluntary skeletal muscle movement of the body and what does each pathway control? (4 marks)

Descending pathway	What does it control?
Corticospinal tract	Skeletal Muscle
Corticobulbar tract	Cranial Nerves

- b) Which part of the nervous system is responsible for **involuntary** control of movement? (1 mark)

- Extrapyramidal System
- Basal Ganglia and Subthalamic Nucleus

c) Complete the following table (12 marks)

	Hemiballismus	Chorea	Partial seizure
List two (2) causes	<ul style="list-style-type: none"> • CVA • TBI • Amyotrophic Lateral Sclerosis • Nonketotic Hyperglycemia • Neoplasm • Tuberculoma • Demyelination • HIV 	<ul style="list-style-type: none"> • Autoimmune post Group A Strep infection • Huntingtons Disease • Antipsychotic Drugs • CVA • Hyperthyroidism 	<ul style="list-style-type: none"> • Drugs • Drug withdrawal • Infection • Head injury • Hypoglycaemia/metabolic • Structural lesion • Idiopathic
Area of the brain involved	<ul style="list-style-type: none"> • Subthalamic Nucleus of Basal Ganglia 	<ul style="list-style-type: none"> • Corpus Striatum of Basal Ganglia 	<ul style="list-style-type: none"> • Anywhere in brain
Typical features of the movements	<ul style="list-style-type: none"> • Large amplitude movement of proximal muscles • Irregular flinging movement of one side of the body 	<ul style="list-style-type: none"> • Continuous random irregular movements • Flow from one part of the body to another with no pattern 	<ul style="list-style-type: none"> • Uncontrolled shaking movements • Usually only part of the body involved • No impairment of consciousness • Rapid repeated contraction and relaxation of muscles

SAQ 27 (12 marks)

A 85-year-old woman is transferred to your emergency department from her residential care facility. The staff reports that she has been complaining of a headache, is more confused than normal and is unsteady on her feet.

She has a past history of dementia, CRF, IHD and AF.

Her medications include digoxin, warfarin, atenolol, isosorbide mononitrate, lorazepam and aspirin.

Her vital signs are

BP 100/60 mmHg
 HR 50bpm, irreg,
 GCS 13 (V4,M5,E4)

A CT has been performed (**see image in props booklet**).

a) List four relevant (4) findings on the CT (4 marks)

- Bilateral subdural haematomas
- Acute on chronic
- Loss of sulci and right ventricular volume – demonstrates raised ICP
- No midline shift on single slice
- No fracture evident on single slice

b) List four (4) other investigations you would perform and explain why (4 marks)

- **Bold answers required for full marks**

Investigation	Justification
• INR	• On warfarin, may need reversal
• ECG	• Bradycardia - ?slow AF vs block vs digoxin toxicity

<ul style="list-style-type: none"> • EUC 	<ul style="list-style-type: none"> • Hypo/hypernatraemia effect on mental state • Potassium and renal failure in presence of digoxin
<ul style="list-style-type: none"> • Digoxin level 	<ul style="list-style-type: none"> • ?toxicity
<ul style="list-style-type: none"> • CT neck 	<ul style="list-style-type: none"> • C-spine clearance in potential trauma
<ul style="list-style-type: none"> • CBE 	<ul style="list-style-type: none"> •

c) There is an advanced care directive that states she is not for CPR or intubation. Neurosurgery have advised non-operative management. List 4 OTHER management issues you will address. (4 marks).

- Reversal of anticoagulation and cessation of warfarin
- Address family expectations and possibility of further deterioration
- Analgesia
- Documentation

continue to full recovery

- Medication review:
- Mobility and falls assessment with OT/PT
- Repeat CT at 24 hours
- Adequate communication with GP / care facility prior to discharge