# South East Queensland Fellowship Written Mock Exam

2019.2

3rd October 2019

# Book Two

SAQ 10 to 18

*With thanks to the FACEMs and the Emergency departments of*

*Sunshine Coast University Hospital*

*Caboolture Hospital*

*Redcliffe Hospital*

*The Prince Charles Hospital*

*Royal Brisbane & Women's Hospital*

# SAQ 10

Long question 18 Marks **Question pass mark = 15/18**

A 5 month old baby presents to ED with a history of increasingly noisy breathing.

His vital signs are:

| | |
|---|---|
| GCS | 15 E4 V5 M6 |
| Pulse | 170 beats/min |
| CRT | 2 seconds |
| BP | 90/50mmHg |
| $O_2$ Sats | 99%$FiO_2$ 0.21 |
| Temp | 36.4 $^oC$ |
| BSL | 4.2 mmol/l |

1. List 5 differences between adult and paediatric airways (5 marks)

- Smaller mandible
- Larger head and occiput
- Paediatric airways
- Tongue is relatively larger
- Epiglottis is longer and floppier
- Larynx is higher and more anterior
- Narrowest part is cricoid ring (until about 5 years)
- Airway is shorter and narrower

2. List three (3) causes of stridor and DESCRIBE the nature of the stridor that would be associated with each cause (3)

| Cause | Noise |
|---|---|
| Supraglottic: Foreign body, Down Syndrome, Choanal atresia | Expiratory Stridor, Sonorous, coarse, gurgling |
| Glottic lesions: Foregin body | Biphasic Stridor |
| Subglottic lesions eg Subglottic stenosis, subglottic haemangiomas, vascular ring, croup, bacterial tracheitis | Inspiratory Stridor, high pitched |

3. When assessing an infant with stridor LIST five (5) important clinical features and their significance (JT - note original question paper does not have a table here. Question authors have used a table for clarity in the range os possible answers.)

| Clinical Feature | Significance |
|---|---|
| Position of child | Sitting upright and forward means unable to maintain airway when flat |
| Fever | Infective causes – croup, retropharangeal abscess |
| Toxic looking | Severe infections – bacterial tracheitis |
| Drooling | Severe pain, unable to swallow due to obstruction |
| Muffled voice | Supraglottic - epiglotitis |
| Respiratory distress (Respiratory rate, work of breathing, saturations) | Assess the effort and efficacy of breathing |
| Neck stiffness | Infective causes, foreign body, trauma |
| Cyanosis, hypotonia, altered mental state | Severe respiratory compromise with impending loss of airway |
| Character of noise | Biphasic – glottic<br>Expiratory – supraglottic<br>Inspiratory - subglottic |

4. As you are assessing the patient their stridor worsens. They become lethargic and cyanosed. LIST 5 actions you would take to safely secure the airway (5 marks)

Aim to manage airway in theatre with anaesthetics and ENT present.

Infant in position of comfort and preferred position, parents close

Minimise distress – avoid iv, avoid topical anaesthesia, avoid unnecessary transfer

Consider oral dexamethasone

ED airway only if resp arrest

Check and prepare for DL or VL

Anticipate difficult airway

Anticpate CICO prepare for FONA

# SAQ 11

12 Marks

A 54-year-old man presents with palpitations and is light headed. He has a wide complex tachycardia on ECG.

**Short Answer Witten Question: Submitted from Associate Professor Wayne Hazell**

1. List the four steps in Brugada criteria to distinguish VT from SVT (4 marks)

| Step Name |
| --- |
| Absence of RS complex |
| R to nadir of S > 100ms |
| AV dissociation |
| Abnormal or atypical bundle branch morphology |

Published in 1991, the Brugada criteria were the first to offer applicability to all WCT without limitation to one BBB configuration or another. The original paper reported overall accuracy of 98 %. However, no subsequent study has been able to achieve such results, with the overall accuracy of the algorithm 77–85 % across four large studies.[13,15–17] Most authors note difficulty in applying the last step of the criteria (the morphology section), particularly among non-cardiologists. The criteria are applied in stepwise fashion, stopping further analysis if any step suggests VT.

- Step 1: Absence of RS complex anywhere in V1–V6 = VT.
- Step 2: Onset of R to nadir of S in any precordial lead >100 ms = VT.
- Step 3: AV dissociation = VT.
- Step 4: Morphology criteria (see *Figure 1* for details). Of particular note, both V1 and V6 must suggest VT for the diagnosis to be made; otherwise, SVT is the diagnosis.

Recognizing that the morphology criteria can be difficult to remember, some advocate using only steps 1 and 2. The results of this approach have been variable with PPV for VT of 81–96 % in two different studies.[10,17]

2. State 8 other features on an ECG that are more indicative of VT than SVT in WCT.

   (8 marks = 1 per feature)

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1. QRS width > 140 msec
2. Precordial concordance with all V lead waves being predominantly either positive or negativein concordance
3. Northwest axis with dominant R wave in AVR
4. In RBBB left R peak greater than R peak or first rabbit ear higher
5. Lead 2 initial R wave deflection > 40/50 msec
6. Lead 2 initial Q wave deflection > 40/50 msec
7. Axis changed from normal ECG
8. Similar ECG to past episodes of VT diagnosed by EP testing or EP analysis of ECG
9. VT producing condition on prior ECG such as Brugada or STEMI or ARVD
10. Verecki criteria in lead AVR or any of the following:

Step 1: An initial, dominant R in aVR = VT.
Step 2: An initial, non-dominant q or r in aVR >40 ms = VT.
•Step 3: Notching on an initial downstroke in aVR = VT.
•Step 4: Vt≥Vi in aVR = VT. To apply, measure the total vertical distance covered by the final 40 ms of the QRS in aVR. If this is equal to or more than the vertical distance covered by the first 40 ms of the aVR QRS, VT is diagnosed. The concept is that with aberration, ventricular activation during the first portion of the QRS is mediated by the His-Purkinje system, whereas in VT,

Any of these steps could be given 1 mark

# SAQ 12

12 Marks No answer yet

An 18 month old male presents to your regional Emergency Department three hours following the accidental ingestions of one of his Grandmothers medications whilst in her care. The child is asymptomatic and has a normal clinical examination. He weighs 12kg.

His vital signs are:

| | |
|---|---|
| GCS | 15 E4 V5 M6 |
| Pulse | 120 beats/min |
| CRT | 2 seconds |
| BP | 90/50mmHg |
| $O_2$ Sats | 99%$FiO_2$ 0.21 |
| Temp | 37 $^oC$ |
| BSL | 4.2 mmol/l |

1. List four factors on history that form part of the toxicological risk assessment for this patient's presentation (4 marks)

2. Given the child is well and asymptomatic 3 hours post ingestion, please LIST the four (4) medication groups you would be most concerned about the child ingesting? (4 marks)

The child becomes increasingly confused. REPEAT observations are outlined below.

| | |
|---|---|
| GCS | 13 (E4 V4 M5) |
| Pulse | 150 beats/min |
| CRT | 2 seconds |
| BP | 110/65mmHg |
| $O_2$ Sats | 99%$FiO_2$ 0.21 |
| Temp | 37.0$^oC$ |

3. Please state two important investigations and justify your choice for this child (4 marks)

_____

_____

_____

_____

# SAQ 13

12 Marks

You are the ED consultant in a small regional ED with 20 treatment spaces, including 2 resuscitation cubicles. There is a heatwave event occurring in your region.

You receive a call from ambulance on site at a local music festival, stating that they are currently treating 30 patients with heat related illness.

There are 4 critically unwell patients with heat stroke who are already enroute to your ED.

1. Using the headings provided, outline the preparations you will make in your ED in anticipation of the arrival of this group of 30 patients. (4 marks)

| | |
|---|---|
| Staff | Assemble multiple resuscitation teams for 4 critically unwell patients.<br>Call in extra staff from home, ICU, wards, theatre recovery if available |
| Space | Clear department of low acuity patients.<br>Send admitted patients to wards |
| Equipment | Cooling equipment – evaporative cooling with fans, cool saline, icepacks<br>Intubation equipment, extra ventilation equipment, RSI drugs |
| Communication | Activate external disaster<br>Notify ED director +/- Medical Superintendent of hospital |

(Note there is more than one correct answer for each, candidate is not expected to give more than one answer per box.)

2. List the 3 criteria that are required for a diagnosis of heat stroke. (3 marks)

Neurological dysfunction (confusion, ALOC, seizures)
Core temp > 41.5 degrees
Hot, dry skin (absence of sweating)

3. List 3 pharmacological agents that may increase the risk of developing heat related illness. (3 marks)

MDMA
Diuretics
Phenothiazines
Anticholinergic agents
Salicylates

4. List 2 methods of cooling that you could use for the critically unwell patients on their arrival to your ED. (2 marks)

Evaporative cooling – spray patient with tepid water and use of fan
Icepacks to neck, groin and axilla

(Other methods of cooling such as ice-bath immersion would be impractical in a disaster scenario with multiple patients. ECMO is not likely to be available in a small regional ED. Cool IV fluids would not be ideal first choice in patients who may have concurrent hyponatraemia for MDMA or water intoxication.)

Reference: Cameron 5th Edition Ch 24.1 Heat-related illness

# SAQ 14

12 Marks

You are looking after a patient in your Resuscitation area with breathing difficulties. Your registrar is keen to have a discussion with you regarding the use of Non-Invasive Ventilation (NIV) in the ED.

1. List 4 indications for the use of NIV in the ED. For each indication you choose, state which mode of NIV you would use by putting it in the appropriate column. (4 marks)

| **Continuous PAP (CPAP)** | **BiLevel PAP (BiPAP)** |
|---|---|
| T1 Resp failure Acute Pulmonary oedema | T2 Resp failure from ECOPD |
| Pre-oxygenation for delayed sequence intubation | T2 Resp failure in asthma (controversial but acceptable) |
| | T2 Resp failure from neuromuscular disease |

**Note:** Important that type of resp failure is mentioned. Must have correct condition and correct mode to get mark.

2. List 4 absolute contra-indications for the use of NIV in ED.(4 marks)

| |
|---|
| Need for endotracheal intubation |
| Altered level of consciousness and unable to protect airway or follow commands |
| Excess secretions/vomiting |
| Unable to fit mask for whatever reason, eg facial surgery |

**Note:** there are other acceptable answers here such as cardiac arrest, but they must be absolute contraindications

3. List 4 major complications of NIV in the ED.(4 marks)

| |
|---|
| PTX |
| Aspiration |
| Local trauma – nasal bridge, eyes |
| Hypotension |

**Note:** Others acceptable, eg delay to intubation

Reference:
https://lifeinthefastlane.com/non-invasive-ventilation/

# SAQ 15

12 Marks Pass mark 7/12

A 6 week old male child presents to the emergency department with a 12-hour history of bilious vomiting, irritability and 2 x episodes of loose stool.

His vital signs are:

| | |
|---|---|
| AVPU | Alert |
| Pulse | 165 beats/min |
| CRT | 3 seconds |
| BP | 85/40mmHg |
| $O_2$ Sats | 99%$FiO_2$ 0.21 |
| Temp | 37.2 $^oC$ |
| Weight | 4200grams |

1. In the table below, please list four (4) most likely differential diagnosis and the clinical signs you would expect to find on examination. (8 marks)

| Differential diagnosis | Clinical signs |
|---|---|
| Malrotation/ volvulus | • Bilious vomiting<br>• May have normal abdominal examination<br>• Distension is a late sign<br>• Shock is a late sign |
| Meckles diverticulum | • Recurrent jelly stool/ PR haemorrhage<br>• Obstruction<br>• Shock<br>• Intusseption |
| Pyloric stenosis | • RUQ mass (olive_<br>• Non-bilious projectile vomiting<br>• Peristaltic waves<br>• Abdo distension |

| | |
|---|---|
| Intusseption | • RUQ mass<br>• Abdo pain; episodic followed by profound pallor and lethargy<br>• Vomiting<br>• +/- Blood rectal exam |

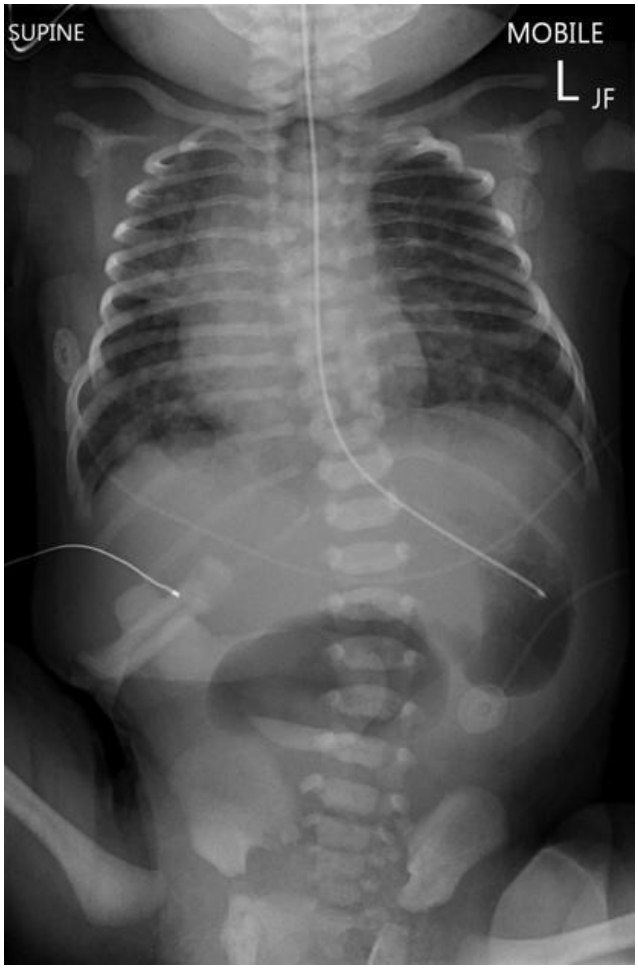
Other:

- NEC: less likely with timeframe and weight
- Duodenal/pyloric atresia
- Meconium ileus
- Imperforate anus

2. Please state the three (3) most important investigations for this child. (3 marks) (JT - note original question paper does not have a table here. Question authors have used a table for clarity in the range os possible answers.)

| **Investigation** | **Justification** |
|---|---|
| VBG | • Pyloric stenosis: Hypochloraemic, hypokalaemic met alkalosis<br>• BSL- hypoglycaemia<br>• Lactate- shock |
| USS | • Intusseption : Target/ doughnut sign<br>• Appendicitis<br>• Malrotation/ midgut Volvulus: duodenal distension, dilated loops of bowel (R side)<br>• Pyloris stenosis: thickened pylorus |
| AXR | • Malrotation/ midgut Volvulus: double bubble sign<br>• Duodenal atresia: double bubble<br>• Nec: pneumatosis intestinalis, portal venous gas, pneumoperitoneum |

An abdominal X-ray was performed. There is one (1) image below.




3. Please state the sign demonstrated on the abdominal X-ray and the most likely diagnosis (1 mark)

X-RAY: **Double bubble sign**

Diagnosis: high level bowel obstruction (duodenal atresia)

# SAQ 16

12 Marks

A 32 year old woman presents to the emergency department after giving birth in the car on the way to the hospital. She is G5P5 at 38 weeks gestation. The pregnancy was complicated by gestational diabetes that was managed by diet. Her most recent ultrasound showed a foetus that was large for gestational age. At arrival, she is pale and has persistent, brisk vaginal bleeding. Her vital signs are

| | |
|---|---|
| BP | 95/52 mmHg |
| Pulse | 106 bpm |
| RR | 18 /min |
| $SpO_2$ | 98 % in room air |
| Temp | 37.0 $^oC$ |
| GCS | 15 |

1. What are the two most likely causes of post-partum haemorrhage in this patient? (2 Marks)

   Uterine Atony

   Retained tissue

   **Pass 2/2**

2. Describe your management of the third stage of labour. (2 Marks)

   Look for signs of placental separation – lengthening cord, gush of blood, fundus globular

   Gentle traction backward and downward while supporting the uterus with one hand placed suprapubic

   **Pass 1/2**

3. List 4 non-pharmacological and 4 pharmacological measures that could be used to control haemorrhage, in order of escalation. (8 Marks)

| Non-Pharmacological | Pharmacological |
|---|---|
| Deliver the placenta | Oxytocin 5 units IV then 10units per hour |
| Fundal rub | Ergometrine 250mcg IM |
| Empty bladder | Misoprostol 800-1000mcg PR once |
| Bimanual uterine compression | Intramyometrial prostaglandin F2 500mcg alloquats up to 2grams |
| Surgical exploration of uterine cavity | |
| Uterine tamponade balloon | Tranexamic acid 1gram IV – anytime in escalation |
| Uterine artery ligation | |
| Hysterectomy | |

# SAQ 17

12 Marks Total pass mark 8/12

In early January, a 23 year old man presents with a fever after returning from a group tour in far north Queensland. He is usually well, and fully vaccinated on the Australian immunisation schedule. His vital signs are

| | |
|---|---|
| GCS | 15 |
| Pulse | 108 bpm |
| BP | 110/65 mmHg |
| RR | 22/min |
| SpO2 | 97% in room air |
| Temp | 38.2 $^{o}$C |

1. List four (4) features of history that will assist you to determine the source of fever (4 Marks)

Travel destinations – rural or metropolitan

Sexual history

Fever – onset, pattern

Bites and stings

Associated symptoms – respiratory, GI, headaches , arthralgia, myalgias, rashes

**Pass 3/4**

2. List 3 specific examination findings you will seek, and 2 potential infections that may be indicated by each. (6)

Rash – dengue, rickettsial infection, gonorrhoea, syphilis, brucellosis

Jaundice – hepatitis, leptospirosis

Lymphadenopathy – rickettsial infections, brucellosis, dengue

Hepatomegaly – amoebiasis, hepatitis, leptospirosis

Petechiae – dengue, meningococcaemia

Meningism – Neisseria meningitidis, strep pneumoniae

**Pass 3/6**

The following laboratory results are obtained.

| | | Reference range |
|---|---|---|
| Hb | 124 | 130 - 180 g/L |
| WCC | 15.7 | 4.5 - 11.0 x $10^9$/L |
| Neuts | 9.8 | 1.8 – 7.7 x $10^9$/L |
| Platelets | 32 | 150 – 400 x $10^9$/L |
| Albumin | 31 | 33 – 47 g/L |
| AST | 431 | 10 – 45 U/L |
| ALT | 32 | 65 – 45 U/L |
| ALP | 124 | 30 – 110 U/L |
| GGT | 196 | 10 – 70 U/L |
| Total Bili | 32 | < 20 µmol/L |
| Urea | 7.9 | 3.0 – 8.0 mmol/L |
| Creatinine | 85 | 60 – 110 µmol/L |
| Glucose | 5.4 | 3.0 – 5.5 mmol/L |

3. What is the MOST LIKELY infectious diagnosis based on these laboratory results? (1 Mark)

Dengue fever

4. Identify one other possible infectious diagnosis. (1 Mark)

Severe sepsis, hepatitis, leptospirosis

# SAQ 18

12 Marks

A 60yr old man presents to your non-tertiary emergency department stating he 'walked into something' 30 minutes ago sustaining a left eye injury. He refuses to answer further questions as to the exact mechanism. He undergoes an urgent CT scan of his head and face.

His CT is found in the Props Booklet

1. List THREE abnormalities on his CT scan (3 marks)

**Must have first two to get any marks**

- Globe rupture
- Orbital blowout fracture or fracture of orbital floor with depression
- Displacement of inferior rectus
- Haemorrhage/Air in maxillary sinus

2. List FOUR examination findings you would look for on your assessment (4 marks)

**Must have VA to get any marks**

- Visual acuity
- Extra ocular movement
- Sensation over inferior orbital nerve
- Assessment of pupils shape
- Pupillary reflexes
- Inspect for hyphaema
- GCS or other neurological assessment for intracranial injury
- Cervical spine midline tenderness
- Septal haematoma/other facial injury

*testing IOP not recommended as to avoid pressure on the eye, avoid flouroscein

3. State your ongoing management for this man (5 marks)

- Urgent referral to Opthalmology
- Lie patient flat
- Avoid external pressure on the eye
- Tetanus update
- IV antibiotics (cephazolin 2gm IV +/- gentamicin)
- Eye shield – not pad
- Analgesia – appropriate opiate-based analgesia
- IV anti-emetic
- Sinus precautions

*topical antibiotics not indicated