Paediatrics Fellowship SAQ

Question 1

You have received notification that a term baby has been born in an ambulance en route to ED.

APGAR currently 5 at 5 minutes.

a) What are the 5 components of the APGAR scoring system (5 marks)

Appearance/Colour

Pulse

Grimace/Reflex Irritability

Activity

Respiration

b) List 3 anatomical and 2 physiological differences between a neonate and an adult. For each difference state how the difference might impact upon your management of this childs airway or breathing. (10 marks)

Large head – position in neutral not sniffing, towel under shoulders

Short trachea – potential for accidental extubation/RM intubation

Narrowest at cricoid – need for uncuffed/need to use high vol low press cuff/risk of stenosis

Small airways – increased risk obstruction, must suction regularly

Large floppy epiglottis – use a straight blade on top of epi

Soft tissues easily compressed – care during BVM

Easily damaged soft palate – guedel in right way up

Low FRC – fast desat

High Met rate – fast desat

Faster RR – need to ensure match the rate

High Ant Larynx – anticipate difficulty, use VL, straight blade, get help

Straight Ribs – limits VT

Reliance of diaphragmatic breathing – need to ensure stomach decompressed

**On arrival the child has poor tone and respiratory effort. There has been no cry since birth despite continuous stimulation. Guedel in situ. Several attempts at canulation have failed.**

**P 100**

**BP 50/30**

**Sats 60% RA**

**RR 13**

**Temp 34.2**

c) List the immediate action/interventions you will perform on this child for each category in the table below, giving details of each (e.g equipment sizes/doses/steps). This excludes calling for external help (10 marks)

|  |  |  |
| --- | --- | --- |
| **Category of Intervention** | **Interventions** | **Details of Interventions** |
| **AIRWAY** | Airway opening manoeuvres and adjuncts  Suction  Intubation | Head in neutral, chin lift, guedel, BVM in time with resps plus additional  Small gauge soft suction catheter under direct vision  Straight blade, ETT approx. 3.5, 11cm depth, check CO2 |
| **BREATHING** | PPV with neopuff  Ventilation | Resuscitaire/Neopuff 5-10 PEEP, plus 5-10 IPAP  Vt 6mls/kg (approx. 20mls for term baby), PEEP 5, |
| **CIRCULATION** | Insert IO  Insert Umbi Line  IV fluid bolus | Into proximal tibia medial border 1cm below TT  Sensible description of procedure  20mls/kg NaCl |
| **DISABILITY** | Check BSL | If low, 2mls/kg 10% dextrose |
| **OTHER** | Warm child | Overhead heater in resuscitaire/ |

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| --- | --- | --- |
| **Category of Intervention** | **Intervention** | **Details** |
| AIRWAY |  |  |
| BREATHING |  |  |
| CIRCULATION |  |  |
| DISABILITY |  |  |
| OTHER |  |  |

**Question 2**

**A 4 year old male has been brought in my ambulance after being found face down in the backyard pool. His observations are shown below**

**P 40**

**BP 60/50**

**Sats 67% on 15L NRB**

**RR 8**

**Temp 34.2**

a) List 4 factors that predict a poor outcome in drowning patients (not specifically relating to THIS patient) (4 marks)

CPR ongoing in ED

Asystole at any time

>10/15 mins submersion (Tintinalli/Dunn)

Non reactive pupils and GCS <5 when arrive to ICU are best predictors of survival

Quality of CPR

**Orlowski Scale (>3 = 5% surv, <3 90%)**

Coma

No attempted resus

>5mins submerged

Age <3

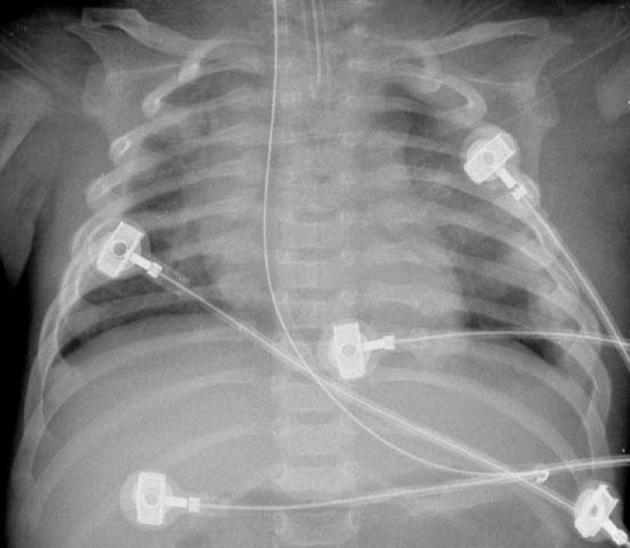
Met Acidosis <7.1

b) In the table below, list 4 potential **acute** complications of intubation, and the steps that you will take when preparing to minimise the risk of each complication. (8 marks)

|  |  |
| --- | --- |
| **Complication** | **Measures to prevent** |
| Hypoxia | Preoxygenation with BVM, 100%, |
| Worsening acidosis | Ventilate with BVM pre and during intubation if acidotic |
| Hypotension | Preload with fluid bolus 20mls/kg NaCl, mataraminol or other push dose pressor/noradrenaline infusion |
| Aspiration | Insert NGT pre intubation and aspirate stomach, ?cricoid pressure (controversial) |
| Failure | Most experienced intubator to attempt first, VL, |
|  |  |

|  |  |
| --- | --- |
| **Complication** | **Measure to Prevent** |
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**The child’s CXR is shown.**



c) Describe the positive and negative findings (5 marks)

Intubated – appropriate depth of ETT

NGT in stomach

5 lead monitoring leads in situ

Multiple bilateral healing rib fractures raising concern for NAI or prior traua

No signs of aspiration or pulmonary airspace opacity that would be consistent with submersion

**Question 3**

**A 20 day old neonate is brought in by parents due to poor feeding and being “floppy”. The birth was uncomplicated and child discharged from hospital at 24 hours.**

**Observations**

**P 170**

**BP 69/50**

**Sats 87%**

**RR 50**

**Temp 37.3**

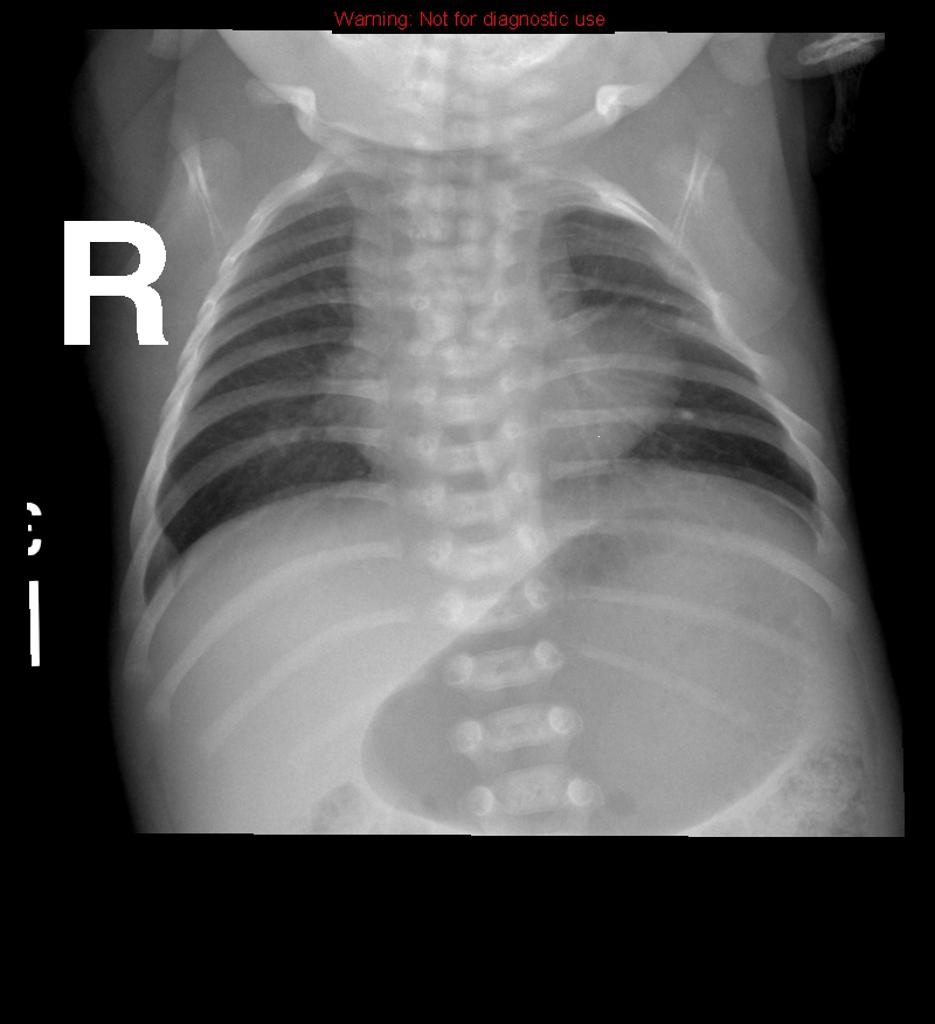
a) List 3 broad categories of differential diagnosis for this presentation and give a specific example of each (6 marks)

Sepsis – e.g EColi, GBS, Listeria, Staph/Meningitis/pneumonia

Metabolic – PKU, jaundice

Cardiac – e.g Tetralogy of Fallot Tricuspid Atresia, Truncus Arteriosus, Transposition, TAPVR

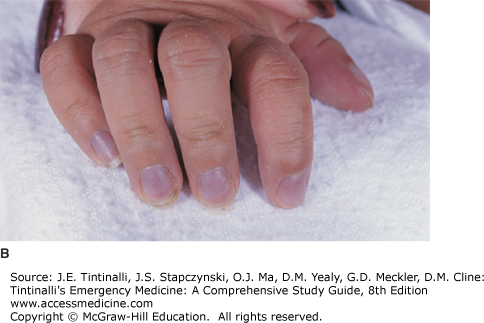
**A CXR is performed as the child appears tachypnoeic.**



b) What sign does this CXR show and what condition does this suggest (1 marks)

Boot shaped heart - ?TOF

**The child becomes upset and on crying mum points out that the child has developed the following sign. Sats drop to 78% but other obs remain the same.**



c) Outline your approach to **management** of this episode

100% O2

Position of calm and comfort with mother

Knees to chest

Opiates – morphine 0.1-0.2mg/kg

20mls/kg fluid bolus

If fails:

NaHCO3 2mEg/kg bolus

Propranol 0.2mg/kg iv

Pheylephrine 2-10mcg/kg/min

If unsure RE: sepsis administer broad spectrum abx – cefotaxime 50mg/kg and ampicillin 50mg/kg

**Question 4**

A 3 year old boy has been brought to ED by his parents as he has a fever and rash. Mum is concerned that he has measles.

P 130

BP 80/50

Sats 99%

RR 25

Temp 37.7

[](http://www.google.com.au/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwi-xNSuvebSAhUEXrwKHV0hAE0QjRwIBw&url=http://doctor-deena.blogspot.com/2015/01/measles-cases-highest-since-2000.html&bvm=bv.150120842,d.dGo&psig=AFQjCNEx6O0mKyip9T_8CjdI6nYEq-mTXA&ust=1490147268600017)

a) Other than measles, list 4 other differentials should you should consider for this rash (5 marks)

Rubella

Parvo

Enterovirus

Adenovirus

HHV-6

Morbilliform Drug eruption

b) What features on examination, other than rash and fever, might you expect to find in a patient with measles (4 marks)

Conjunctivitis

Coryza

Cough (95%)

Kopliks spots

Generalised lymphadenopathy

c) What are the key actions with regards to infection control (6 marks)

Double bag specimens

Don’t use the pneumatic chute

Isolation of child in a single room with negative pressure if possible, decant non essential equipment, requires door closed and must not be used for other patients for 2 hrs and be high cleaned

Patient to wear a mask at all times

Awareness that child was infectious from 5 days before and till 4 days after the appearance of the rash – avoidance of other vulnerable people

Vaccination of unvaccinated contacts/family

To inform CDC – notifiable disease

Contact tracing via CDC

Not to present to the GP/avoid waiting areas/public places/schools etc

**Question 5**

A 7 day, term born neonate presents to ED with jaundice. Mum is not sure when it started. The child has been exclusively bottle fed and was born by elective C-Section.

a) Complete the table below with the potential causes of conjugated and unconjugated jaundice IN THIS NEONATE (10 marks)

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| --- | --- |
| **Unconjugated** | **Conjugated** |
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| --- | --- |
| **Unconjugated** | **Conjugated** |
| Physiological | Sepsis |
| Haemolysis | Biliary abnormality |
| Sepsis | TORCH |
| Hypothyroidism | Hepatitis |
| Inborn Errors – CN, Gilberts | CF |
| **Breast Milk Jaundice – NOT this – bottle fed** | Alpha 1 antitrypsin deficiency |
|  | Inborn errors – DJ and ROTOR |

b) What features on examination will you seek to determine the cause of the jaundice (4 marks)

Signs of systemic sepsis- dehydration/reduced cap refill/reduced activity level/fever

Localising signs of infection – chest signs/skin rashes/full fontanelle in meningitis

Evidence of easy bruising/haematomas

Evidence of bowel obstruction – distended/vomiting

c) Aside from LFTs and conjugated/unconjugated bilirubin, list 5 laboratory tests you might perform to investigate the cause. Give your rationale for each (10 marks)

Blood group – mother and baby

CRP and WCC for ? infection

Septic screen if febrile or signs infection

TSH – congenital hypothyroidism

Coombs or elution test (detects antiA or antiB on red cells) – to detect haemolysis

Blood film – for signs of haemolysis/fragmented red cells

**Question 6**

**A 3 month old, 5kg baby presents with PR bleeding. The child has vomited twice today. The child is seen in ED by the RMO. Mum has brought you a dirty nappy**

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a) What are the likely causes of PR bleeding will you consider in your assessment of this child?

Local trauma/fissures/constipation

Gastroenteritis - bacterial

Meckels

Intussusception

Polyps

Cows Milk Protein Allergy

Vascular lesions

Clotting disorders/thrombocytopenia

Swallowed mothers blood from breast feeding – less likely than in neonates

**The child is initially well and is discharged from hospital, to follow up with the GP. 48 hrs later the child returns with copious diarrhoea, is floppy and has a fever of 40 degrees. You estimate them to be 10% dehydrated.**

**P 160**

**BP 60/40**

**RR 50**

**Sats 99%**

**Temp 37.9**

**pH 7.19**

**pCO2 24**

**HCO3 12**

**Lact 4.3**

**Na 132**

**K 3.1**

b) List the intravenous fluid management that you will institute for this child over the next 24 hrs

**Resus**

10-20mls NaCl 0.9% - repeated till signs of shock resolved (max 60mls/kg)

**Defecit replacement**

10 x 10% x5kg = 500mls

**Maintainence** = 5 x 100 = 500mls

Replace deficit plus maintainence over 24 hrs = 1000mls per 24 hrs = 42mls per hr of NaCl plus 20mmol KCL/L

Can replace the defecit over a quicker period depending on the state of the child.

c) What other management will you commence assuming that the childs haemodynamics and VBG improve with fluid therapy (2 marks)

Paracetamol for distress/fever

Antibiotics –

For GI Source - Amp 50mg/kg, Gentamycin 7mg/kg, Metronidazole 12.5mg/kg (Best answer)

OR

Empirical ? focus – Cefotax/Gent/Vanc (less good answer)

OR

Ceftrixone alone if convinced that gastroenteritis only

**The mother writes a complaint expressing her displeasure that the child’s illness was not picked up and treated when they originally presented to the ED.**

d) Outline the steps you will take in addressing this complaint (6 marks)

Acknowledge the complaint and agree a timeframe to investigate and report back in 72 hrs

Gather information – review case from notes, parent, doctors etc

Review departmental policy and other guidelines

Rapidly respond and feedback to parent

Meet back with parents to discuss/open disclosure if deficiencies in care found

Pastoral care of those involved

M&M/feedback of learning points

Institute any changes to departmental practice

Keep record of complaint/document

Audit to close the loop

**Question 7**

**A 3 month old girl presents with fever and malodorous urine. She looks well, is feeding and has good hydration.**

**P 100**

**BP 110/70**

**Sats 99%**

**RR 30**

**Temp 37.6**

a) In the table below list the options do you have for the collection of a urine specimen, with 1 pro and 1 con of each

|  |  |  |
| --- | --- | --- |
| **Method** | **Pro** | **Con** |
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| --- | --- | --- |
| **Method** | **Pro** | **Con** |
| Bag Urine | Requires little parental input, passive and easy | Takes time, unclean and usually contaminated. Only helpful if dipstick completely negative |
| Midstream | Clean if collected properly, non invasive, usually acceptable and painless | Takes time, messy, easily missed, requires parental attentiveness |
| Catheter | Cleaner than other above methods, quick | Can be distressing and may need sedation to achieve in older baby |
| SPA | Very clean | Requires a full-ish bladder, invasive, risk of damage to surrounding bowel, may need sedation to achieve with N2O or IN midaz |

**A clean, reliable urine sample shows the following**

**Leuc ++**

**Prot normal**

**Nitrites pos**

**Blood ++**

b) List the ED management and follow up plans for this child (5 marks)

Antibiotics orally

* Trimethoprim 4mg/kg/Bactrim 4/20mg/kg 12hrly or Ceflex 12.5mg/kg 6 hrly, 10 days duration as per RCH/5 days as per eTG

Paracetamol 15mg/kg for pain and fevers

USS renal tract within 6 weeks

Follow up for MSU result with GP

Note that BP high – needs to be rechecked in ED and if remains high needs a more urgent USS and paed follow up/discussion

**You notice when you are checking results that the patient has grown pseudomonas in their urine**

c) Outline how you will deal with this now (4 marks)

Call back child / call GP

Ensure that child remains clinically well – if so GP can follow up

If clinical concerns needs to come to ED

Is an atypical organism so needs more urgent USS in 48hrs

Change abx to Norfloxacin 10mg/kg 12 hrly

**Question 8**

**An 8 year old indigenous girl presents to ED with a sore right knee. She has poor English language skills and is very quiet and shy. Her mother was present but popped out and has been gone for 20 minutes. Nobody is sure where she has gone and when she will return.**

**The girl is crying whenever you try to examine her**

**P 100**

**BP 130/90**

**Sats 99%**

**RR 12**

**Temp 37.3**

a) In the table below outline 4 possible causes of her knee pain, and 2 examination findings and 2 tests that you may order to add weight to the diagnosis

|  |  |  |
| --- | --- | --- |
| **Diagnosis** | **Examination** | **Tests** |
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| --- | --- | --- |
| **Diagnosis** | **Examination Findings** | **Tests** |
| Trauma/Fracture or soft tissue injury/NAI | Localised tenderness, ligamentous laxity, effusion | XRay, ultrasound if suspect ligamentous injury |
| Juvenile arthritis | Swollen and tender joint | ESR, CRP, ANA, RhF, Anti CCP, |
| Rheumatic Heart Disease | Murmur, chorea, erythema marginatum, subcut nodules, Fever | ECG, ASOT, antiDNAase B, ESR |
| Septic Joint | Extreme tenderness and limited ROM, heat and redness, effusion, features of sepsis | Aspirate >100 000 WCC, CRP and WCC elevated |
|  |  |  |

Her Xray is shown



b) Describe the abnormality shown in this XRay (1 mark)

Metaphyseal corner fracture of the medial proximal tibia

c) What is the significance of this injury (1 mark)

Likely NAI – highly specific for

d) How will you further investigate and manage the patient (6 marks)

Provide analgesia – panadol and nurfofen

POP/splint for pain

Try to contact parents and relatives to get more information

Contact paediatrics/ortho to assess and admit the patient

Contact FACS to make a report

Involve social worker

Skeletal survey – ideally with the consent of a parent first

Assess for other signs of NAI

**Question 9**

**A 3 year old boy presents with a rash. He was been ‘cranky’ according to mum for the last few days. He is off his food and has been crying in ED for the whole time. He had 2 days of diarrhoea last week but normal stools for 5 days now.**

**Obs are normal, no fever recorded**

[](http://www.google.com.au/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwjM_fCRo-zSAhXCI5QKHVvEAbkQjRwIBw&url=http://www.medlibes.com/entry/henoch-schonlein-purpura&bvm=bv.150475504,d.dGc&psig=AFQjCNFncfxYZInLDnt0n8iORUyUnBtatA&ust=1490346400980520)

a) Describe the rash (3 marks)

Raised red macular/purpuric rash to bilateral lower limbs

Relative sparing of the popliteal fossa creases

Only extensor surfaces shown

Some areas of crusting/scabs on lower legs

c) List your diferential for this rash (4 marks)

HSP

Meningococcal disease

ITP

Leukaemia

Drug reactions e.g to NSAID

d)What other features on examination will you seek out to narrow your differential? (10 marks)

Well or sick child/behaviour – active and alert vs subdued

Fevers/sepsis features - Meningococcal

Abdo tenderness, joint pains – HSP

Lymph nodes and organomegaly

Other areas of bruising/bleeding e.g mucus membranes/epistaxis/rectal bleeding

Confusion/neurological signs of HUS

c) List the **initial** tests you will order in ED and give a reason for each (

FBC - ?low platelets of TTP, anaemia with haemolysis, WCC with meningococcal

Coags - ?DIC

Blood cultures ? sepsis/meningococcal

EUC - ?renal dysf in HUS/HSP/Sepsis

Urine Dip – protein in HSP/Blood in HUS

Haemolysis screen inc retics/haptos/bili – HUS

Stool sample - ? HUS strain of EColi

Blood film - ?leukaemia