1. Admin complaint double question

This question has 20 marks – a double question	Question	Answer
Please review the following complaint made to your Emergency Department and answer the questions below. A 76 year old woman presented to your ED 4 days ago. She complained of 1 day of vomiting, non-bloody diarrhoea and crampy LLQ pain. She had fever and chills at home. She had no sick contacts and no travel history. On the day of the presentation: Temp: 38C. HR 110 BP, 118/76, RR 16, SAO2 97% RA. Her documented examination findings were mild tenderness in the LLQ with no guarding or rebound. Her rectal exam was noted as an "empty rectum". Her WCC: 10.3 with 77% neutrophils. Hb 15g/L. EUC, lipase and LFT were all within normal limits. At 4 hours, her pain improved. Her vitals signs were: Temp: 38C. HR 100, BP 122/80. She was discharged home.	Q1. Based on the clinical documentation above, what makes this a high-risk discharge? (2 marks)	• Elderly woman with non-specific abdominal pain as vomiting and non bloody diarrhoea with fever still holds a high potential of diagnoses other than gastroenteritis • Abnormal vital signs post treatment - remaining febrile and tachycardic at 4 hours, presumably after some treatment does not lower her risk of a bad outcome • Conclusion: still remains highly suspicious of a serious diagnosis beyond gastroenteritis
Her discharge letter was a "cut and paste" of the clinical encounter, together with the lab results.	Q2. What discharge information would you consider essential to include in the letter?	• Presenting symptoms and course (5 marks)

1. Admin complaint double question

The diagnosis was gastroenteritis. She was asked to see her GP within the next 48 hours. She was given a fact-sheet for management of gastroenteritis.	(5 marks)	• Examination findings • Most likely diagnosis and alternatives and provide reasons • Treatment rendered in the ED • Reasons for discharge • What instructions/advice were given to the patient: indications for return, complications to be mindful of, when to see GP
The patient returned to the ED on Day 2 with a temp of 39C. She continued to have vomiting and diarrhoea. She was discharged with a diagnosis of gastroenteritis and asked to start oral rehydration fluid. She returned on Day 3 with an acute abdomen. Her CT showed a diverticular phlegmon with possible perforations.	Q4. Part of your review of this complaint requires you to **identify processes** that would **prevent a recurrence** of this encounter in your ED. How would you address this? (4 marks)	• System: work-process: all re-presenters need to be identified to SMOs • Medical expertise: Re-presenters need to have complete review of the diagnosis, then follow up arranged to ensure management is correct and resolution of the problem • Education of staff: Gastroenteritis is only a diagnosis of exclusion if there is no sick contact and no temporal relation to a food source. Undifferentiated abdominal pain in the elderly requires a dedicated search for the diagnosis. Discharge home needs to be conservative including a medical review within a 12 hour rather than the 24-48 hour time frame. Include in all department education. Include this in a list of high risk discharge diagnosis

1. Admin complaint double question

		• Audit/quality : initiate and establish an audit cycle for this problem The patient spent 1 week in ICU. She has since recovered. Her son is extremely concerned about the treatment given by your ED. You are asked by your DEM to manage his concerns as part of the review.

Her son has contacted the hospital and you are expected to manage this.	Q5. Outline how you would manage this. (5 marks)	• Brief your DEM in regards to your findings and the steps you intend to take to prevent / mitigate a recurrence
		  ○ Ensure the hospital medico-legal/IMMS department is also involved
		  ○ Agree with the above as to the assessment and course of management
		• Contact the son and organise a face to face meeting. Offer a support person for the son such as a patient advocate
		• At the meeting: apologise for treatment/harm caused. Identify processes that require improvement, explain processes initiated since the occurrence and follow up of the problem
		• Opportunities for questions and answer
		• Follow up as appropriate

1. Admin complaint double question

One of your Registrar comes to you and admits that he was the treating doctor on both occasions. He says he consulted the Emergency consultant, who reassured him his management plan was appropriate.	Q6. How would you manage this situation? (4 marks)	Registrar: Review the case with him, identifying critical decision points and discuss possible alternatives to a future similar presentation. Outline the process when complaints are made to the department. Identify his personal involvement should the case progress further. Ask about his personal indemnity cover if any. Encourage him to let them know if he has a personally indemnified. Enquire about his welfare and need /wish for further support for this situation. Colleague: Contact your colleague to further investigate the situation

SAQ 2 Mental Health

	Question	Answer
A 32 year old woman is brought in by police. She is handcuffed and screaming obscenities on arrival. She is in your resuscitation room.	Q1. What non-pharmacologic de-escalation would you use? (2marks)	• Calming the environment: minimise personnels involved, dedicate one staff to speak, ensure safety of staff and then patient • Show of force • Verbal de-escalation: Support (we can work this out) Acknowledge (I see this is hard for you) Validate (I can understand why you are angry) Emotion naming (I see you are angry)
	She doesn't respond to your actions. You decide to use physical restraints. Q2. What precautions would you take to ensure the patient remains safe when physically restrained? (4 marks)	• Use medical restraints • Position patient with 30 degree head up, supine • One arm above and one arm below the head • Tie restraints to the bed frame and not the rails • Use 4/5 point restraints
	Q3. What is the purpose of chemical restraints? (1 mark)	• Chemical restraints is to calm the patient to facilitate rapid assessment and stabilisation of the potentially critically ill patient ○ In particular, to search for life threatening diagnoses

<table>
<tr>
<td></td>
<td></td>
<td>

Agitation is secondary to a number of causes

</td>
</tr>
<tr>
<td></td>
<td>She is now calm.
Q4. What would you examine or investigate for? Provide a management/ treatment where appropriate. (3 marks) Fill in the table below.
<table>
<tr><th>Examination /investigation</th><th>Management</th></tr>
<tr><td>•</td><td>•</td></tr>
<tr><td>•</td><td>•</td></tr>
<tr><td>•</td><td>•</td></tr>
<tr><td>•</td><td>•</td></tr>
<tr><td>•</td><td>•</td></tr>
<tr><td>•</td><td>•</td></tr>
</table>
</td>
<td>
<table>
<tr><th>Examination findings or investigation</th><th>Management/treatment</th></tr>
<tr><td>Hypoxia</td><td>Give supplemental O2</td></tr>
<tr><td>Hyperthermia</td><td>Cool. Consider sepsis</td></tr>
<tr><td>Hypothermia</td><td>Keep warm</td></tr>
<tr><td>Hypovolaemia</td><td>Give crystalloids</td></tr>
<tr><td>HyperK or hypok or acidaemia</td><td>Treat as required</td></tr>
<tr><td>Head trauma or SOL to cause agitation/behavioural change</td><td>CT cerebral</td></tr>
<tr><td>CK with renal function</td><td>Rhabdomyolysis</td></tr>
<tr><td>Thyroid function</td><td>Hyperthyroid storm</td></tr>
<tr><td>Drug screen</td><td>Drug affected behaviour</td></tr>
<tr><td>Trauma</td><td>May need eFast</td></tr>
<tr><td>ECG</td><td>Less likely that CAD is a cause in this patient</td></tr>
</table>
</td>
</tr>
</table>

<table>
<tr><td></td><td>Question</td><td>Answer</td></tr>
<tr><td>A two year old Vietnamese child is referred in by her GP for assessment of pallor and failure to thrive. The problem probably dates back to her first birthday. Her FBE is as follows:

<table><tr><td>Hb 26 g/L (135 - 175)</td><td>Retics 5.3%</td></tr><tr><td>Plt 324 x 10 ^{9}/L (140 – 400)</td><td>Neuts 3.24 x 10^{9}/L (1.7 – 7.0)</td></tr><tr><td>MCV 60 fL (80 – 100)</td><td>Lymp 4.37 x 10^{9}/L (1.5 – 4.0)</td></tr><tr><td>HCT 0.1 L/L (0.37 – 0.47)</td><td>Mono 1.3 x 10^{9}/L (0.1 – 0.8)</td></tr><tr><td>WCC 9 x 10^{9}/L (3.5 – 11.0)</td><td>Eos 0.06 10^{9}/L (0.04 – 0.44)</td></tr><tr><td></td><td>Baso 0.00 x 10^{9}/L (0.0 – 0.2)</td></tr></table>
Pencil cells noted.</td><td>Q1: List the three most important features of this blood count (3 marks)</td><td>Profound hypochromic microcytic anaemia (pass/fail)
Other cell lines preserved (pass fail)
Likely chronic (reticulocytes/HCT)</td></tr>
<tr><td></td><td>Q2: List the 4 most important differential diagnoses and historical discriminators. (4 marks)</td><td></td></tr>
</table>

<table>
<tr>
<td></td>
<td></td>
<td>
<table>
<tr><th>Differential diagnosis</th><th>Discriminating historical feature</th></tr>
<tr><td>Malignancy</td><td>Weight loss, night sweats</td></tr>
<tr><td>Haemolysis</td><td>Recent new medication
Neonate with ABO incompatibility</td></tr>
<tr><td>Bleeding</td><td>Haematuria/GI loss
Coagulopathy in family</td></tr>
<tr><td>Haemoglobinopathy</td><td>Family history, mediterranean</td></tr>
<tr><td>Iron deficiency anaemia due to dietary insufficiency</td><td>Specific dietary factors cultural/vegan etc</td></tr>
</table>
</td>
</tr>
<tr>
<td></td>
<td>Q3: What are your initial management priorities? (3 marks)</td>
<td>Must include the highlighted in the answer to pass. NB Accept any reasonable answer. NB The information given has not said that the child is unstable. The condition is chronic.
1. Assess and initiate management with VS and monitored bed</td>
</tr>
</table>

		2. Ensure IV access +/- O2 and investigations (bloods/CXR) as above taken 3. **Seek and treat signs of heart failure or end organ dysfunction**, consider echo 4. **Consent and plan for transfusion to Hb 70 +/- iron transfusion** 5. Seek and treat underlying cause 6. Will need admission

SAQ 4 asthma

SQ 1

18 year old female who has a history of asthma presents with 3 days of worsening shortness of breath

1. List 2 examination findings and 2 basic investigation findings which correlate with defined features of life-threatening asthma. (4 points)

Clinical features	**Investigation results**
1.	1.
2.	2.

2. Despite treatment with continuous nebulised B-agonists, ipratropium and steroids the patient continues to deteriorate. Outline three treatments including doses, you might use before intubation. (3 points)

Treatment	**Dose**
1.	
2.	
3.	

3. With regard to initial ventilator settings for the asthmatic, fill in the following table (3 points):

Parameter	**Range**
Tidal volume	
Respiratory rate	
I:E time	

ANSWER Q1

1. Exam findings:

- silent chest
- cyanosis
- feeble respiratory effort
- bradycardia
- dysrythmia
- hypotension
- exhaustion
- confusion
- coma

Investigation findings:

PEF < 33% best or predicted
SpO2 < 92%
PaO2 < 60 mmHg
Normal PaCO2 (35-40)

2. **Treatments/Doses:**

- IV Magnesium 1.2-2g over 20 min.
- IV Salbutamol 250-500mcg loading, followed by 5-20mcg/min
- IV Aminophylline 5mg/kg loading, then 0.5-0.75mg/kg/min
- Adrenaline subcut (0.3-0.5mg); nebulised (2-4mg hourly); IV (100-200mcg boluses up to 1mg)
- Ketamine for intubation 2mg/kg

3. **Ventilator settings:**

Tidal volume 4-8ml/kg
Respiratory rate 12-14 breaths/min
I/E ratio 1:4

SAQ 5 ID rash

	Question	Answer
Mum presents with Sebastian, born 2 days ago via NVD at term. Mum has developed a vesicular rash on her chest this morning, and she is worried about infecting Sebastian. You are concerned it might be herpes zoster. Sebastian is well, with an unremarkable exam and normal observations.	Q1. What is your treatment of him? (2)	Varicella immunoglobulin Aciclovir 20mg/kg TDS
	Q2. What complications may Mum get? (5)	Pneumonia Encephalitis/meningitis Shingles/post herpetic neuralgia Secondary bacterial skin infections/cosmesis Transverse myelitis Hepatitis
	Q3. What are other considerations during mum and baby's stay in your ED? (3)	Isolate, minimal time in WR, terminal clean.. Consider staff exposure (eg preg/unvaccinated staff..) Notifiable +/- contact tracing

<table>
<tr><td></td><td>Question</td><td>Answer</td></tr>
<tr><td>A 67yr old male farmer is brought in to your rural ED by ambulance with CPR in progress following a lightning strike.</td><td>Q1. What are your immediate management priorities? (5 marks)</td><td>1. Continue ACLS protocol with uninterrupted CPR and adrenaline 1mg q4mins
2. Assess and optimise airway and breathing whilst maintaining C spine precautions, 15L/min O2 via BVM and prepare for intubation when able
3. ECG – seek and treat shockable rhythm
4. Fluid bolus 20mL/kg N/Saline x3 prn; seek and treat active external sources of bleeding
5. Seek and treat other causes of arrest – Hs and Ts and other injuries
6. Recognise that prolonged CPR may be indicated in the setting of lightning strike so preparation of team and resource allocation to avoid exhaustion of staff and optimise outcomes. (pass/fail)
7. Reversal of normal mass casualty triage</td></tr>
<tr><td>He is successfully resuscitated.</td><td>List one short and one long term complications from the three systems in this table. (3 marks)</td><td>
<table>
<tr><td>System</td><td>Short Term</td><td>Long Term</td></tr>
<tr><td>Neurological (pass/fail)</td><td></td><td></td></tr>
<tr><td>Ophthalmological (pass/fail)</td><td></td><td></td></tr>
<tr><td>Otological</td><td></td><td></td></tr>
</table>
<table>
<tr><td>System</td><td>Short Term</td><td>Long Term</td></tr>
<tr><td>Neurological (pass/fail)</td><td>IVH, CVA
Amnesia/post concussion syndrome
Keraunoparalysis
Seizures
Coma</td><td>Chronic pain syndrome
Neurocognitive deficits
Pituitary or hypothalamic dysfunction
Sleep disorders
Depression</td></tr>
</table>
</td></tr>
</table>

		Vascular	Vasomotor instability Arterial spasm Vasoconstriction Vasodilatation Pericarditis	Recurrent pericarditis Otherwise minimal
		Ophthalmological (pass/fail)	Corneal lesions Hyphema Iritis Vitreous hemorrhage Retinal detachment Optic nerve injury	Cataracts Permanent visual damage
		Otological	Perforated TM Temporary hearing loss Ossicle disruption	Persistent dizziness and instability from vestibular nerve disruption Persistent hearing loss
	Give one example of each of the skin and deep tissues of the electrical injury listed in the table (2 marks)		Skin effect	Deep tissue effect
		High voltage		
		Lightening		
			Skin effect	Deep tissue effect
		High voltage	Flashover burn, full thickness entrance and exit wounds	**Muscle damage with rhabdomyolysis and compartment syndrome (pass/fail)**
		Lightening	Superficial or dermal flashover burns. Lichtenberg. Exit burns on feet	Eardrum perforation and corneal damage

SAQ 7 OGPPH

	Question	Answer
A 25 year old lady is brought in by ambulance to your emergency department with post-partum haemorrhage. She had a precipitous home delivery of a healthy term infant 30 minutes ago. The eMR confirms a singleton pregnancy. The paramedics estimate that she has lost 1.5L of blood. Her observations are as follows: HR 135 BP 80/60 RR 35 Temp 36.3 Sats 99% RA	1. What are your management priorities are in the resuscitation room? (5)	i. haemodynamic resuscitation- activate massive transfusion protocol, must mention minimal volume resuscitation/balanced resuscitation/avoidance of excessive crystalloid ii. mechanical cessation of bleeding (must mention at least 1): uterine massage/ bimanual compression/ drain bladder/ suture tears iii. pharmacological uterotonics: oxytocin 5-10 units slow IV push, 40 units IV infusion over 4 hours, +/- ergometrine 0.25mg slow IV/IM repeated q 5 minutely up to 1mg if necessary, +/- misprostol up to 1000mcg rectally, +/- prostaglandins intra-myometrially, (must mention at least 1 with appropriate dose and route of administration) iv. Tranexamic acid 1g IV +/- repeat in 30 minutes (must mention first dose and route) v. Urgent O&G for consideration of emergency OT (must mention)

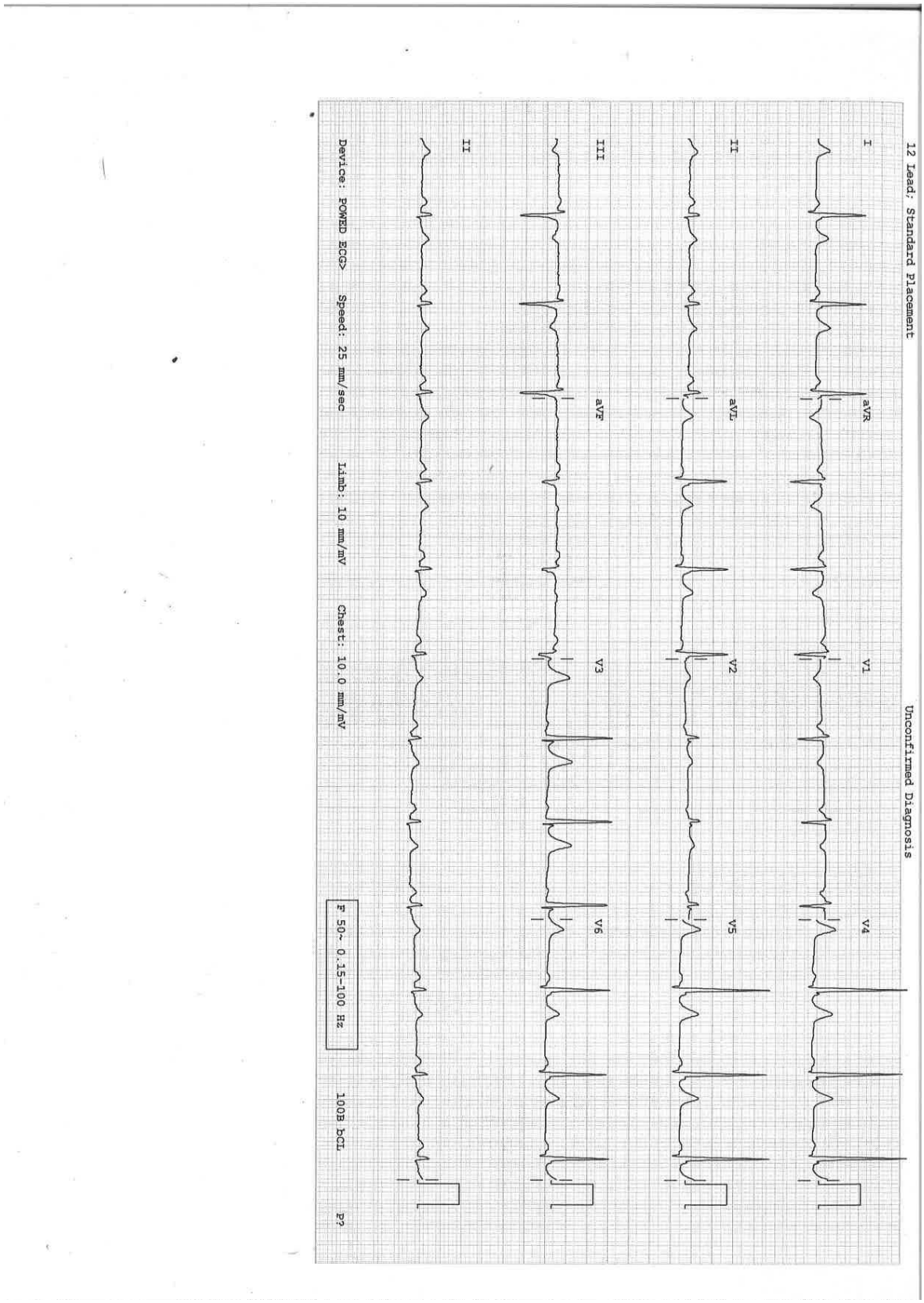
		vi. checking bloods/ examination etc will not be accepted as question specifies *management* priorities not assessment
	2. What are the 4 likely underlying causes for her haemorrhage? (4 marks)	i. Trauma (eg uterine rupture, perineal tear, cervical tear, vaginal tear) ii. Tone (uterine atony due to prolonged labor, increasing parity, multiple pregnancy, polyhydramnios, macrosomia iii. Tissue (retained products of conception, placenta praevia, placenta accrete) iv. Thrombin (DIC, severe pre-eclampsia, placental abruption, sepsis, amniotic fluid embolism) v. Twin
	3. Describe one method of providing external aortic compression for intractable torrential PV bleeding (1)	Downward compression of the aorta using a closed fist placed over a point just above the umbilicus and to the patient's left until femoral pulses are no longer palpable (must mention loss of femoral pulses)/ use of a mechanical external aortic compression device/ non-pneumatic anti-shock garment.

SAQ 8 Cardiology 1

	Question	Answer
A 42 year old man presents to your ED with palpitations. This occurred while he was ocean swimming. The duration was less than 5 mins. He presented today because it is his 3rd episode this week. He has no associated symptoms. He was triaged to the waiting room and you have been asked to review his ECG.	Q1. Describe his ECG (2marks)	• SR • Abnormal QRS – prolonged usually V1-3 • Epsilon wave: a deflection at the end of the QRS : most specific finding • Slow rising slope of the S wave T wave inversion in V1-3 (ECG signs of RV hypertrophy
	Q2. What is the most likely diagnosis? (1mark)	• Arrhythmogenic Right Ventricular Dysplasia
	Q3. What rhythm could have caused his palpitations? (1 mark)	• Paroxysmal ventricular arrhythmia – ectopic • VT – paroxysmal or sustained
	Q4. In his risk assessment, what questions would you ask? (2 marks)	• FHx of sudden unexpected cardiac death in first degree relative • Recurrent syncope (due to malignant ventricular arrhythmias including cardiac arrest)
	Currently, he has no symptoms and no abnormal findings on examination. You speak with your cardiologist who wants to see him in her rooms tomorrow morning. He is reluctant to do so because he has other	• *There is a risk of sudden death (essential)* • There is a risk of malignant ventricular arrhythmias • These are more likely during exercise due to triggering by catecholamine release

	obligations. He wants to know why it is necessary. Q5. What essential information would you need to convey? (2 marks)	• Patients with high risk features of syncope, FHx of sudden cardiac death are likely to require an implantable cardioverter defibrillator • Anti-arrhythmic drugs are used • Some may benefit from radiofrequency ablation of conduction pathways • Untreated, may lead to cardiac failure •
	Q6. What investigations are usually performed and why? (2marks)	• Echo to look for structural abnormalities, specific to ARVD is dilated hypokinetic RV, dilated RV outflow tract • MRI to assess the RV : size, function, fibrofatty infiltration and thinning of the RV myocardium, RV aneurysms, RV dilatation, regional wall motion abnormalities and global systolic dysfunction. •

SAQ 8 Cardiology 1



SAQ 9

	Question	Answer
A 75 year old man arrives by ambulance with epistaxis. He has a blood soaked towel pressed against his nares. His observations in the resus bay: BP 156/99 HR 122 RR 14 SaO2 96%. He speaks in full sentences and able to spit out the blood. While you are talking to him he begins to clear his mouth of large volumes of bright blood. His medications at the end of his bed include clopidogrel and aspirin. You notice active bleeding from both nares. Direct pressure is no longer stemming the bleeding.	Q1. What historical features would make you suspect a posterior bleed? 2 marks	• Age: adult • Associated symptoms: nausea, haemetemesis, haemoptysis
	Q2. What physical findings would make you suspect a posterior bleed? 2 marks	• Bleeding from both nares • Large volumes of blood in the oropharynx • No bleeding found in the anterior part of the nose • Persistent bleeding after anterior nasal packing has been done
You suspect he may have a posterior source of bleeding. The topical vasoconstrictor spray and direct pressure anteriorly have both failed. You cannot see an area of anterior bleeding.	Q3. What are your options in the Emergency Department? 2 marks *Any of the options below. Not accept contact ENT as one of the 2 marks*	• Rapid Rhino 7.5cm to both nares • Foleys catheter size 10,12,14 Fr. Saline to the ballon until it sits against the posterior nasal choana, Anterior traction. Alternative is the Epistat or Storz • Add anterior packing to Foleys catheter • Posterior nasal packing
	What complications can be caused by the methods of haemostasis? 4 marks *Expect local and systemic complications. Accept any combination of local and systemic.*	• Pain and discomfort • Otitis media • Facial sinus drainage obstruction • Pressure necrosis of nasal mucosa and cartilage, nasal ala • Systemic: hypoventilation • Systemic: toxic shock syndrome • Systemic: MI and death due to vagal nerve stimulation, anaemia, recurrent bleeding leading to apnoea with hypoxia, oversedation from analgesia

SAQ 9

SAQ 10 Neurology Seiz Double questions

	Question	Answer
22 female BIBA with status epilepticus following probable drug ingestion at a college party. It has just been terminated by paramedics following a second dose of midazolam IV.	1. List 5 causes for seizures in this patient (5)	• Overdose/drug use -Amphetamines, or non prescribed meds - Citalopram/venlafaxine, TCAs, etc • Biochem abnormalities -Hyponatraemia (sympathomimetics), hypoglycaemia • SAH or other ICH • Infection -meningitis/encephalitis • Any other reasonable differentials - eclampsia, pseudoseizures, epilepsy, heat stroke, extrapyramidal side effects..
She is currently haemodynamically stable, but drowsy. ECG shows sinus tachycardia. You performed an ABG with the following results. pH 7.1 pO2 110 pCO2 40 hCO3- 10 Na 118 K 5.4 Glu 9 Lactate 12	2. Please describe and explain 3 important findings. (3)	• Severe metabolic acidosis, concommitant respiratory acidosis, with hyperlactataemia likely type A, B2, +/-B1 • Likely secondary to seizure (lactate), T2RF 2' to drowsiness (post ictal, BZ, low Na) • Critical hyponatraemia (119), likely drug induced (eg ectasy), though may be post ictal. • Mild hyperK, but relative normo/hypoK when correct for acidosis: 5.4 - 0.6 x3=3.6 • (Had to leave Cl- out of details so they don't calculate AG as I can't get HAGMA to work with the low Na).

SAQ 10 Neurology Seiz Double questions

She starts seizing again.	3. What is your next treatment option and treatment target? (2)	• 3% hypertonic saline 100-150ml +/- rpt in 10 mins if continues to seize • or, 250ml 3% saline /10 mins • To stop seizure and raise Na 3-4mmol/L
	4. You suspect SIADH, what investigation results would help confirm this diagnosis? (3)	• Ur osmol >serum osmolality, (or serum osmol<275, inapprop high Ur osmol), • Ur Na >30 (or similar) • Normal TFTs, cortisol, UECs, LFTs
	5. What likely drug/class of drug might she have ingested? (1)	Sympathomimetics -ectasy, cocaine
	6. Give 5 organ systems that can be affected with use of this? (6)	• CNS-ICH/stroke • Cardiac-arrhythmia/c'myopathy • Rhabdomyolysis • Resp - pneumomediastinum/pneumotx/non cardiogenic APO • Renal-changes in Na, K, creatinine

SAQ 11 BW

A 63 year old male presents with frank haematemesis.

1. Describe what features of the history and examination may suggest the aetiology, starting with what might suggest oesophago-gastric varices as the cause ? (3 points)

2. Complete the following table as it relates to the correction of coagulopathy occurring during acute upper gastrointestinal bleeding. (3 points)

Coagulopathy	**Threshold**	**Management**
Platelets		
INR		
aPPT		
Fibrinogen		

3. Apart from transfusion of blood products and endoscopic management, describe the emergency department treatments available for acute upper gastrointestinal bleeding, and when they might be used. (4 points)

SAQ 11 BW

Answers SAQ 2

1.

- Varices/portal hypertensive gastropathy — alcohol excess, chronic liver disease, spider naevi, jaundice, ascites hepatosplenomegaly, encephalopathy
- Peptic ulcer disease/gastroduodenitis — NSAIDs, previous ulcer, systemic illness
- Mallory-Weiss tear — Excessive retching & vomiting prior
- Stricture/malignancy — Weight loss, dysphagia
- Oesophagitis — Chronic reflux, biphosphonate use
- Aorto-enteric fitula — Previous AAA repair
- Vascular ectasia — Chronic kidney disease
- Malignancy — Cachexia, lymphadenopathy

2.

Coagulopathy	**Threshold**	**Management**
Platelets	< 50 x10 9/L	Platelet transfusion
INR	> 1.5	FFP or PCC if on warfarin
aPPT	> 1.5	FFP
Fibrinogen	< 1.5 g/L	Cryoprecipitate (if low despite FFP)

3.

- PPI – controversial as may mask source bleeding. European society GE recommends infusion before endoscopy
- Terlipressin (or alternative) – suspected variceal – reduces portal pressure by 20%; 2mg four times a day; C/I: arterial disease, hyponatremia, myocardial ischemia, severe cardiac failure, prolonged QT
- Gram negative antibiotic prophylaxis (e.g ceftriaxone) in cirrhotic patients reduces mortality and rebleeding
- Prokinetics – 250mg iv erythromycin 30-120 mins pre-endoscopy to improve visualisation
- Tranexamic acid – role unclear
- Balloon tamponade – variceal bleeding

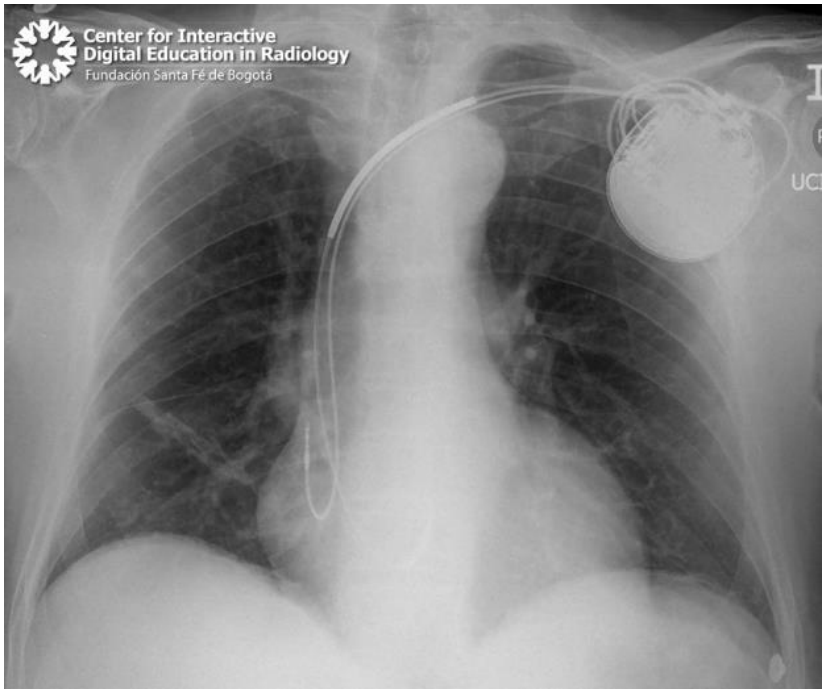
SAQ12

	Question	Answer
A 65yr old male presents shocked with a heart rate of 30bpm and a broad complex QRS on his ECG. His CXR is as follows.	**Q1. Outline your management priorities (6 marks)**	Recognise that leads are misplaced – 'Twiddler's syndrome' 2. Optimise airway and breathing, 15L NRB support with BVM if needed, consider sedation/analgesia to tolerate TCP 3. Rate control: - consider atropine - pacing - electrical (TCP), - chemical (adrenaline 0.05-0.3mcg/kg/min, isoprenaline 1-8cg/min) - optimisation of electrolytes (Ca, K and Mg) 4. Other haemodynamic support as indicated (consider noradrenaline/vasopressin if refractory hypotension and adequate electrical and mechanical capture) 5. Urgent cardiology input regarding repositioning of wires or TJP 6. Evaluation for complications – ischaemic end organ insult 7. Discussion with patient regarding cause and advice re not twiddling PPM. Pass/fail criteria: • Mention of misplaced leads pass/fail • Appropriately detailed chemical vs electrical pacing pass/fail

SAQ12

	Q2 How do you differentiate between failure of output and failure to capture in a paced ECG? (2 marks)	*Failure of output*: no pacemaker spike on ECG (lead failure/movement /oversensing) *Failure to capture*: spike with no subsequent depolarisation (lead displacement, fracture, electrolytes, fibrosis/exit block)
	Q3.What are the effects of a magnet on (i) AICD and (ii) pacemaker function? (2 marks)	(i) AICD switched off (ii) PPM switched to asynchronous mode

SAQ12


Center for Interactive
Digital Education in Radiology
Fundación Santa Fé de Bogotá

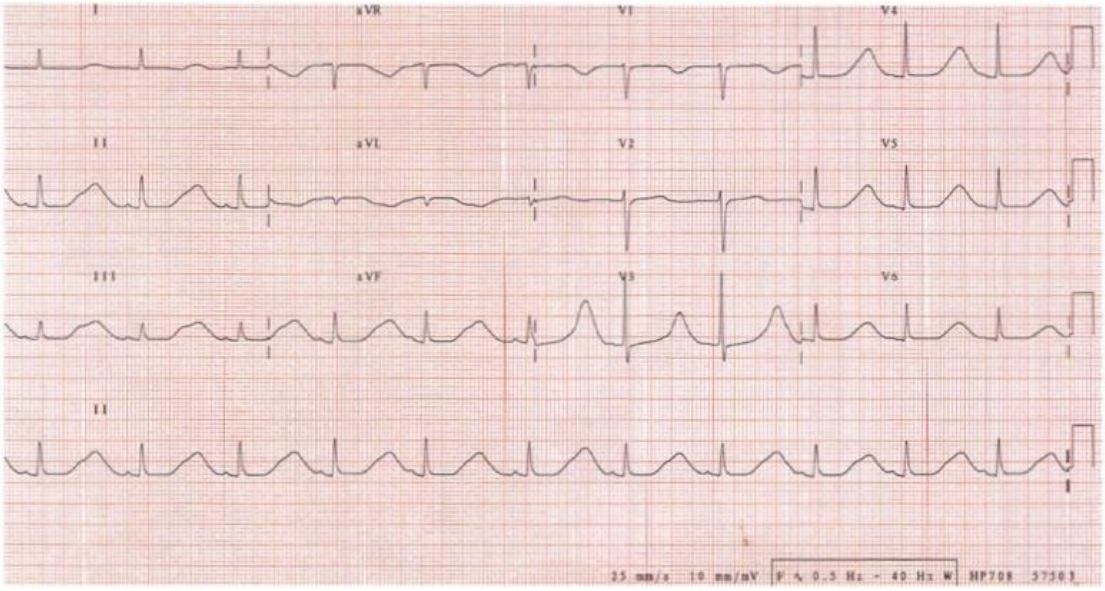
SAQ 13 Resus Paeds Endocrine

	Question	Answer
A 2 year old arrives in the ED with her mother. She has been lethargic for the last 12 hours. She has no significant past medical history. She has no sick contacts. HR 150/min BP 80/50, RR 44 , SaO2 96% on room air. BSL: high. vBG: pH 7.03, HCO3 3 mmol/L. Capillary refill is 2 seconds	Q1. The bedside nurse establishes IV access and asks if you would like an IV fluid bolus. What do you want and why? (2marks)	• Vital signs are not showing decompensated shock • Risk of cerebral oedema in non-judicious fluid administration • NB Acidosis can cause delayed capillary refill and mottling • Rate: maximally 2x maintenance rate at present
	Q2. What is the most serious cause of her altered mental status do you need to keep in mind? (1 mark)	• Cerebral oedema is possible as a complication or a primary cause of the DKA. Eg cerebral infection
While you are writing up her notes, the alarm alerts to the following changes: HR 90/min, BP 140/50	Q3. How will you manage this? (3marks)	• Elevate head of the bed to 30 degress to reduce ICP • Give hypertonic saline 3% or mannitol if she deteriorates • Review her airway patency and ventilation status
Her conscious state deteriorates despite the measures you have taken. You decide to prepare for intubation.	Q4a. You remember that she is severely acidotic with pH of 7.03 HCO3 of 3mmol/L. What is the most significant complication you must prepare for? (1 marks) 4b.What role does the severe acidosis play in this? (2 marks) 4c. How would you prevent/mitigate this? (1 mark)	4a. Cardiac arrest 4b. Severe acidosis predisposes to cardiac arrest Patient's respiratory compensation must be matched to prevent a worsening of the acidosis during the intubation. 4c.Hence must **eliminate the apnoeic phase** in the induction. **Prevent hypoventilation** in the period immediately post intubation. Use the patient's pre-intubation pCO2 as a guide to your ventilation settings.

SAQ 14 Tox 2

Toxicology 2:

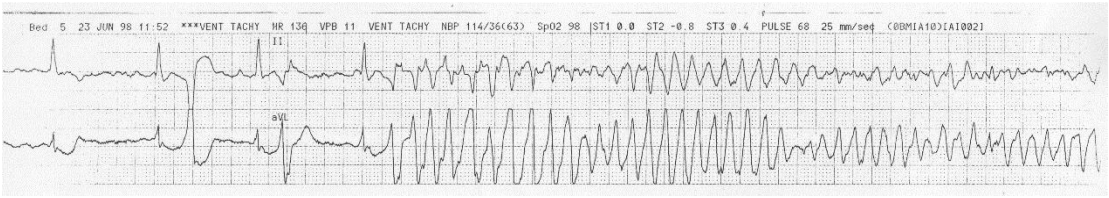
A 26 year old male presents following a polypharmacy overdose. An ECG is obtained, as shown below.



Q1. List 5 *classes* of medications with one appropriate example, that could produce these ECG findings in overdose. (5 marks)

Class	Drug
Antipsychotics	*Amisulpride,*
Antidepressants	*Citalopram, escitalopram*
Antibiotics	*Clarithromycin, azithromycin, erythromycin*
Opioids	*Methadone*
Antimalarials	*Hydroxychloroquine, Chloroquine, mefloquine*
Antiarrhythmics	*Sotalol, amiodarone*

The patient becomes bradycardic, HR 45, and develops the following rhythm on monitor.



Q2. What is this condition and give 4 treatment regime for this condition? (5 marks)

Condition: Prolonged QT and Torsades de pointes.

1. *ACLS & defibrillation as per protocol.*
2. *Magnesium: 2g IV stat followed by infusion*
3. *Maintain K, Mg, Ca within normal range*
4. *Overdrive pacing (will accept each of the individual types of pacing: isoprenaline/transcutaneous/transvenous pacing)*

<table>
<tr><td></td><td>Question</td><td>Answer</td></tr>
<tr><td>A 20yr old female presents with a unilateral throbbing headache and vomiting. She is afebrile, GCS 15 and haemodynamically stable. She states that Google told her she has a migraine.</td><td>Q1. 1. List 4 differentials and 1 discriminating features in each of history/examination findings. (4 marks)</td><td>
<table>
<tr><td>Diagnosis</td><td>Historical feature</td><td>Examination feature</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>Differential Diagnosis</th><th>Symptoms/features</th><th>Clinical Signs</th></tr>
<tr><td>Venous sinus thrombosis</td><td>Pregnant
Recent facial infection</td><td>Chemosis/proptosis
CN palsy (III,IV,V,VI)</td></tr>
<tr><td>Meningo-encephalitis</td><td>Recent infection
Contact with meningitis</td><td>Fever with photophobia</td></tr>
<tr><td>Space Occupying lesion</td><td>Morning headaches
Malignancy history</td><td>Presence of focal neurology
Papilloedema</td></tr>
<tr><td>Intracranial bleed (SAH)</td><td>Thunderclap
Syncope</td><td>Coma/altered GCS on arrival</td></tr>
<tr><td>Idiopathic Intracranial HTN</td><td>Young obese patient
Constant and mild</td><td>Looks well
VFD 50%
Bilateral papilloedema</td></tr>
<tr><td>Tension headache</td><td>Mild
Bandlike</td><td>Normal examination</td></tr>
<tr><td>Migraine Headache</td><td>Unilateral
Prodrome
Known trigger/syndrome</td><td>Photophobia without fever
+/- neurology</td></tr>
</table>
</td></tr>
</table>

		Cluster Headache	Severe/ice-pick Unilateral Ipsilateral autonomic symptoms/nasal congestion	Tearing and chemosis No focal neurological deficits
She has no high risk features for a secondary cause of headache.	Q2. Which investigation do you order? (2 marks)	HCG and BSL Not for CT – CT = fail.		
	Q3. What are four treatment options for migraine with an NNT <5? (4 marks) NB You are not required to list the NNT.	Chlorpromazine (1.7) 25mg in 1L N/Saline Prochlorperazine 12.5mg IM (2.2) Sumatriptan 50-100mg po or 6mg sc (2.2) Ketorolac 30mg IM (2.4) Tramadol 50-100mg IV/IM (2.8) Metoclopramide 10-20mg IV (3.0) ** do **not** need to list NNTs** $MgSO_4$ NNT = 6 (table from Cameron)		

SAQ 16 ID adult

	Question	Answer
47 yr male, Sebastian, presents with increasing headache. His boss called an ambulance when he started to behave strangely. Your intern has initially sent bloods. On her examination, Sebastian had a low grade fever. She felt he was quite "frontal", but he had no lateralising neurology.	Q1. What signs/symptoms may indicate frontal lobe involvement? (3)	Concrete thinking Change in personality/emotional lability urinary incontinence Expressive dysphasia Leg weakness Frontal reflexes: grasp, snout reflex
His partner arrives quite distressed. Sebastian has not been taking his HAART for over a year. He works as a construction worker, and with the early starts, he frequently forgets to take his medication. Sebastian has no other medical problems, and has never taken non prescribed drugs.	Q2. What key investigations would you like to further evaluate this patient? (2)	FBC with diff, CD4 count (+/- viral load -unlikely to change management in next few hours) CTB post contrast Alcohol/UDS CXR: TB/PCP/mets, etc Other reasonable options: UECs -contrast load for CT, LFTs reasonable -HAART meds, abx for a lot of HIV CNS infections are liver excreted
He returns from his CTB.	Q3. Please describe 4 clinically relevant features in his post-contrast CT Brain. (2 marks)	Need to mention ring enhancing, oedema, and at least 2 signs of mass effect
His partner asks about the likely outcome of his current condition.	Q4. What is his likely prognosis post treatment? (3 marks)	Reactivation in immunosuppressed patient is often fatal. Relapse is common and would need 1/2 dose maintanence therapy long term.

SAQ 16 ID adult

SAQ17

	Question	Answer
A 75 year old lady presents with haemoptysis. She has been coughing up bright red blood for a few hours and estimates the volume as 2 cups. PMH includes HTN, and AF and she is taking Apixaban 5mg BD, Metoprolol 25mg BD and Amlodipine 10mg D. On assessment she looks well, BP 156/89, Pulse 72 irregular, CRT < 2 secs, RR 20, Sats 97% on room air and faint crepitations are heard at the left lung base.	Q1 List 2 drugs that can be used to reverse Apixaban in acute bleeding (2 marks) Include the route and dose of each.	IV Tranexamic acid 1g over 15 minutes and 1g over 8 hours IV Prothrombinex 30-50 Units/kg bolus
	Q2. What specific imaging modality is required to try and identify the bleeding site? (1 mark)	CT angiogram chest I.e systemic arterial phase exam because most bleeding is from bronchial/systemic arteries •bleeding from bronchial arteries much more common than from the pulmonary circulation 90% massive haemoptysis is from systemic/bronchial arteries
The patient gradually deteriorates over an hour with ongoing haemoptysis of bright fresh red blood. She remains haemodynamically stable but develops tachypnoea with hypoxia and increasing FiO2 requirements and has widespread harsh crepitations throughout the LEFT lung field. O2 sats are currently 95% on 15L via NRBM. You elect to intubate the patient in ED prior to definitive treatment.	List 4 differences in your approach to intubation in this scenario as compared to a predicted easy intubation (4 marks)	*Predicted difficult airway so any of:* Send for help/ anaesthetics backup Dual suction setup Dual team setup/ prepare for cricothyroidotomy Larger ett than usual: ideally size 8.5-9.0 to allow passage of bronchoscope Not accepting any answers pertaining to intubation of haemodynamically unstable patient

		as this pt is stable, and haemoptysis rarely results in shock before asphyxiation causes death
	<u>What 3 definitive treatment options are available to treat massive haemoptysis? (3 marks)</u>	• BRONCHOSCOPIC •application of adrenaline •balloon tamponade • BRONCHIAL ARTERY EMBOLISATION •most effective non-surgical first-line treatment for severe haemoptysis •stops bleeding initially in 80% •recurrence rate up to 30% • SURGERY (PULMONARY RESECTION) Considered 2nd line after embolisation where appropriate -control of bleeding with IR prior to surgery -failure of embolisation -intra-operative mortality of 20-30%

SAQ 18 Neurosurgery

	Question	Answer
A 43 year old lady presents with a sudden onset of the most severe headache she has ever experienced. The onset was during an exercise class in her gym 8 hours ago. She does not have a history of headaches or migraines. She is normally in good health with no significant medical history. Her only medication is the Oral Contraceptive Pill Her examination is unremarkable. Notably, her GCS is 15 with no neurological deficits.	1. Other than a subarachnoid haemorrhage or sentinel bleed, what other differential diagnoses are there for a thunderclap headache? List 4 (4 marks)	Cerebral Venous Sinus thrombosis Carotid or vertebral artery dissection Giant Cell Arteritis Hypertensive crisis Posterior Reversible Encephalopathy Syndrome Ischaemic stroke Reversible Cerebral Vasoconstriction Syndrome
Her non -contrast CT brain is reported as "no acute intracranial abnormality and no subarachnoid blood is seen". Lumbar Puncture is performed and a traumatic tap is reported with visible blood in the tubes.	2. Her CSF cell count reveals red cells. List 4 features which would make the diagnosis of a bloody tap, rather than SAH more likely (2 marks)	Normal CSF opening pressure Absence of Xanthochromia Ratio of WCC: Red Cells approximately 500-1000:1 Clearing of red cells from first to last tube
MRI with MRA is performed confirming SAH with an 8mm aneurysm within the anterior communicating artery.	3. a. Detail your haemodynamic aim in this situation. (1 mark)	Aim for SBP < 140mmHg
	3 b. What drug therapies, would you use to achieve these goals (2 marks)	• Analgesia: Fentanyl or Morphine in appropriate doses • PO Nimodipine 60mg Q 4 hourly (although this is not it's specific role this is an acceptable answer as it is indicated and will lower BP) • Titrateable IV drug such as SNIP/GTN
	3 c. Why do we aim for this BP endpoint? (1 mark)	SBP > 150mmHg is associated with increased rebreeding rate

SAQ 19 double question

<table>
<tr><th></th><th>Question</th><th>Answer</th></tr>
<tr>
<td>A 23yo man presents to with seven days of diarrhoea and intermittent abdominal pain. The diarrhoea was initially profuse and watery. Currently, it has blood and mucus evident. He complains of weakness.
He is previously well with no co-morbidity and he has not been travelling or had any exposure to vector transmitted disease. He has an accompanying GP referral letter advising that E. Coli has been identified in a culture of his stool.
His vital signs are: BP 120/70 mmHg, HR 100 bpm, RR 20, Temperature 37.8^{o}C.
On examination he has a soft non tender abdomen with hepatosplenomegaly.</td>
<td>Na 144 mmol/L (135 - 145)
K 1.5 mmol/L (3.2 - 5.2)
Cl 110 mmol/L (95 - 110)
HCO3 12 mmol/L (22 - 32)
Urea 24 mmol/L (2.5 -7.1)
Creatinine 480 micromol/L (60 – 110)

Hb 94 g/L (135 - 175)
WCC 16 x 10^9/L (3.6 - 11.0)
Plt 80 x 10^9/L (140 - 400)
Blood film: ‘some schistocytes seen’

Urine SG 1010

Q1. Describe and analyse 4 of the results provided. (8 marks)</td>
<td>
<table>
<tr><th>Describe the finding</th><th>Interpret/analyse the finding</th></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
</table>
- Normal Na/Cl though both towards upper limit likely due to loss of salt and water in diarrhoea with mildly inadequate water replacement.
- Immediately life threatening hypokalaemia causing weakness and risk of arrhythmia.
- Severe lowering HCO3 most likely metabolic acidosis in this setting due to dehydration + renal impairment + critical illness tissue hypoperfusion = mixed acidosis. Anion gap is widened 144+1.5-110-12=23.5
- Severe AKI highly unlikely to be solely pre-renal in well young person with only mild-mod features of dehydration. Urine SG is low which suggests minimal pre-renal cause or loss of renal concentrating capacity.
- Low Hb could be due to blood loss but this would be rare in a dysenteric picture, clinical picture in keeping with HUS and haemolysis, confirmed by schistocytes.
- Elevated WCC and low grade fever in keeping with infectious illness precipitant.
- Low Plt unlikely clumping, likely plt consumption in HUS from small vessel deposition.
</td>
</tr>
<tr>
<td></td>
<td>Q2. What is the MOST LIKELY one underlying diagnosis that explains all his results. (2 marks)</td>
<td>Haemolytic Uraemic Syndrome (OR Thrombotic Thrombocytopaenic Purpura OR Microangiopathic haemolytic anaemia).</td>
</tr>
</table>

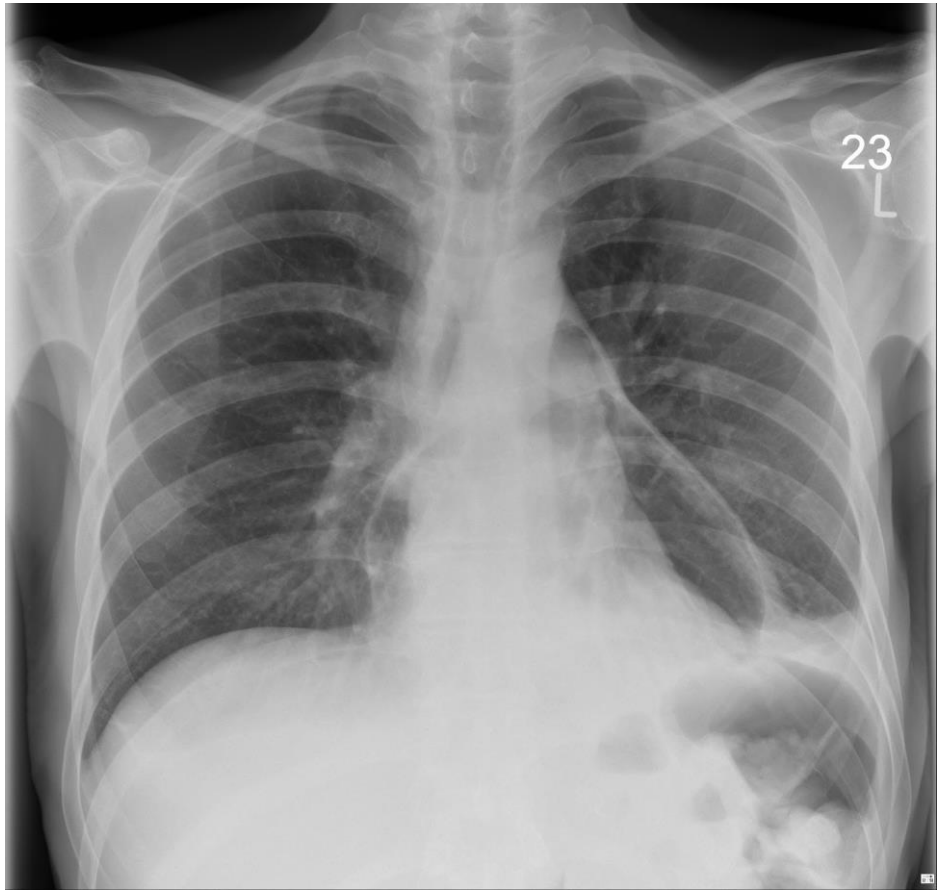
SAQ 19 double question

	Q3. What is his single immediately life threatening problem. (1 mark)	Critical Hypokalaemia
	Q4. List three ECG changes that he is likely to have. (3 marks)	- Voltage: Low voltage QRS and T - Baseline: ST sagging - Conduction: Long PR and QT. - Wave shape: Prominent p and u waves
	Q5. State the initial drug treatment for the immediately life threatening problem you have identified in Q3. Please include the route, dose, risks and benefits. (5 marks)	1. Route: Life threatening hypokalaemia requires IV potassium at concentrations and rates unsafe for peripheral use so he will need a PIC or central line with ECG monitoring. (1) 2. Dose: The initial replacement rate should be between 20-40mmol hourly depending on the degree of ECG changes, rhythm anomalies, and muscle weakness. Rate titrated to hourly repeat serum K. An initial rate of 40mmol for the first hour at least would be prudent due to the critically low level and high risk of arrhythmia due to concurrent illness and acidosis. (2) 3. Risks: Risk is arrhythmia from replacement which is much lower than hypo-K risk of arrhythmia. Other risks relate to line placement, PIC would be safer as thrombocytopaenic and may have coagulopathy. (1) 4. Benefit: Reduction in risk of cardiac arrest, weakness/paralysis, rhabdomyolysis. (1)
	5. List the two most important specialty services required for his immediate care. (1 mark)	Intensive care and Renal – needs cardiac monitoring, 1:1 supervision, quite likely to need dialysis.

SAQ 20 Trauma major chest

	Question	Answer
A 20 yr old male presents with pleuritic chest pain after a motocross accident. Vital signs are as follows: RR 35 SpO2 97% RA HR 110 BP 120/75 Temp 37.4` CXR is reproduced below.	**Q1.Identify the two most important Xray findings that has a bearing on his outcome. (2 marks)**	- Pneumopericardium - Left haemothorax **Cannot pass the question if includes answers such as the ones below.** - Cardiac silhouette not enlarged - No evidence of pneumothorax
Shortly after his CXR he becomes acutely more dyspnoeic, hypotensive and tachycardic, although still has equal air entry bilaterally.	Q2. **What is the cause? (1)**	Tension pneumopericarium
	Q3. **What procedure does he require? (1)**	Decompression pericardiocentesis
	Q4. Outline the steps in performing this procedure (6)	• Cardiac monitoring, prep and drape if time • Ultrasound guided • subxiphoid approach with long 18-22 G needle attached to syringe • insertion: between xiphisterum and left costal margin • direct towards the left shoulder at 40 degree angle to skin • continual aspiration as needle approaches RV • STE or VEBs on monitoring signals ventricular contact • once pericardial fluid/air aspirated, can insert cannula into pericardial space • attach a 3 way tap and remove fluid/air with improvement in haemodynamics

SAQ 20 Trauma major chest



SAQ 21 Haematology SCD

	Question	Answer
It is a busy winter evening in the ED. A 38 year old woman with sickle cell disease present to your ED with chest pain. She is not on regular medications. She has had her pneumovax. The chest pain started 2 days ago. She has been taking regular paracetamol with no relief. She thinks she might have picked up a virus from her daughter. On examination: HR 100/min, BP 128/80, RR 20, SaO2 98% RA, Temp 37C.	Q1. What are your management priorities at this stage? (3 marks)	Pain management - Treat hypovolaemia if present - Seek an infection - Seek anaemia if present to improve oxygen carrying capacity
She apologies for wasting your time and wants to self-discharge. You are unable to persuade her to stay. She returns the next day. Her pain is much worse and not manageable with the Panadeine Forte she has at home. Her vital signs: HR 100/min, BP 110/60, RR 24/min., SaO2 92% RA, Temp 38C.	Q2. What are your management priorities now? Please provide a rationale for your answers (4 marks)	1.Supplemental oxygen: SaO2 > 95% . To reduce sickling 2.Analgesia: likely to need opiates, parental or oral 3. Empirical antibiotics for infection: wide spectrum. Use cephalosporin and an oral macrolide 4. Blood transfusion if the Hb is more than 1g/L below her baseline. Rationale is to increase the oxygen carrying capacity
Within 20 mins of seeing her, the nurse calls you back to the bedside as her SaO2 now drops to 90% despite being placed on a non-rebreather mask. Her RR has increased to 28/min. She complains of severe chest pain and the endone is not working.	Q3. What is your management? (3 marks)	1. Pain management: start a PCA with IV fentanyl 2. Increase the FIO2 without intubation. NIV starting from HFNP, BIPAP with high EPAP to increase alveolar recruitment 3. Discuss with haematologist regarding her deterioration and the need for urgent exchange transfusion (Refer to ICU for admission)

SAQ 22 Blood Gas/Coma Resus

Blood gas/Coma Resus question.

You are the consultant in charge of an evening shift at the ED of a small urban district hospital. There is no anaesthetist or anaesthetic registrar on-site. A 47 year old man is brought in by ambulance after he was found drowsy and stumbling by a road. Triage category was 3, and at triage observations were in normal range, GCS was 14, and he was mildly combative.

A resident asks you to urgently review the patient about 25 minutes later because his GCS has fallen to 4. The electronic medical record indicates a history of schizophrenia treated with olanzapine, and no other relevant history. The only other feature of note in the presentation is the presence of two empty boxes in the patient's belongings of a combined paracetamol 500mg & ibuprofen 150mg per tablet preparation. There are 60 tablets missing from those boxes. No-one has been able to contact family, friends or next-of-kin.

Observations are:
T 36.2
HR 106
BP 120/70
RR 24
SpO2 97% on room air

Examination reveals man of normal BMI, approximately 75kg, with:
- Clear airway with nothing to suggest a difficult intubation
- Equal air entry with no added sounds
- Dual heart sounds and normal signs of perfusion
- Pupils equal and reactive at 4mm, normal tone, a flicker of movement only to pain, and no vocalization or eye opening. You confirm GCS is 4.
- Normal skin warmth and moisture. Present bowel sounds
- No sign of injury aside from the reduced GCS.

You obtain:
- An ECG, which shows sinus tachycardia with marginally prolonged QTc and no other concerning features
- His VBG is below:

Venous Blood Gas

pH	6.82 (7.3 – 7.4)
PO2	36 mmHg
pCO2	22 mmHg (40 – 50)
02 Saturation	32%
Actual bicarbonate	4 mmol/L (22 – 32)
Base Excess	< -30 mmol/L (-3 – 0.3)
Blood Gas Sodium	138 mmol/L (136 – 146)
Blood Gas Potassium	2.9 mmol/L (3.7 – 4.7)
Blood Gas Chloride	118 mmol/L (101 – 110)
Blood Gas Ionized Ca	1.28 mmol/L (1.15 – 1.30)
Blood Gas Lactate	1.68 mmol/L (0.0 – 2.0)
Blood Gas Glucose	6.8 mmol/L (3.5 – 5.4)
Blood Gas Haemoglobin	139g/L (130 – 170)

SAQ 22 Blood Gas/Coma Resus

a. Interpret this blood gas.

……..

……

……

……

……

……

……

……

(3 marks)

b. Describe your four most serious concerns with regard to support of the airway and breathing of this patient.

i. ……

……

ii. ……

……

iii. ……

……

iv. ……

……

(2 marks)

c. Outline your approach to the management of the airway and breathing of this patient.

……..

……

SAQ 22 Blood Gas/Coma Resus

……

……

……

……

……

……

……

……

……

……

……

……

(5 marks)

SAQ 22 Blood Gas/Coma Resus

Answers

a. Interpret this blood gas.

- There is a life-threating **metabolic acidosis**
- There is **partial respiratory compensation**, which is actually surprisingly good for GCS 4. [This can be determined by inspection. The maximum possible respiratory compensation would be to breathe down CO2 to around 5-10 mmHg, and this patient has CO2 of 22.]
- There is a **high anion gap.** [The exact number depends on the formula used. Using Anion Gap = Na+ – (Cl- + HCO3-) gives a gap of 16 compared to a normal range of 4-12.]
- Delta ratio:
  Increase in anion gap = 16-8 = 8 (or similar depending on formula used)
  Decrease in Bicarbonate = 24-4 =20
  Delta ratio = 8/20 = 0.4
  So there is a co-existing **normal anion gap metabolic acidosis**
- There is **severe hypokalaemia**
- The HAGMA could be caused by a **massive ibuprofen overdose** or an unknown co-ingestant
- The NAGMA and hypokalaemia could be due to a **massive paracetamol overdose** causing a renal tubal acidosis

Marking: Half a mark for each of the above, or anything else sensible and notable, to a total of 3. Candidates must mention metabolic acidosis and partial respiratory compensation to get any marks. To get full marks, candidates must mention HAGMA, delta ratio, potassium, and a sensible likely cause.

b. Describe your four most serious concerns with regard to support of the airway and breathing of this patient.

- The precipitous fall in GCS is a strong indication for early intubation for airway protection
- Critically severe acidosis causes myocardial depression and is a risk for arrest during intubation especially if normal doses of induction agents are used
- Severe hypokalaemia is a (relative) contraindication to use of sodium bicarbonate to treat the acidosis
- The patient has quite good partial respiratory compensation for the acidosis given their GCS; their survival depends on preserving or enhancing the respiratory compensation

Marking: half a mark per point, or any other reasonable answer (but must be a serious concern).

c. Outline your approach to the management of the airway and breathing of this patient.

In resus with cardiac, spO2 and etCO2 monitoring.

Summon any available and necessary staff to assist.

There are at least 3 reasonable intubation approaches:

- Modified RSI, with a low dose of induction agent (e.g. ketamine 10-30mg), and minimal apnoea: i.e. vigorous bagging the patient after paralysis, after intubation, and whenever re-bagged.
- Non-paralyzed “awake” or “cold” intubation with minimal or no sedation, and optionally topical treatment of the airway with lignocaine spray or co-phenylcaine
- “Delayed sequence intubation” using minimal or no sedation and either BiPAP or LMA + pressure support to increase respiratory compensation while:

- Calling the most experienced intubator possible
- Loading with potassium
- Placing an art line
- Re-checking ABG and considering a bicarbonate load if potassium is increasing

Before proceeding with one of the above approaches

Whatever approach is used, post-intubation care must be addressed, specifically maintaining respiratory compensation with:

- Maintenance of the current resp rate (24) or similar
- Appropriate tidal volume or pressure supports
- Frequent ABG monitoring

and appropriate sedation as necessary.

Marking (out of 5):

To get full marks, candidates must address:

- Preparation
- Use of bicarbonate (must be mentioned as considered either in part b or c even if not used)
- An appropriate intubation strategy as above
- Maintenance of respiratory compensation during intubation
- Maintenance of respiratory compensation after intubation
- ABG monitoring after intubation
- Post-intubation sedation

Auto-fails:

i. Failure to appropriately address maintenance of respiratory compensation is a critical fail (no marks for the whole question).

ii. To get any marks for part c, candidates must:

- Not use a normal dose of an induction agent (more than 50mg of propofol, ketamine or equivalent) without using an inotrope.
- Not bolus sodium bicarbonate without mentioning potassium. A small bolus of bicarbonate is not necessarily wrong, but candidates must then indicate they understand the (potentially fatal) effect it will have on the potassium level.
- Describe reasonable ventilator settings post intubation.

SAQ 23 Minor trauma Orthop

	Question	Answer
A 48 year old woman presents to your ED due to a swollen foot. Her left foot was entangled in a pile of rubbish in the garden. Immediately after the fall, she noted the foot swelling up and she has not been able to weight-bear since. On examination, she has bruising on the sole of her foot with marked swelling of her midfoot. Here is her Xray.	Q1. What is the diagnosis and what radiological features support your answer?(3 marks)	• Lisfranc fracture dislocation : tarso-metatarsal joint fracture/dislocation with disruption of ligaments • AP view shows widening of the joint between the base of the first and second metatarsals • Fracture line through the medial aspect of the base of the 2nd metatarsal • The medial aspect of the 2nd metatarsal does not align with the medial aspect of the middle cuneiform
	Q2. What limb threatening complication may occur acutely? (1 mark)	• Compartment syndrome of the foot
	Q3. What management would you initiate in the ED? (2 marks)	• Non-weight-bearing posterior back slab for immobilisation • Elevation of the leg
	Q4. What are the admission criteria for this injury? (4 marks)	• Need for specific treatment : urgent surgical intervention for displacement > 2mm at the LIsfranc joint • Need for non-specific treatment: Unmanageable pain • Other significant injury requiring admission • Needs treatment or observation for complication(s): signs suggestive of compartment syndrome: paraesthesia, hyperesthesia in the first dorsal interspace due to compression of the anterior tibial nerve.

SAQ 23 Minor trauma Orthop

SAQ 24 Tox 3

A 17-year-old female presents following an overdose of venlafaxine and moclobemide. She presents 3 hours after ingesting 20 x 37.5 mg venlafaxine (Efexor) and 10 x 300 mg of moclobemide (Aurorix). She has previously taken an overdose of fluoxetine, but has no other medical history.
She is very anxious and agitated with an obvious fine tremor. She is diaphoretic with the following observations: HR 125; BP 140/90; Temp 37.3. What is the most likely diagnosis?

Q1. What is the most likely diagnosis? (1 mark)

Serotonin syndrome

Q2. In order to recognise this condition, what 3 body systems are likely to be involved? (3 marks) Provide at least 2 clinical features of each system mentioned (6 marks)

Systems	Clinical Features
Autonomic	tachycardia, hypertension, mydriasis, diaphoresis, hyperthermia
Neuromuscular	Tremor, ocular clonus, rhabdomyolysis, hyper-reflexia, clonus, myoclonus.
CNS	Agitation, delirium, coma, seizures.

SAQ 25 Paeds

Paediatrics

A 13 month old boy has been brought to your district ED with burns to his feet. Mum reports that he was attempting to get into the bath with his older sister and burnt himself. The only injuries found are shown below.

1. <u>Describe the abnormalities seen in the photograph (2), estimating % TBSA (1) (total 3 marks)</u>
    - Bilateral superficial partial thickness burns visible on dorsum of feet, bilateral distal 1/3 (or ½) of lower legs
    - Either mention some de-roofed blisters over toes, or the fact that it crosses joints
    - ~2 x 1% feet
    - Entire legs are ~14% each, ~ ¼ or 1/5 of these are 2 x 3% = 6%
        - ⇨ 2% + ~6%, so approx. 8% TBSA

    <u>2. List 6 indications for a Burns Centre referral (3)</u>
    (Must mention examples from different categories)
    - Specific **regions**: facial /genital /hands /feet
    - Specific **types**: electrical /chemical /lightning
    - Associated significant significant **trauma**
    - Circumferential /risks of compartment syndrome
    - **NAI**
    - Inhalational injury

- **%TBSA** 5% child, 5% full thickness, 10% partial thinkness adult
- Over joints

3. What features about this child's injury are concerning? (4)

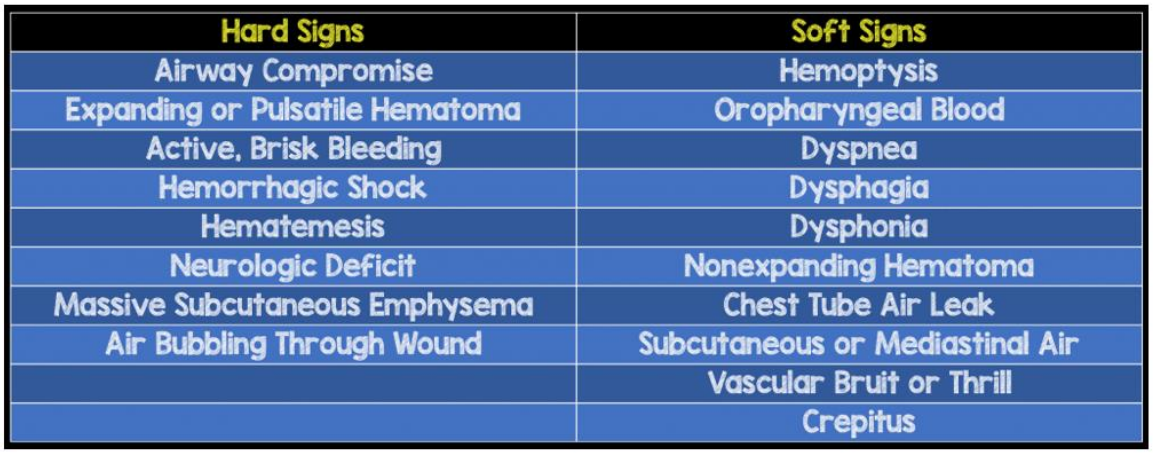
- This is an immersion injury: symmetrical, bilateral, even depth throughout without splash marks
- Mechanism is not consistant with the history given
- Mechanism is not consistant with the motor development of a 13 month old (cannot get into bath himself, or if he did, there would be splash marks)
- Delayed presentation –days ago, this is not a fresh burn

SAQ 26 Respiratory 2 PHT

	Question	Answer
A 65 year old NESB woman is brought in by ambulance. She complains of increasing dyspnoea. These are her findings on arrival: HR 175 – Atrial fibrillation BP 82 on palpation RR 21 SaO2 88% RA Temp: 37C You find sidenifil and apixiban in her medications. You suspect she may have underlying pulmonary hypertension. On examination, she has signs of right heart failure. Her lungfields are clear. She is peripherally shut-down.	Q1. What are the common causes of pulmonary hypertension? Name 3 causes (3 marks)	• Secondary to left-sided valvular heart disease or LV disease leading to raised LA pressure – back pressure to cause increased pulmonary vascular resistance • Secondary to chronic lung disease – chronic hypoxia • Secondary to thromboembolic disease – 4% of patients develop PH after an acute E • Secondary to medications/drugs: amphetamines, desfenfluramine • Primary causes: congenital heart disease with systemic-pulmonary shunts, CTD
She is alert and cooperative. She is able to speak to you.	Q2. What is your immediate management? Please provide an explanation for your actions. (2 marks)	• Prevent hypoxia as this will increase the pulmonary vascular resistance. Provide supplemental oxygen. SaO2 > 90%. Don't use PPV in already hypotensive patient • Rate control - as she is reliant on the atrial kick to maintain her cardiac output. Cardioversion should be attempted. Do not use BBlocker because of its negative inotropic effects – can cause cardiogenic shock

She is now in sinus rhythm with a rate of 90/min. Her BP is 120/90.	Q3. List the priorities in her management and provide the rationales for your answers (5 marks)	• Ensure she is not hypoxic – give supplemental oxygen to SaO2 > 92%. Reduces RV afterload. Avoid NIV/PPV. Use lung protective measures if you must intubate. Avoid permissive hypercarbia
		• Maintain SR – reliant on atrial kick for cardiac output
		• Optimise RV preload – to prevent RHF. 2 groups: volume overload – distended IVC – cautious diuresis. Volume depleted – cautious fluid boluses, slow and low volumes/aliquots. Repeat IVC. Do not keep maintenance fluid going.
		• Medications to support RV contractility – use inotropes
		  ○ Dobutamine is first line because selective B1 agonist. Can cause hypotension because of B2 agonist action leading to systemic vasodilation.
		  ○ Milrinone is second line for RV contractility. It increases cAMP, hence increases intracellular Ca. Also causes hypotension in high doses
		Must support mean arterial BP.
		  ○ No perfusion of RCA if PVR is > SVR
		  ○ Noradrenaline is the drug of choice
		  ○ A 1and 2 increases SVR, increases RV contractility and cardiac output
		  ○ High doses can cause vasoconstriction

SAQ 27 Trauma major

	Question	Answer
You receive a bat-call that you are about to receive a 17yo male who has been stabbed in the neck. His vital signs are: RR 26, HR 125, BP 120/75, GCS 13. He is combative. He has subcutaneous emphysema overlying a wound on the left side of his neck.	1.What are the anatomic landmarks for the zones of the neck? (3 marks)	Zone 1: Clavicles/Sternum to cricoid cartilage Zone 2: Cricoid cartilage to angle of mandible Zone 3: Angle of mandible to base of skull
	2. List 3 hard signs of major aerodigestive or neurovascular injury. (3 marks)	
	3. What is the significance of the hard signs in terms of need for disposition +/- imaging? (1 mark)	A patient with hard signs of injury should be taken directly to the operating theatre for surgery. Do not delay this by getting imaging. Delays should only occur to secure the unstable airway.

SAQ 27 Trauma major

	4.The surgical team wants some form of imaging prior to a definitive surgical plan. What imaging modalities are appropriate for this injury? Provide a rationale for each as you are concerned that he may deteriorate rapidly as his injury is time-critical. (3 marks)		Imaging Modality	Rationale	
			CXR	PTX, HTX, pneumomediastinum	
			CTA neck	Vascular injury, soft tissue injury	
			Contrast oesophagram, gastrograffin swallow / endoscopy	Oesophageal injury	