

Question One

You are called to review a 5-year-old child on the paediatric ward. He had a tonsillectomy 4 hours ago and has been coughing up blood for the last hour.

This is an important emergency situation and the key points include:

- *Managing the frightened child with anxious parents*
- *Assessing and managing hypovolaemia: It is crucial to ensure adequate resuscitation before inducing anaesthesia for surgical arrest of bleeding.*
- *The patient will have a full stomach: They may have been fed post-operatively and certainly will have swallowed blood*
- *Residual physical and potentially psychological effects of the anaesthetic earlier that day*
- *Anticipated difficult intubation – bleeding and airway oedema from the previous intubation and surgery*
- *Blood transfusion may be required so blood samples and time to cross match will be needed*

a) List five physiological indicators that would help you estimate the degree of blood loss in this child (5 marks)

- Heart Rate
- Pulse volume and character
- Capillary Refill Time
- Skin colour (mottling, pallor, peripheral cyanosis)
- Blood pressure ($80 + (2 \times \text{age in years})$) *although hypotension is a late sign*
- Postural hypotension *Although this will be difficult to measure in a frightened shocked child*
- Level of Consciousness
- Lost or absent post-operative urine output
- Core:Peripheral temperature difference - *greater than 2°C is a sign of poor skin perfusion*
- Respiratory rate - *may be elevated as a compensatory mechanism for hypovolaemic metabolic acidosis*

b) Why might you be likely to under-estimate the degree of blood loss? (1 mark)

- Bleeding will be hidden as most will have been swallowed so looking at the amount of blood coughed up or vomited with lead to inaccuracy

After a period of resuscitation on the ward, it is decided that the child should return to theatre for surgical arrest of post-tonsillectomy bleeding.

c) List two methods of induction of anaesthesia for this patient, stating in each case the most appropriate position of the child for the technique (4 marks)

Technique 1: Rapid Sequence Induction (*with Cricoid Pressure*)

Position of the Child: Supine Position

Technique 2: Inhalational Induction

Position of the Child: Head-down and left-lateral position

The child's mother would like to accompany him to theatre as she was present during induction of anaesthesia for the original operation earlier in the day.

d) List two practical things that would be important to tell her before commencing induction of anaesthesia (2 marks)

- It is very likely to be a different experience to earlier in the day.
- She will be asked to leave much quicker than before after induction of anaesthesia
- There will be strict preoxygenation
- Explain cricoid pressure
- Explain the position of the child during induction of anaesthesia
- Explain that there will likely be more people present in the anaesthetic room

e) List two precautions that should be taken prior to induction of anaesthesia to reduce the risk of airway complications specific to this scenario and in excess of standard precautions taken during induction of anaesthesia? (2 marks)

- There should be two suction devices in case one becomes blocked with a clot
- Preparation should be made for a difficult intubation and airway oedema: *(a variety of laryngoscope blades and tube sizes and rescue supraglottic airway devices should be immediately available.)*
- An ENT surgeon and scrub nurse should be scrubbed and prepared to perform a tracheostomy (or otherwise obtain front of neck access) should the need arise

Videolaryngoscopes may be of limited use as their optics may be obscured by active bleeding so this cannot be accepted as an answer.

f) How might you prepare for further blood loss in theatre? (4 marks)

- Ensure presence of appropriately experienced staff: consultant anaesthetist and surgeon, experienced ODP and scrub team, multiple people to assist (IE: a second anaesthetist and ODP if available)
Maximum of one mark for naming appropriate staff who should be present
- Ensure appropriate reliable IV access in-keeping with the size of the child
- Pre-operative FBC, clotting and cross match should be sent
- The ability to rapidly infuse warm fluids, blood and blood products should be available
- Good communication and planning with the surgical team is essential - *as you won't be able to assess intra-operative blood loss externally*

g) What intraoperative steps could the surgeon take to help prevent pulmonary aspiration of blood following emergence from anaesthesia? (2 marks)

- *One mark for:* Ensure meticulous haemostasis at the end of surgery *or* Suctioning of the oropharynx
- Insertion of a gastric tube and suctioning of gastric contents (swallowed blood)

Question Two

- What is haemophilia A and how is it inherited? (2 marks)
- What is the laboratory definition of severe haemophilia A? (2 marks)
- In 'severe' haemophilia, what types of bleeding episodes might a patient present with? (3 marks)

A primigravida carrier of haemophilia A presents for induction of labour at 39 weeks gestation with symptoms of severe pre-eclampsia. She is requesting an epidural.

- What blood tests are indicated to assess bleeding risk in this patient, and what are the thresholds for these tests at which neuraxial block would be considered normal (low) risk? (5 marks)

The haematologist has suggested desmopressin might be useful to decrease bleeding risk.

- How does desmopressin decrease bleeding risks and how is it administered? Why might it be contraindicated in this patient? (7 marks)
- What other pharmacological drugs can decrease bleeding risk in haemophilia A? (1 mark)

Syllabus	OB_IK_01 Recalls/describes the influence of common concurrent medical diseases on pregnancy
Question type	Easy: pass mark 14
Topic	Bleeding disorder (in pregnancy)
Aim	Understanding of pathophysiology, effects and management of haemophilia A
Pass requirements	Must know definitions, symptoms, resulting blood test derangements which would impact on neuraxial block insertion, pharmacological treatments

Qn	Answer	Marks	Guidance
A	FVIII deficiency X linked	1 1	
B	Severe: FVIII <0.01 IU/ml	2	Must have units
C	Spontaneous bleeds Into joints and muscles	2 1	Accept either location, or both
D	Platelet count > 100 x 10 ⁹ /L INR < 1.5 APPT-R < 1.5 FVIII > 0.5 IU/ml	1 1 1 2	
E	Increases levels of FVIII levels Increases levels of vWF Improves platelet function Intranasal or subcutaneous Intravenous Contraindicated due to risk of uteroplacental vasoconstriction (CI in PET) Increases fluid retention (CI in PET)	1 1 1 1 1 1 1	Accept either for this mark Relative CI due to this patient having PET – this must be mentioned as part of the reason in this patient
F	Tranexamic acid	1 mark	

Question Three

You have been asked to speak to a 34-year-old primigravida in the joint obstetric-haematology clinic as she suffers from Type 2 von Willebrand disease

a. How is von Willebrand disease (VWD) diagnosed and what complications does it cause? (2 marks)

b. Complete the table classifying types of VWD. (4 marks)

Type	Type of deficiency	Inheritance
Type 1		
Type 2		Usually autosomal dominant
Type 3	Complete quantitative	

c. What blood tests are specifically indicated in VWD for monitoring the course of disease and what levels of these are targeted around the time of delivery? (4 marks)

d. What therapeutic options might be used to reduce risks around the time of delivery and how do they work? (7 marks)

e. In the case of severe disease, what will you advise about labour analgesia options? (3 marks)

Syllabus	OB_IK_01 Recalls/describes the influence of common concurrent medical diseases on pregnancy
Question type	Moderate: pass mark 13
Topic	Bleeding disorder (in pregnancy)
Aim	Understanding of pathophysiology, effects and management of von Willebrand disease
Pass requirements	Must know definitions, symptoms, resulting blood test derangements which would impact on neuraxial block insertion, pharmacological treatments

Qn	Answer	Marks	Guidance												
a	vWF < 0.3 IU/ml Bleeding tendency	1 1	Need units for mark												
b	<table border="1"> <thead> <tr> <th>Type</th> <th>Type of deficiency</th> <th>Inheritance</th> </tr> </thead> <tbody> <tr> <td>Type 1</td> <td>Partial quantitative</td> <td>Autosomal dominant</td> </tr> <tr> <td>Type 2</td> <td>Qualitative</td> <td>Usually autosomal dominant</td> </tr> <tr> <td>Type 3</td> <td>Complete quantitative</td> <td>Autosomal recessive</td> </tr> </tbody> </table>	Type	Type of deficiency	Inheritance	Type 1	Partial quantitative	Autosomal dominant	Type 2	Qualitative	Usually autosomal dominant	Type 3	Complete quantitative	Autosomal recessive	4	1 mark for each item as written; Type 1 only give mark if 'partial' written
Type	Type of deficiency	Inheritance													
Type 1	Partial quantitative	Autosomal dominant													
Type 2	Qualitative	Usually autosomal dominant													
Type 3	Complete quantitative	Autosomal recessive													
c	FVIII:C (FVIII coagulant) and vWF activity should each be > 0.5IU/ml around delivery	4	1 mark each for each test and 1 mark each for correct target level												
d	<ul style="list-style-type: none"> Desmopressin – improves FVIII and VWF levels (variable response in Type 2 VWD though, may worsen) Tranexamic acid – prevents fibrinolysis by plasmin Factor concentrates/vWF containing concentrates/FVIII concentrates – improve levels of vWF Platelet transfusions – improve VWF levels (as 10% is contained in platelets) 	1+1 1 1+1 1+1	Only give mark for tranexamic acid if mechanism is correct (accept 'prevents fibrinolysis') (10% not required for marks)												
e	<ul style="list-style-type: none"> Entonox is OK to use Remifentanil PCA is good option 	1 2	(IM injections should be avoided Epidural contraindicated in Type 2 and Type 3 or severe Type 1												

Question Four

A 55 year-old female presents with severe stabbing pain over her right cheek, which occurs when she is touching her face, or brushing her teeth.

Examination reveals hyperalgesia and allodynia over her R cheek, with no facial weakness and normal reflexes.

Q1: What is the most likely diagnosis? (1)

Q2: What is the cause of this condition? (2)

Q3: What are 3 differential diagnoses? (3)

Q4: What autonomic symptoms might occur? (2)

Q5: Describe the anatomical course of this cranial nerve (4)

The patient is initially prescribed Carbamazepine 200mg BD

Q4: What is the mechanism of action of this drug? (1)

Q5: What patient monitoring is needed for this drug? (3)

Q6: Name two further drugs that are used as adjuncts for this condition? (2)

The patient fails to respond to pharmacological management, and her symptoms are significantly affecting her quality of life.

Q7: What surgical/interventional options are available? (3)

Q1: What is the most likely diagnosis? (1) *Classic Trigeminal Neuralgia*

Q2: What is the cause of this condition? (2) *Neurovascular compression of the trigeminal root*

Q3: What are 3 differential diagnoses? (3) *Multiple Sclerosis, Giant Cell Arteritis, Cluster headaches.*

Q4: What autonomic symptoms might occur? (2) *Conjunctival tearing, conjunctival redness, rhinorrhoea*

Q5: Describe the anatomical course of this cranial nerve? (3) *Arises at lateral pons, the ganglion lies in the trigeminal fossa/meckels cave, then branches off as maxillary, mandibular and ophthalmic*

The patient is initially prescribed Carbamazepine 200mg BD

Q4: What is the mechanism of action of this drug? (1) *Sodium channel blocker*

Q5: What patient monitoring is needed for this drug? (3) *FBC, LFT, UEs*

Q6: Name two further drugs that are used as adjuncts for this condition? (2) *Gabapentin, pregabalin, levetiracetam, lamotrigine, baclofen, botox*

The patient fails to respond to pharmacological management, and her symptoms are significantly affecting her quality of life.

Q7: What surgical/interventional options are available? (3) *Microvascular decompression, stereotactic radiosurgery to the root, ganglion or branch, fluoroscopic-guided radiofrequency or glycerol ablation or balloon compression.*