

Hematomorph

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FRCPath Haem Part 2 Sessions

Haemostasis and Transfusion-Autumn 2026

Haemostasis Case 1: 10mins and post your answer in group

A 34-year-old man presents to the emergency department with progressive abdominal distension, right upper quadrant discomfort, and early satiety for two weeks. On examination, he has mild splenomegaly and shifting dullness suggestive of ascites. There are no stigmata of chronic liver disease.

CT abdomen with venous phase imaging demonstrates extensive portal vein thrombosis extending into the splenic vein, with partial superior mesenteric vein involvement. The liver appears non-cirrhotic.

Test	Result	Reference Range
Hb	182 g/L	130–170
Hct	0.56	0.40–0.50
WBC	$12.8 \times 10^9/\text{L}$	4.0–11.0
Platelets	$620 \times 10^9/\text{L}$	150–400

1. What are the differential diagnoses and predisposing causes of portal vein thrombosis in a young patient without cirrhosis?
2. What additional investigations would you request to evaluate the underlying prothrombotic disorder and extent of disease?
3. Outline your haemostasis management plan for this patient.
4. The patient is commenced on LMWH followed by Warfarin and hydroxycarbamide due to JAK2 positivity. Six months later, he requires an elective laparoscopic cholecystectomy for symptomatic gallstones. How would you manage his peri-operative anticoagulation?
5. Would your long-term anticoagulation strategy differ if:
 - the thrombosis was unprovoked but JAK2-negative,
 - antiphospholipid syndrome was identified,
 - or there was associated bowel ischaemia?

Haemostasis Case 2: 10mins and post your answer in group

A 72-year-old man is admitted with extensive spontaneous bruising over the arms, chest, and abdomen associated with painful swelling of the left thigh and persistent haematuria for one week.

There is no personal or family history of bleeding. He underwent cataract surgery 5 years earlier without haemostatic complications.

Past medical history includes Rheumatoid arthritis

Current medications: Methotrexate and Aspirin 75 mg daily

On examination: Large ecchymoses over trunk and proximal limbs and Tense painful swelling of left thigh

Test	Result	Reference Range
Hb	64 g/L	130–170
WBC	$7.5 \times 10^9/L$	4.0–11.0
Platelets	$280 \times 10^9/L$	150–400
PT	11.5 s	10–13
APTT	96 s	25–35

A 1:1 mixing study demonstrates failure of APTT correction after incubation.

Test	Result
Factor VIII activity	<1 IU/dL
Factor IX activity	Normal

Bethesda inhibitor titre 48 BU/mL

CT thigh demonstrates a large intramuscular haematoma without active arterial extravasation.

1. What underlying conditions are associated with this acquired bleeding disorder and outline your immediate haemostatic management plan in this patient.
2. Discuss the advantages and limitations of recombinant activated factor VII (rFVIIa), activated prothrombin complex concentrate (APCC) and recombinant porcine FVIII in acquired haemophilia A.
3. How would you eradicate the inhibitor in this patient?
4. The patient develops acute chest pain and hypoxia 5 days after bypassing therapy. What are the possible causes, and how would you investigate and manage this complication?
5. He now requires urgent percutaneous coronary intervention (PCI) following an NSTEMI. How would you approach peri-procedural haemostatic management and antiplatelet therapy in this situation?

Haemostasis Case 3: 10mins and post your answer in group

A 18-year-old girl is transferred to a tertiary haemostasis centre with gastrointestinal bleeding. She has a background of recurrent epistaxis, gingival bleeding, easy bruising, and prolonged bleeding after minor trauma since early childhood. She was diagnosed with Glanzmann Thrombasthenia at age 10 after platelet function testing. She has multiple platelet transfusions in the past but no benefit recently.

She now presents with 5 days of melaena and ongoing heavy menstrual bleeding.

Examination: Pale and clammy with Mild epigastric tenderness

Test	Result	Reference Range
Hb	52 g/L	115–155
Platelets	$280 \times 10^9/L$	150–400
WBC	$9.2 \times 10^9/L$	4–11
PT	12 s	11–13
APTT	31 s	25–35
Fibrinogen	3.8 g/L	1.8–4.0
Ferritin	6 $\mu g/L$	15–150

Upper GI endoscopy demonstrates diffuse gastric mucosal bleeding without a discrete ulcer.

Questions-4marks each

1. Explain why ristocetin-induced aggregation remains normal in Glanzmann Thrombasthenia.
2. What is the inheritance pattern and molecular basis of this disorder? Which genes are commonly involved?
3. Why is she failing to respond to platelet transfusions?
4. How would you manage her acute bleeding?
5. What are the long-term management options for severe disease?

Haemostasis Case 4: 10minutes-Write your answer and send a pic in group

A 46-year-old woman with metastatic colorectal carcinoma is admitted for elective bowel resection. She has a history of recurrent venous thromboembolism and has been receiving low molecular weight heparin (LMWH) for the past 12 days following a recent pulmonary embolism.

On Day 11 of admission, she develops worsening abdominal pain and swelling of the left leg. CT angiography demonstrates new thrombosis involving the left iliac artery and segmental splenic infarction despite therapeutic anticoagulation.

Investigations:

Test	Result	Reference
Hb	108 g/L	115–155
WBC	$13.5 \times 10^9/\text{L}$	4–11
Platelets	$320 \rightarrow 82 \times 10^9/\text{L}$ (over 6 days)	150–400
PT	14 s	11–13
APTT	36 s	25–35
Fibrinogen	4.8 g/L	1.8–4.0
D-dimer	$>5.0 \mu\text{g}/\text{mL FEU}$	<0.5
Blood film	Thrombocytopenia without schistocytes —	

Questions-4marks each

- What is the most likely diagnosis and explain the immunopathogenesis involved?
- What clinical scoring systems are used before laboratory testing, and how are they interpreted?
- Discuss the screening and confirmatory laboratory investigations for this condition.
- Outline the management of this patient, including anticoagulant choices, duration and platelet transfusion considerations.
- She requires major abdominal surgery in 3 months. How would you plan peri-operative anticoagulation and future heparin exposure?

Haemostasis Case 5: 10minutes-Write your answer and send a pic in group

A 69-year-old man is referred to the haemostasis clinic before elective transurethral resection of the prostate (TURP). He reports spontaneous epistaxis occasionally, increasing bruising over 12 months and excessive bleeding after a recent skin biopsy

There is no personal or family history of bleeding disorders.

Past medical history: Bilateral carpal tunnel syndrome and MGUS

Examination: Extensive ecchymoses over forearms

Test	Result	Reference
Hb	98 g/L	130–180
WBC	$6.2 \times 10^9/\text{L}$	
Platelets	$245 \times 10^9/\text{L}$	
PT	28 s	10–13
APTT	62 s	25–35
Fibrinogen	3.4 g/L	Normal

Mixing Study

Immediate mix: PT corrects and APTT corrects

2-hour incubation: Remains corrected

Bone marrow: 12% clonal plasma cells and congo red stain positive

Questions

1. What is the most likely diagnosis and its pathogenesis 04marks
2. How would you manage spontaneous epistaxis if it happened again? 06marks
3. The patient is scheduled for TURP next week. How would you manage him peri-operatively? 06marks
4. Why might FFP fail to maintain haemostasis? 04marks

Haemostasis Case 6: 10minutes-Write your answer and send a pic in group

A 41-year-old woman is referred to the haemostasis clinic before elective total abdominal hysterectomy for symptomatic fibroids.

She reports Menorrhagia since adolescence, Excessive bleeding after wisdom tooth extraction and Postpartum haemorrhage following her first pregnancy

However, she also had A deep venous thrombosis at age 33 during pregnancy.

Family history Father had "abnormal clotting tests"

Test	Result
Hb	104 g/L
Platelets	$290 \times 10^9/L$
PT	17.5 s
APTT	45 s
TT	38 s
Reptilase time	Markedly prolonged
Clauss fibrinogen	0.6 g/L
Fibrinogen antigen	2.8 g/L

1. What is the most likely diagnosis? How would you confirm the diagnosis? 04marks
2. What causes fibrinogen disorders? 04marks
3. What are the clinical manifestations? 04marks
4. Discuss the perioperative management. 08marks

Haemostasis Case 7: 10minutes-Write your answer and send a pic in group

A 34-year-old woman is referred to the joint haematology obstetric clinic. She has a history of two first-trimester miscarriages and a recent episode of unprovoked left lower limb deep vein thrombosis (DVT). She is currently 10 weeks pregnant. She has no significant past medical history, does not take regular medications EXCEPT FOR ANTICOAGULATION, and has no family history of thrombosis.

Investigations:

- FBC: Normal
 - PT: 13.8 s (normal)
 - APTT: 50 s (prolonged)
 - Anti-cardiolipin IgG: 105 GPL units
 - Anti-beta-2-glycoprotein I IgG: 95 SGU units
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- a) Explain the principle of DRVVT 04marks
 - b) Discuss the anticoagulation management of the patient during pregnancy. 06marks
 - c) At 29th week, she presented acutely with severe headache, dyspnoea, hypertension, severely deranged renal and liver functions. What is the likely possibility and discuss the acute management 06marks
 - d) How would you manage the patient if she develops another DVT while on anticoagulation 3months after delivery? 04marks

Haemostasis Case 8: 10minutes-Write your answer and send a pic in group

Write a brief perioperative plan for the following patient below- 04 marks each

1. A 72-year-old woman with mechanical mitral valve replacement, permanent atrial fibrillation and previous embolic stroke while subtherapeutic on warfarin, is admitted with acute mesenteric ischaemia. She needs emergency laparotomy. Investigations: INR 4.1, Hb 124 g/L and Platelets $250 \times 10^9/L$
2. A 38-year-old woman is 10 days postpartum following an emergency Caesarean section. She develops extensive iliofemoral DVT and is commenced on therapeutic LMWH. Five days later she develops acute cholecystitis requiring urgent laparoscopic cholecystectomy. Current treatment: Enoxaparin 1.5 mg/kg OD Renal function normal.
3. A 58-year-old man is booked for elective right hemicolectomy. He has a history of recurrent DVT and pulmonary embolism despite anticoagulation and has been on apixaban for 8 months. He has no other significant medical history.
4. A 68-year-old man with a history of heparin-induced thrombocytopenia (HIT) 3 months ago requires urgent appendectomy. He was on Rivaroxaban and last dose was 48hrs ago. His current platelet count and renal functions are normal.
5. A 70-year-old man with end-stage renal disease requiring haemodialysis is scheduled for elective repair of an abdominal aortic aneurysm. On apixaban 5 mg BD for PE. Laboratory results: eGFR 16 mL/min

Please discuss these scenarios with your haemostasis consultant

Haemostasis Case 9: 10minutes-Write your answer and send a pic in group

A 24-year-old woman is being treated for Philadelphia-negative B-cell Acute Lymphoblastic Leukaemia (ALL) according to a UKALL-based protocol.

She achieved morphological remission after induction chemotherapy and is currently receiving consolidation.

Day 12 following PEG-asparaginase administration, she develops:

- Severe headache
- Nausea and vomiting

MRI brain with venography demonstrates:

- Superior sagittal sinus thrombosis extending into the right transverse sinus.

Test	Result	Reference Range
Hb	101 g/L	115–160
WBC	$2.8 \times 10^9/L$	4–11
Platelets	$52 \times 10^9/L$	150–400
PT	15.8 sec	10–13
APTT	31 sec	25–37
Clauss fibrinogen	0.6 g/L	1.8–4.5
Antithrombin activity	28%	80–120

Questions:

1. What are causes of acquired antithrombin deficiency? What is the mechanism of thrombosis during asparaginase treatment?
2. How would you manage the thrombosis?
3. After 48 hours, anti-Xa monitoring is performed. Peak Anti Xa level 0.18 IU/mL. The treating team increases the LMWH dose. However, the anti Xa level is still subtherapeutic. What is the possible pathogenesis?
4. Three days later she develops menorrhagia. Platelets $28 \times 10^9/L$ and Fibrinogen 0.5 g/L. The treating team asks whether anticoagulation should be continued.?

Haemostasis Case 10: 10minutes-Write your answer and send a pic in group

A 12-year-old girl is referred urgently with recurrent severe gastrointestinal bleeding. She has a lifelong history of: Frequent epistaxis since infancy, Easy bruising and Gingival bleeding.

Over the previous 18 months she has had: Four admissions with melaena

There is parental consanguinity. A younger sibling has a history of severe nosebleeds.

Examination: Pale appearance, Multiple ecchymoses over limbs and Mild systolic flow murmur

Hb 58 g/L

MCV 67 fL

WBC $6.8 \times 10^9/L$

Platelets $420 \times 10^9/L$

PT 12 sec

APTT 92 sec

Fibrinogen 3.4 g/L

vWF Antigen <1 IU/dL

vWF Activity <1 IU/dL

FVIII:C 3 IU/dL

No detectable vWF multimers.

Capsule endoscopy reveals: Multiple bleeding vascular lesions within the jejunum and ileum consistent with angiodysplasia.

1. Interpret the laboratory findings. 2marks
2. Why is the APTT markedly prolonged in this patient? 2marks
3. How would you manage the acute GI bleed 6marks
4. List the main points of long-term management 4marks
5. Discuss the perioperative plan for tooth extraction 6marks

Haemostasis Case 11: 10minutes-Write your answer and send a pic in group

A 13-year-old boy with severe congenital haemophilia A (baseline FVIII <1 IU/dL) presents to the emergency department with severe abdominal pain following a bicycle accident 12 hours earlier.

His past medical history includes:

- High-titre FVIII inhibitor diagnosed at age 5 years (peak inhibitor 120 BU)
- Failed first course of immune tolerance induction (ITI)
- Commenced emicizumab prophylaxis 18 months ago with excellent bleed reduction
- No spontaneous joint bleeds over the past year

On arrival:

HR 138 bpm, BP 82/48 mmHg, RR 28/min, Pale and clammy with Generalised abdominal tenderness. FAST ultrasound demonstrates free intra-abdominal fluid.

CT angiography confirms splenic laceration with active arterial bleeding. Emergency laparotomy is planned.

Test	Result
Hb	64 g/L
Platelets	$275 \times 10^9/L$
PT	12.3 s
APTT	25 s
Fibrinogen	3.4 g/L
FVIII assay (one-stage)	280 IU/dL
Bethesda inhibitor assay	Pending

The anaesthetist asks whether recombinant FVIII should be administered before theatre.

Questions

1. Interpret the coagulation results. Explain which laboratory tests should be requested urgently. 05 marks
2. Outline your immediate haemostatic management before emergency laparotomy. 06 marks
3. Six months later the patient has persistent inhibitor (>40 BU). Discuss long-term management. 06 marks
4. Discuss the laboratory challenges introduced by emicizumab. 03 marks

Haemostasis Case 12: 10minutes-Write your answer and send a pic in group

A 42-year-old woman presents to the emergency department with a 10-day history of worsening headache, vomiting and intermittent blurred vision. She has no previous history of thrombosis.

Her medical history includes:

- Morbid obesity (weight 180 kg, BMI 63 kg/m²)
- Hypertension
- Awaiting assessment for elective bariatric surgery within the next 6 months
- No hormonal contraception and Non-smoker and No family history of venous thromboembolism

MRI brain with MR venography demonstrates:

- Extensive thrombosis involving the superior sagittal sinus, right transverse sinus, and sigmoid sinus

Test	Result
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Hb	96 g/L
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Platelets	$310 \times 10^9/L$
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WBC	$8.3 \times 10^9/L$
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Question

1. Discuss the anticoagulation advice 06marks
2. What further investigations would you request to determine the underlying cause of her cerebral venous sinus thrombosis? Justify your choice of investigations 04marks
3. She has lost little weight and now weighs 176 kg. She is referred for elective Roux-en-Y gastric bypass surgery. The bariatric surgeon requests haematology advice regarding peri-operative anticoagulation. Discuss your peri-operative anticoagulation plan. 06marks
4. Discuss the anticoagulation strategy following bariatric surgery.04marks

Haemostasis Case 13: 10minutes-Write your answer and send a pic in group

A 31-year-old woman at 24 weeks' gestation (G2P1) is admitted with a 3-day history of visual blurring and petechiae. She reports mild epigastric discomfort but no hypertension during the pregnancy. Her previous pregnancy was uncomplicated.

On examination, her GCS is 14/15, afebrile, BP 128/76 mmHg and has widespread petechiae. Fetal monitoring is reassuring.

Test	Result
Hb	62 g/L
Platelets	$18 \times 10^9/L$
LDH	1850 U/L
Haptoglobin	Undetectable
Creatinine	132 $\mu\text{mol/L}$
PT	11.8 s
APTT	29 s
Fibrinogen	4.5 g/L

By day 6 of intervention, platelet count has increased to $95 \times 10^9/L$ and LDH have normalised. However, on day 9, despite continuing daily plasma exchange, her platelet count falls to $34 \times 10^9/L$, LDH rises to 980 U/L, and new schistocytes are seen on the blood film.

- How would you manage her at initial presentation? *06 marks*
- She deteriorates despite six days of therapy. Outline your management of refractory disease *04 marks*
- Following recovery, she wishes to have another pregnancy in two years. Discuss counselling and long-term management before conception and during pregnancy. *06 marks*
- How would the diagnosis and management differ if ADAMTS13 activity remained <5% but no inhibitor was detected? *04 marks*

Haemostasis Case 14: 10minutes-Write your answer and send a pic in group

A 32-year-old woman (G3P1+1) with a St. Jude mechanical mitral valve presents at 9 weeks' gestation for urgent review. She has a history of rheumatic heart disease requiring valve replacement 5 years previously.

Her anticoagulation has been stable on warfarin 8 mg daily (target INR 2.5–3.5). She conceived unexpectedly and continued warfarin until pregnancy was confirmed.

Her previous pregnancy ended in a first-trimester miscarriage while receiving therapeutic LMWH.

Echocardiogram Normally functioning mechanical mitral valve

Following multidisciplinary discussion, warfarin is discontinued and therapeutic LMWH is commenced. Five weeks later (14 weeks' gestation), she develops increasing dyspnoea.

Repeat echocardiography demonstrates restricted movement of one mitral valve leaflet with an elevated transvalvular gradient, suspicious for prosthetic valve thrombosis. Peak anti-Xa levels over the previous month ranged from 0.65–0.75 IU/mL (target 1.0–1.4 IU/mL for mechanical mitral valves).

- A. Discuss the anticoagulation options throughout pregnancy for women with mechanical heart valves. *06 marks*
- B. How would you manage this patient from haemostasis point of view? *04marks*
- C. Outline your delivery plan from haemostasis point. *06 marks*
- D. Following successful delivery she asks about future pregnancies. Discuss counselling regarding future pregnancies. *04 marks*

Haemostasis Case 15: 10minutes-Write your answer and send a pic in group

A 38-year-old woman presents to the Emergency Department with a 3-day history of pleuritic chest pain, progressive shortness of breath and mild haemoptysis. She has no previous history of venous thromboembolism (VTE).

She reports no recent surgery, trauma or prolonged immobilisation. No family history of thrombosis. No long-haul travel. No pregnancy or hormonal contraception. No previous miscarriages.

Past medical history: Migraine only. No regular medications.

On examination: HR: 112 bpm, BP: 118/72 mmHg, RR: 24/min, SpO₂: 93% on air and BMI: 26 kg/m²

CT pulmonary angiogram confirms bilateral segmental pulmonary emboli.

Test	Result
Hb	108 g/L
WCC	$6.2 \times 10^9/L$
Platelets	$72 \times 10^9/L$
CRP	35 mg/L
PT	Normal
APTT	Normal

She reports occasional bruising but no significant bleeding history.

1. Discuss your management of anticoagulation for this patient (06 marks)
2. This patient has thrombocytopenia at presentation. Discuss the differential diagnosis of thrombocytopenia in a patient presenting with acute pulmonary embolism. (04 marks)
3. Further investigations are performed after few weeks because of persistent thrombocytopenia. CT chest/abdomen/pelvis demonstrates a 5.5 cm left renal mass suspicious for renal cell carcinoma. The multidisciplinary team recommends a renal biopsy followed by possible nephrectomy depending on results. Discuss the relationship between malignancy and venous thromboembolism. How would this influence your management? (04 marks)
4. Develop a peri-procedural anticoagulation and haemostasis plan for renal biopsy. (06 marks)

Haemostasis Case 16: 10minutes-Write your answer and send a pic in group

Briefly discuss your advice in the following situations(04 marks each)

1.

A 73-year-old woman develops spontaneous large thigh haematomas. She is taking apixaban for atrial fibrillation.

Investigations: Hb: 82 g/L, Platelets: $230 \times 10^9/L$, PT: normal, APTT: 92 seconds, Mixing study: no correction after incubation, FVIII activity: 2% and Inhibitor: positive

2.

A 76-year-old man on dabigatran 150 mg twice daily for atrial fibrillation presents with perforated bowel requiring immediate surgery. Last dose: 8 hours ago.

Results: Creatinine: 95 $\mu\text{mol/L}$, eGFR: 70 mL/min, APTT: mildly prolonged and Thrombin time: markedly prolonged

3.

A 64-year-old man had an acute STEMI 12 days ago and underwent PCI with a drug-eluting stent. He is taking Aspirin 75 mg daily and Prasugrel 10 mg daily. He develops perforated appendicitis requiring emergency laparotomy. Platelets: $245 \times 10^9/L$.

4.

A 72-year-old woman develops extensive lower limb DVT and pulmonary embolism 7 days after starting unfractionated heparin following hip replacement. She has been on Fondaparinux as per her choice. She has developed significant hematuria and Hb drop from 120 to 82 g/L. HIT antibody positive.

5.

A 59-year-old man receives alteplase for acute ischaemic stroke. Four hours later he develops worsening neurological symptoms. CT brain shows symptomatic intracranial haemorrhage. Blood results: Hb: 110 g/L, Platelets: $160 \times 10^9/L$ and Fibrinogen: 0.7 g/L.

Haemostasis Case 17: 10minutes-Write your answer and send a pic in group

A 68-year-old man is admitted with a 5-day history of fever and productive cough. His past medical history includes type 2 diabetes mellitus and chronic kidney disease (Stage 3).

On admission: Temperature: 39.4°C, BP: 92/56 mmHg, HR: 118 bpm, RR: 30/min and Oxygen saturation: 91% on air. Chest X-ray demonstrates right lower lobe pneumonia. Blood cultures are obtained and intravenous piperacillin-tazobactam is started. He is transferred to the Intensive Care Unit with **septic shock**.

Investigation Result

Hb	108 g/L
WBC	$19.5 \times 10^9/L$
Platelets	$15 \times 10^9/L$
PT	18 sec (INR 4.0)
APTT	44 sec
Fibrinogen	5.8 g/L
D-dimer	>10,000 ng/mL
Blood film	Occasional schistocytes

There is no clinical bleeding. The ICU team asks for urgent haematology advice.

1. What is the most likely diagnosis? Which scoring system would you use to support the diagnosis? (4 marks)
2. The ICU consultant contacted you for opinion regarding abnormal investigations. Outline your advice about LMWH, Platelets, Fresh frozen plasma, Cryoprecipitate, Prothrombin complex concentrate (PCC) and Tranexamic acid (08marks)

Despite broad-spectrum antibiotics, the patient deteriorates. He develops oozing from central venous catheter, haematuria and ecchymoses. Hb 62g/L, **Platelets 17**, PT 17s, IN4 4.5, APTT 67s, Fibrinogen 0.7g/L and D-Dimers 20,000ng/ml

3. Outline your haemostatic management after deterioration. Include transfusion thresholds and targets according to UK practice. (08 marks)

Haemostasis Case 18: 10minutes-Write your answer and send a pic in group

A 72-year-old man with muscle-invasive transitional cell carcinoma (urothelial carcinoma) of the bladder (T3N1M0) is receiving gemcitabine–cisplatin chemotherapy while awaiting assessment for radical cystectomy.

Three months ago, he developed a proximal left lower limb DVT and was commenced on therapeutic apixaban (5 mg twice daily).

He now presents with:

- Increasing swelling of the left leg for one week
- New onset right-sided pleuritic chest pain

Investigation Result

Hb 98 g/L

WBC $7.4 \times 10^9/L$

Platelets $76 \times 10^9/L$

Fibrinogen 4.8 g/L

Creatinine 112 $\mu\text{mol/L}$ (eGFR 58 mL/min)

CT Pulmonary Angiography: New segmental pulmonary emboli.

Venous Doppler: Extension of previous femoral DVT into the iliac vein.

- A. What additional factors should be assessed before diagnosing anticoagulation failure? (4 marks)
- B. How would you manage recurrent thrombosis in this patient? Include the choice of anticoagulant and rationale. (07 marks)
- C. Three weeks later, the patient was followed in oncology clinic. The blood results show Hb 88g/L, Platelets 44 and WCC 6.4. How would you manage anticoagulation in the setting of thrombocytopenia? (04 marks)
- D. Four weeks later, the Urology MDT recommends radical cystectomy with ileal conduit formation. How would you manage anticoagulation before radical cystectomy? (05 marks)

Haemostasis Case 19: 10minutes-Write your answer and send a pic in group

A 48-year-old woman is referred to the emergency with new-onset mucocutaneous bleeding. She has no previous personal or family history of bleeding.

Her past medical history includes hypertension and ischaemic heart disease. She is not taking anticoagulants but is on aspirin 75 mg daily started for cardiovascular prevention.

Clinical examination: Multiple ecchymoses over arms and legs

Test	Result	Reference Range
Hb	108 g/L	130–180
Platelets	$1820 \times 10^9/L$	150–400
WCC	$6.5 \times 10^9/L$	4–11
PT	12 s	10–13
APTT	48 s	25–35
Fibrinogen	3.1 g/L	1.5–4.0
Mixing study (APTT)	Partial correction	

Questions:

- a. What further investigations are required to reach diagnosis? 06marks

Further Results

vWF antigen	<1 IU/dL
Ricof activity	<10 IU
Factor VIII	8 IU/dL

- b. Outline your immediate management? 07marks
c. Six months later, the patient is listed for elective cholecystectomy. How would you plan and manage her peri-operative haemostatic care? 07marks

Haemostasis Case 20: 10minutes-Write your answer and send a pic in group

A 19-year-old woman presents to the Emergency Department with melaena and symptomatic anaemia. She reports a lifelong history of mucocutaneous bleeding, Recurrent spontaneous epistaxis since childhood, Easy bruising following minor trauma AND Prolonged bleeding from minor cuts

She has no previous history of: Haemarthrosis, Deep muscle bleeding and Spontaneous joint swelling

Family History: No known bleeding disorders in the family

Clinical Examination: Pale appearance, Multiple ecchymoses over upper and lower limbs and No splenomegaly or lymphadenopathy

Test	Result	Reference Range
Haemoglobin	85 g/L	120–150
Platelet count	$180 \times 10^9/L$	150–400
WCC	$7 \times 10^9/L$	4–11
MPV	10 fL	7–11
PT	12 seconds	10–13
APTT	32 seconds	25–35
Fibrinogen	Normal	1.5–4.0 g/L

Platelet Function Testing: Light transmission aggregometry demonstrates:

Ristocetin with normal response while other agonists shows absent response

Questions

- Explain the principle of light transmission aggregometry and interpret the platelet aggregation results. (4 marks)
- Discuss the acute management of this patient presenting with gastrointestinal bleeding. (6 marks)
- The patient requires an elective tonsillectomy. How would you plan her peri-operative haemostatic management? (6 marks)
- Discuss the long-term management considerations for this patient. 04marks

Haemostasis Case 21: 10minutes-Write your answer and send a pic in group

You are the Haematology registrar on call and are asked for advice in the following situations. 4marks each

1. A 67-year-old woman develops a proximal DVT 5 days after suffering a spontaneous intracerebral haemorrhage. Repeat CT brain demonstrates a stable haematoma with no expansion. She has no neurological deterioration.

The neurosurgical team is concerned about restarting anticoagulation, while the medical team is concerned about the risk of pulmonary embolism.

2. A 59-year-old man with acute myeloid leukaemia undergoing induction chemotherapy develops sudden pleuritic chest pain and hypoxia. CT pulmonary angiography demonstrates a large bilateral pulmonary embolism with right ventricular strain. His platelet count is $11 \times 10^9/L$. He has no active bleeding. The ICU team asks whether therapeutic anticoagulation can be given.

3. A 42-year-old woman presents with a second unprovoked proximal DVT. Investigations demonstrate persistent Lupus anticoagulant. She has therefore been confirmed to have antiphospholipid syndrome. She has diabetes and hypertension. She is currently taking rivaroxaban 20 mg once daily. She asks whether she can remain on rivaroxaban because she finds warfarin monitoring difficult. Discuss the management plan briefly.

4. A 31-year-old woman with a mechanical mitral valve presents at 7 weeks' gestation. She has been taking warfarin with excellent INR control and has had no previous thromboembolic or bleeding complications. She is very concerned about stopping warfarin because her mother previously died from a valve-related thrombotic complication. The obstetric team asks for urgent haematology advice.

5. A 58-year-old woman presents with a 5-day history of increasing pain, redness and swelling of her left thigh. She has no chest pain or breathlessness. Her medical history includes Hypertension, Obesity and Varicose veins. She is not taking anticoagulants. Duplex ultrasound demonstrates an 8 cm thrombus within the great saphenous vein, extending to within 2.5 cm of the saphenofemoral junction. There is no evidence of deep vein thrombosis.

Haemostasis Case 22: 10minutes-Write your answer and send a pic in group

A sample is issued as part of a UK NEQAS Haemostasis survey.

Clinical information

- Sample type: Citrated plasma
- Clinical indication: Investigation of an isolated prolonged APTT
- Patient: 46-year-old woman. No known bleeding history
- Not taking anticoagulants

Parameter	Result
Your APTT	68 seconds
Local reference range	24–35 seconds
Your APTT ratio	1.94
Your reagent	Actin FS – Siemens
Number of participants using same reagent	310
Reagent-specific median APTT ratio	1.32
Overall median APTT ratio	1.35
% deviation from reagent median	+47%

The accompanying NEQAS report indicates that most laboratories obtained an APTT ratio between 1.2 and 1.4. Your laboratory's internal IQC results for the day were reported as within the laboratory's stated acceptable limits.

Questions

- A. What are the possible clinical consequences if this analytical bias is present in routine patient testing? (4 marks)
- B. What additional investigations would you perform to determine whether the problem is related to the reagent, analyser, calibration, or sample processing? (6 marks)
- C. Explain why acceptable internal IQC results do not necessarily exclude a significant NEQAS/EQA failure. (4 marks)
- D. The laboratory director asks whether the laboratory should change its APTT reagent. Discuss the factors you would consider before making this decision. (6 marks)

Haemostasis case 22b: 10 minutes-Write your answer

You are the Consultant Haematologist responsible for the Anticoagulation Service in a large DGH.

The hospital currently manages approximately 2,500 patients receiving long-term anticoagulation, including patients with atrial fibrillation, venous thromboembolism, mechanical heart valves and other indications.

The service has undergone a major change over recent years, with increasing use of direct oral anticoagulants (DOACs). However:

- Anticoagulation follow-up is currently divided between haematology clinics, anticoagulation nurses, GPs and specialty clinics.
- There is no dedicated DOAC monitoring pathway.
- Some patients have inappropriate doses continued despite changes in renal function, weight or age.
- There have been several incidents involving perioperative interruption and restarting of anticoagulation.
- Emergency departments frequently contact the haematology team for advice regarding bleeding, urgent procedures and anticoagulant reversal.
- Patients report difficulty knowing who to contact for anticoagulation advice.
- The Trust is considering establishing a dedicated anticoagulation service, supported by specialist nurses/pharmacists and consultant haematology oversight, with electronic referral and standardised protocols.

The Clinical Director has asked you to prepare a business case for developing the service.

Questions

A. What operational, clinical, financial and patient-focused data would you collect to support the business case? 06 marks

B. How could a dedicated anticoagulation service improve patient safety and quality of care? 04 marks

C. What alternative or complementary strategies could reduce anticoagulation-related errors, avoidable hospital attendances and inefficiencies? 04 marks

D. How would you measure the impact of the new service after implementation, including efficiency, clinical outcomes, safety and patient experience? 06 marks

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Haemostasis and Transfusion-Autumn 2026

Transfusion case 1: 10minutes and post your answer in group

A 67-year-old man is admitted under cardiology with decompensated heart failure secondary to severe ischaemic cardiomyopathy.

On admission, his haemoglobin is 62 g/L due to chronic gastrointestinal blood loss from angiodysplasia. He is prescribed 2 units of red cells with a plan for slow transfusion and diuretic cover.

Baseline observations: BP: 110/70 mmHg, SpO₂: 94% on air

After transfusion of the first unit of red cells over 3 hours, he becomes acutely breathless with severe dyspnoea, hypoxia, Bibasal crackles extending to mid zones and hypertension.

1. What alternative diagnoses should be considered in this patient, and what features help distinguish them?
2. What are the recognised risk factors for this condition and how could this complication have been prevented in this patient?
3. Outline your management plan for this patient.
4. What is the recommended approach to future transfusions in this patient? What are the potential complications if this condition is not recognised and treated promptly?

Transfusion case 2: 10minutes and post your answer in group

A 32-year-old woman is admitted following a massive postpartum haemorrhage after emergency caesarean section for placental abruption. She is blood group A RhD-negative.

Due to life-threatening haemorrhage and delayed availability of RhD-negative units, she receives 3 units of group O RhD-positive red cells. Bleeding is controlled with uterotonics and surgical intervention.

She stabilises in ICU and is transferred to the haematology team for further management. She has no prior transfusion history but had one previous pregnancy complicated by pre-eclampsia, delivering an RhD-positive infant.

Initial investigations:

- Hb: 78 g/L
 - Platelets: $95 \times 10^9/L$
 - PT/APTT: mildly prolonged
 - DAT: weakly positive
-
1. What laboratory method would you use to quantify the volume of RhD-positive red cells in her circulation? Describe the principle of the technique.
 2. Outline your haematology management plan immediately after identification of RhD-incompatible transfusion.
 3. What complications may arise in the short- and long-term following exposure to RhD-positive blood in an RhD-negative female?
 4. How would you counsel the patient regarding:
 - future pregnancies
 - risk of haemolytic disease of the fetus and newborn (HDFN)
 - and need for specialist antenatal monitoring?

Transfusion Case 03: 10 Minutes

A 52-year-old man with high-risk acute myeloid leukaemia (AML with adverse cytogenetics) undergoes an allogeneic haematopoietic stem cell transplant (HSCT) from an unrelated 10/10 HLA-matched donor.

The recipient is blood group O RhD negative, while the donor is blood group A RhD positive.

He receives a myeloablative conditioning regimen with Busulfan and Cyclophosphamide. GVHD prophylaxis consists of ciclosporin and methotrexate.

During the first 3 weeks post-transplant, he remains profoundly pancytopenic and transfusion dependent.

Questions-4 marks each

1. What type of ABO and Rh incompatibility is present in this transplant?
2. What blood products should be selected during post-transplant pre-engraftment phase? (RCC, Platelets, Plasma and Granulocytes)
3. What complications can occur due to the ABO mismatch in this patient?
4. How would you monitor for successful engraftment?
5. What transfusion support strategies are required if the patient develops pure red cell aplasia (PRCA) after transplant?

Transfusion Case 04: 10 Minutes

A 71-year-old woman with myelodysplastic syndrome (Myelodysplastic Syndrome) is admitted with symptomatic anaemia and is planned for red cell transfusion.

Background: Blood group: A RhD positive with Known antibodies: anti-E and anti-Jka

Recently detected new weak antibody of unclear specificity

She receives 2 units of E-negative, Jka-negative, crossmatch-compatible red cells

After 45 minutes of the second unit, she develops fever 39.1°C, Hypotension 90/60 mmHg and dark urine

Investigations

Test	Result
Hb	↓ from 72 → 60 g/L
LDH	raised
Bilirubin	raised (indirect predominance)
Haptoglobin	low
DAT	positive (IgG + C3d)

Questions-4 marks each

1. What is the most likely diagnosis. Discuss with reason?
2. List the steps available in UK to make blood transfusion safe?
3. List the immediate management steps.
4. What system-level measures are used to prevent cold chain breaches?
5. Explain the importance of cold chain maintenance for red blood cells

Transfusion case 5: 10 minutes

A 56-year-old woman with relapsed Acute Myeloid Leukaemia is undergoing salvage chemotherapy. She has been profoundly thrombocytopenic for 3 weeks.

Past history: Two pregnancies, Multiple previous platelet transfusions and Stem cell transplant 5 years earlier

She develops Extensive bruising

Test Result

Platelets $4 \times 10^9/L$

She receives two adult doses of platelets.

Platelet counts

Time	Platelet count
------	----------------

Pre-transfusion	$4 \times 10^9/L$
-----------------	-------------------

1-hour post-transfusion	$6 \times 10^9/L$
-------------------------	-------------------

24 hours post-transfusion	$4 \times 10^9/L$
---------------------------	-------------------

The same pattern occurs with three subsequent transfusions.

Temperature: 39.2°C

Blood cultures: Positive for Gram-negative bacteraemia

CT: Splenomegaly (18 cm)

1. What is platelet transfusion refractoriness and what are the causes
04marks
2. Discuss the management of this patient? 06marks
3. What are platelet transfusion thresholds for specific clinical situations- Liver biopsy, RTA with multiple fracture, Bone marrow biopsy and PICC line insertion 04marks
4. List the measures taken by UK Govt to keep platelet transfusion safe
06marks

Transfusion case 6: 10 minutes

A 31-year-old woman, gravida 4 para 2+1, is referred to the fetal medicine clinic at 22 weeks' gestation.

Blood group: O RhD positive

Antenatal antibody screen: Anti-U identified and Titre 1:64

Obstetric history:

Pregnancy 1: Healthy term infant.

Pregnancy 2: Intrauterine transfusion at 29 weeks for severe fetal anaemia.

Pregnancy 3: First-trimester miscarriage managed surgically.

No history of red cell transfusion. Partner is U positive.

Investigations

Maternal Hb: 112 g/L

MCA Doppler: 1.62 MoM

1. Discuss the clinical significance of Anti U and its likely cause in this patient 04marks
2. How would you manage this pregnancy 08marks
3. What are the specifications of red cells if required for intrauterine transfusion 04marks
4. What neonatal management may be required? 04marks

Transfusion case 7: 10 minutes

A 42-year-old man with relapsed acute lymphoblastic leukaemia undergoes salvage chemotherapy. On day 18 post-treatment, he develops severe neutropenia (ANC $<0.05 \times 10^9/L$).

Clinical course

- Persistent fever for 8 days despite meropenem, linezolid, and liposomal amphotericin B.
- Blood cultures repeatedly positive for carbapenem-resistant *Pseudomonas aeruginosa*.
- CT chest demonstrates multiple enlarging pulmonary nodules with cavitation.
- CT abdomen shows multiple splenic microabscesses.
- Bone marrow examination reveals profound hypocellularity with anticipated neutrophil recovery in 10–14 days.
- The patient is being evaluated for allogeneic stem cell transplantation once infection is controlled.

The treating team requests granulocyte transfusions.

Questions

- a. Discuss the indications and patient selection criteria for granulocyte transfusion. 05marks
- b. Describe donor selection and collection requirements for granulocyte concentrates in the UK. 05marks
- c. Outline compatibility testing and transfusion requirements before administration. 05marks
- d. What factors would lead you to discontinue granulocyte transfusion therapy? 05marks

Transfusion case 8: 10 minutes

A 27-year-old woman with severe aplastic anaemia undergoes a matched sibling allogeneic haematopoietic stem cell transplant (HSCT).

On day +45 post-transplant she attends the emergency department with symptomatic anaemia (Hb 68 g/L) and receives two units of red cells overnight.

The following morning, the transfusion laboratory discovers that both units issued were standard red cells and had not been irradiated.

The patient remains clinically well.

Questions

- A. Why does this patient require irradiated blood components? 02marks
- B. What is the risk associated with transfusion of non-irradiated red cells in this setting? 02marks
- C. How would you manage this incident? 08marks
- D. What investigations and follow-up would be required? 04marks
- E. Describe system-level strategies to prevent administration of non-irradiated products to patients who require irradiated components. 04marks

Transfusion case 9: 10 minutes-Write your answer

You are the haematology registrar asked to review a 6-hour-old male neonate admitted to the neonatal intensive care unit. His Platelets are $4 \times 10^9/L$.

- Delivery: Elective Caesarean section at 38 weeks.
- Maternal history: 32-year-old G2P1, no autoimmune disease, no thrombocytopenia, routine antenatal labs normal.
- Clinical findings: Extensive petechiae and bruising over the back. The neonate subsequently develops reduced spontaneous movements of the right arm.

Routine labs:

- Hb: 178 g/L
- Plt: $4 \times 10^9/L$
- WBC: $11 \times 10^9/L$
- PT/APTT: Normal

Mother

Test	Result
Hb	Normal
Platelets	$280 \times 10^9/L$
Blood Film	Normal
	◦

Questions

1. What is the most likely diagnosis and what features support it? (04 marks)
2. Which investigations would you request? (04 marks)
3. Outline your immediate management plan for this newborn. (06 marks)
4. How would future pregnancies be managed? (6 marks)

Transfusion case 10: 10 minutes-Write your answer

You are the haematology registrar on call.

The hospital blood bank has informed you that due to a national shortage, only three adult doses of platelets remain available for the next 12 hours.

You receive the following urgent referrals and must prioritise platelet use, suggest alternatives where appropriate, and justify your decisions.

Questions

A. What general principles should guide platelet allocation during severe shortages? (02 marks)

B. For each of the following patients, outline whether you would transfuse platelets, suggest an alternative strategy if appropriate, and provide your rationale. (03 marks each)

1. A 58-year-old woman with acute myeloid leukaemia (AML) undergoing intensive induction chemotherapy. She develops febrile neutropenia, and her platelet count is $20 \times 10^9/L$.
2. A 62-year-old man with severe septic shock and DIC. He is actively bleeding from mucosal sites. Platelet count: $40 \times 10^9/L$.
3. A 54-year-old woman with immune thrombocytopenia (ITP) attended clinic for follow up. Platelets $2 \times 10^9/L$.
4. A 70-year-old man with severe chronic liver disease admitted with single episode of Malena. Haemodynamically stable. Platelets: $35 \times 10^9/L$.
5. A 68-year-old woman admitted to emergency due to road traffic accident leading to fracture of right humerus and left femur. Platelets: $70 \times 10^9/L$.
6. A 78-year-old man admitted for urgent posterior segment ophthalmic surgery. Platelets: $90 \times 10^9/L$.

Transfusion case 11: 10 minutes-Write your answer

Identisera Diana/Extend-Identisera Diana P/Extend P

IN USE
04/08/23

VIAL	Donor No.	Rh	Rh-hr						Kell				Duffy		Kidd		Lewis		P	MNS				Luth.	Coit.	Xg	SPECIAL TYPE	RESULTS		
			D	C	E	c	e	C*	K	k	Kp*	Js*	Fy*	Fy*	Jk*	Jk*	Le*	Le*	P ₁	M	N	S	s	Lu*	Co*	Xg*				
1	2003237	CCDee R ₁ R ₁	+	+	0	0	+	0	+	+	0	nt	+	0	+	0	0	+	+	+	0	0	+	0	0	+	1	2+	4+	
2	2007786	Ccddee r'r	0	+	0	+	+	0	0	+	+	nt	0	+	+	+	0	0	+	0	+	0	0	0	+	2	0	0		
3	2007787	ccDee R ₁ r	+	0	0	+	+	0	0	+	0	nt	+	+	+	0	0	+	+	+	0	+	0	0	0	+	3	2+	4+	
4	2007788	ccddeE r'r	0	0	+	+	+	0	0	+	0	nt	0	+	0	+	+	0	0	+	+	+	+	0	0	+	4	0	0	
5	2007789	ccDEE R ₁ R ₁	+	0	+	+	0	0	0	+	0	nt	+	0	+	0	0	+	+	0	+	0	+	0	0	+	5	2+	4+	
6	2007790	C*CDDee R ₁ R ₁	+	+	0	0	+	+	0	+	0	nt	0	+	+	+	0	+	0	+	0	+	0	0	0	+	6	2+	4+	
7	2002560	ccddeE rr	0	0	0	+	+	0	+	+	0	nt	0	+	0	+	0	+	0	+	+	0	+	0	0	+	7	0	0	
8	2007791	ccddeE rr	0	0	0	+	+	0	0	+	0	nt	0	+	+	0	+	0	+	+	0	+	0	0	0	0	8	0	0	
9	2007792	ccddeE rr	0	0	0	+	+	0	0	+	0	nt	+	0	0	+	0	+	+	+	+	+	0	0	0	+	9	0	0	
10	2007793	ccddeE rr	0	0	0	+	+	0	0	+	0	nt	+	+	+	0	0	+	+	+	+	0	+	+	0	+	10	0	0	
11	2007794	CCDee R ₁ R ₁	+	+	0	0	+	0	0	+	0	nt	0	+	0	+	0	+	+	0	+	0	+	0	0	+	11	2+	4+	
EXTEND	12	2007795	ccddeE rr	0	0	0	+	+	0	+	+	0	nt	+	0	+	+	0	+	0	+	0	0	+	0	0	+	12		
	13	2007796	ccDEE R ₁ R ₁	+	0	+	+	0	0	0	+	0	nt	0	+	+	+	0	0	+	0	+	+	+	0	+	13			
	14	2007797	CCDee R ₁ R ₁	+	+	0	0	+	0	0	+	0	nt	0	+	+	0	0	+	+	+	0	+	0	0	+	14			
	15	2003450	CCDee R ₁ R ₁	+	+	0	0	+	0	0	+	0	nt	+	0	0	+	0	+	+	+	0	0	+	0	0	+	15		
																												AG	0	

LOT 23010

2023-09-08

ADDITIONAL TESTING

Positive: H, PP, P₁, Vel, Co*, Js*, Kp*, Lu*

Negative: Bg*, Wr*

Pos Control 2+

A 26-year-old woman with homozygous sickle cell disease (HbSS) is reviewed in the pre-assessment clinic before elective total hip replacement for advanced avascular necrosis of the femoral head.

She reports Frequent vaso-occlusive crises (5 admissions/year). Regular hydroxycarbamide with good adherence

Examination: Mild scleral icterus

Investigations: Hb 78 g/L, Bilirubin 46 $\mu\text{mol/L}$, Ferritin 1800 $\mu\text{g/L}$ and HbS 91%

Transfusion history: More than 30 previous transfusions

The orthopaedic team asks for haematology advice regarding perioperative optimisation.

1. Assess this patient's perioperative risk and explain the factors that increase her risk of complications during surgery. 06marks
2. Interpret the antibody screen. Which antibody or antibodies are most likely, and how would they influence your transfusion planning? 04marks
3. Justify your transfusion strategy for the patient 04marks
4. Describe your complete perioperative management plan from 2 weeks before surgery until hospital discharge. 06marks

Transfusion case 12: 10 minutes-Write your answer

A 31-year-old woman (G3P1+1) is referred to the fetal medicine clinic at 24 weeks' gestation.

Her previous pregnancy was complicated by severe haemolytic disease of the fetus and newborn (HDFN) requiring two intrauterine transfusions (IUTs). The baby subsequently required exchange transfusion and intensive phototherapy.

Current pregnancy:

- Blood group: A RhD negative
- Antibody screen: Anti-D: 18 IU and Anti-C detected
- Cell-free fetal DNA confirms the fetus is RhD positive and C positive.

Ultrasound findings: Middle cerebral artery peak systolic velocity (MCA-PSV): 1.62 MoM

1. Describe your fetal monitoring strategy for the remainder of the pregnancy 06 marks
2. The fetus undergoes fetal blood sampling. Hb 68 g/L and DAT positive. Discuss the indications for intrauterine transfusion and specify the blood component requirements for the donor red cells. 06 marks
3. A baby is delivered at 36 weeks after two successful IUTs. Cord blood: Hb 88 g/L, Bilirubin 72 $\mu\text{mol/L}$ and DAT strongly positive. Describe intervention required during the first 48 hours after birth. 04 marks
4. How should future pregnancies be managed? 04 marks

Transfusion case 13: 10 minutes-Write your answer

A 45-year-old female is admitted to the ICU following emergency surgery for a ruptured ectopic pregnancy. She required massive haemorrhage protocol activation and received 6 units of red cells, 4 units of fresh frozen plasma (FFP) and 1 adult therapeutic dose of platelets

She has no previous history of heart failure or chronic lung disease.

Approximately 45 minutes after completion of the platelet transfusion, she develops sudden severe dyspnoea, Respiratory rate 36/min, Oxygen saturation falls from 98% to 80% despite 15 L/min oxygen and Blood pressure 90/55 mmHg

On examination: Bilateral diffuse crackles, No raised jugular venous pressure and no peripheral oedema

Arterial blood gas: PaO_2 6.4 kPa on FiO_2 0.8

Chest X-ray demonstrates new bilateral diffuse pulmonary infiltrates.

Bedside echocardiography shows: Normal left ventricular systolic function

Questions

- A. What are the differential diagnoses for this patient's acute deterioration following transfusion? *04 marks*
- B. Explain the pathophysiology of the acute deterioration. *04 marks*
- C. Outline the investigations required in this case? *04 marks*
- D. Describe the management of the patient and the donor. List the measures to reduce its occurrence. *08 marks*

Transfusion case 14: 10 minutes-Write your answer

An 8-year-old boy (weight 28 kg) is brought to the Emergency Department following a high-speed road traffic accident. He has sustained multiple injuries, including multiple fractures and intra-abdominal bleeding.

On arrival: Heart rate: 160/min, Blood pressure: 68/40 mmHg, Capillary refill: 5 seconds and Glasgow Coma Scale: 13/15

FAST scan demonstrates significant free intraperitoneal fluid.

Hb 72 g/L

Platelets $185 \times 10^9/L$

PT 13 s (control 12 s)

APTT 31 s (control 30 s)

Fibrinogen 1.4 g/L

Lactate 6.8 mmol/L

Questions

- A. Describe your immediate management of this child according to the Paediatric Major Haemorrhage Protocol. *06 marks*
- B. One hour later, the child has received: 40 mL/kg red cells and 20 mL/kg FFP. Repeat laboratory tests show Platelets $58 \times 10^9/L$ and Fibrinogen 1.2g/L.
ROTEM demonstrates: Prolonged R Time, Low MA and alpha angle.
Explain the principle of TEG in assessing coagulation. Interpret these findings. What further blood components would you administer? *08 marks*
- C. Following emergency laparotomy and haemostasis, the child has received: 60 mL/kg RBC, 40 mL/kg FFP, One adult therapeutic dose of platelets and Cryoprecipitate. Repeat blood results are:
PT 17 s
APTT 37 s
Discuss likely cause of the abnormal coagulation profile and Complications expected following massive transfusion in children. *06 marks*

Transfusion case 15: 10 minutes-Write your answer and share in group

A 66-year-old woman with relapsed IgG kappa multiple myeloma has progressed after treatment with bortezomib, lenalidomide and dexamethasone. She is planned to start daratumumab in combination with pomalidomide and dexamethasone.

Her baseline investigations show:

- Hb: 74 g/L
- WCC: $3.2 \times 10^9/\text{L}$
- Neutrophils: $1.4 \times 10^9/\text{L}$
- Platelets: $95 \times 10^9/\text{L}$
- Creatinine: 160 $\mu\text{mol/L}$
- Serum free light chains: markedly elevated

She complains of fatigue and dizziness. She is planned for a red cell transfusion before starting therapy.

1. What baseline laboratory investigations should be performed before starting anti-CD38 monoclonal antibody therapy? (4 marks)
2. Explain how anti-CD38 monoclonal antibodies interfere with pre-transfusion compatibility testing and describe strategies used to mitigate this problem. (4 marks)

A week later, she presented with epistaxis and petechiae. She has not started chemotherapy yet. Blood tests show:

- Platelet count: $8 \times 10^9/\text{L}$
- Hb: stable
- Coagulation screen: normal
- No clinical or laboratory evidence of infection or DIC

3. What is the most likely diagnosis and what clinical and laboratory features support it? (4 marks)
4. Outline the underlying pathophysiology of this condition. (2 marks)
5. Describe the management steps for this patient. (6 marks)

Transfusion case 16: 10 minutes-Write your answer and share in group

A 68-year-old woman presents to the Emergency Department with progressive fatigue, exertional dyspnoea, dizziness and chest discomfort for one week.

She has no previous history of anaemia and has not received any blood transfusions. She was recently diagnosed with rheumatoid arthritis and started on methotrexate 3 months ago.

On examination: Pale, tachycardic (HR 110 bpm), scleral icterus, No active bleeding and Mild splenomegaly

Test	Result
Hb	42 g/L
MCV	102 fL
Platelets	$250 \times 10^9/L$
Reticulocytes	$220 \times 10^9/L$
Haptoglobin	Undetectable

DAT: Strongly positive

- IgG: 4+
- C3d: Negative

The patient is symptomatic with severe anaemia and requires urgent red cell transfusion.

- A. What factors influence the decision to transfuse in AIHA? (04 marks)
- B. The antibody screen is pan-reactive and the auto control is positive. What is the significance of a pan-reactive antibody pattern. How would you differentiate a warm autoantibody from an underlying alloantibody?? (06 marks)
- C. The laboratory reports a strong DAT causing major delay in providing compatible blood. How should her blood transfusion be managed? (06 marks)
- D. Describe Alloadsorption and when it is required. (04 marks)

Transfusion case 17: 10 minutes-Write your answer

A 29-year-old Afro-Caribbean woman with HbSS sickle cell disease is admitted with a severe vaso-occlusive crisis affecting her back and both lower limbs.

Her background history includes: Four to five hospital admissions annually with painful crises, Multiple transfusions since childhood, Baseline haemoglobin 78 g/L and Blood group: O RhD negative.

Investigation	Result
---------------	--------

Hb	66 g/L
----	--------

Reticulocyte count	$280 \times 10^9/L$
--------------------	---------------------

Bilirubin	32 $\mu\text{mol/L}$
-----------	----------------------

She receives 2 units of phenotype-matched red cells because of symptomatic anaemia. Initially, she improves clinically. Five days later, She develops Fever (38.5°C), Increasing bone pain, Marked lethargy and Progressive jaundice.

The investigations:

Hb 45g/l

Platelets 320,

WCC 15.8

Bilirubin 96 $\mu\text{mol/L}$.

DAT and Antibody screens negative

Questions

1. What further investigations would you request? (05 marks)
2. Outline your management plan for the patient. (08 marks)
3. The intensive care consultant requests an urgent red cell transfusion because the haemoglobin is now 43 g/L. How would you advise? (6 marks)
4. The patient develops increasing breathlessness and chest pain. Oxygen saturation 91%. Chest radiography demonstrates new bilateral infiltrates. How would your management change? (8 marks)

Transfusion case 18: 10 minutes-Write your answer

A 47-year-old man with severe osteoarthritis is listed for an elective total hip replacement. He has a background of hypertension and chronic myeloid leukaemia on Dasatinib.

He has no previous history of blood transfusion. He is hesitant regarding receiving blood transfusion. He is extremely concerned about the safety of blood transfusion. He agrees to all routine investigations and blood conservation strategies. He is blood group AB RhD Negative.

Pre-operative Investigations

Hb	118 g/L
Platelets	$245 \times 10^9/L$
PT	12 sec
APTT	29 sec
Fibrinogen	3.4 g/L
Ferritin	28 $\mu\text{g/L}$
Transferrin saturation	14%
Creatinine	88 $\mu\text{mol/L}$

The orthopaedic surgeon requests a pre-operative haematology opinion.

- How would you explore and address the patient's concerns regarding blood transfusion? (05 marks)
- What are the measures used within the UK to minimise the risk of transfusion-transmitted infections and maximise blood safety. (05 marks)
- What pre-operative patient blood management strategies would you recommend before elective hip replacement? (05 marks)
- During the operation, there is an unexpected injury to a branch of the profunda femoris artery, resulting in significant blood loss. How would you manage this situation (05 marks)

Transfusion case 19: 10 minutes-Write your answer

You are the on-call transfusion registrar in a District General Hospital.

The transfusion laboratory receives an urgent communication from NHS Blood and Transplant (NHSBT) informing hospitals of a critical national shortage of cryoprecipitate due to manufacturing disruption and reduced plasma availability. No Fibrinogen concentrates available either.

Your hospital has been instructed to reduce cryoprecipitate use by at least 50% over the next five days and reserve stocks only for patients with clear evidence-based indications.

The transfusion laboratory reports that **only 12 adult doses** of cryoprecipitate remain in stock.

Over the next few hours, the following patients require assessment:

- A 58-year-old man with decompensated liver cirrhosis is **scheduled** for insertion of a transjugular intrahepatic portosystemic shunt (**TIPS**). His fibrinogen is 1.0 g/L.
- A 42-year-old patient with **disseminated intravascular coagulation** secondary to sepsis is bleeding **from multiple venepuncture sites**. Fibrinogen is 0.8 g/L.
- A 70-year-old patient undergoing **elective revision** hip arthroplasty has a pre-operative fibrinogen of 1.1 g/L.
- A 68-year-old man undergoing repair of a **ruptured abdominal aortic aneurysm** develops major bleeding. Fibrinogen is 0.8 g/L.

Questions

A. During the first two hours, what immediate actions would you take to manage the shortage safely within the hospital? (4 marks)

B. How would you prioritise cryoprecipitate allocation for the patients above? Justify your decisions. (6 marks)

C. Which clinicians and hospital teams would you contact, and what key information would you communicate? (4 marks)

D. What alternative strategies could be used to minimise cryoprecipitate use while maintaining patient safety? (6 marks)

Transfusion case 20: 10 minutes-Write your answer

You are the Consultant Haematologist responsible for Transfusion Medicine at a large District General Hospital.

At 08:00, the Hospital Transfusion Laboratory receives an urgent notification from NHS Blood and Transplant (NHSBT) regarding a temporary regional shortage of red blood cells due to reduced donor collections and increased regional demand.

The shortage is particularly affecting group O red cells.

The transfusion laboratory currently has 6 units of O RhD positive RBCs available

Several patients require transfusion today:

Patient 1: A 24-year-old woman with acute myeloid leukaemia receiving induction chemotherapy. Hb: 62 g/L. Complains of dizziness. Transfusion requested

Patient 2: A 28-year-old man with severe trauma following a road traffic accident. Active bleeding. Blood group unknown

Patient 3: A 35-year-old woman with sickle cell disease admitted with acute chest syndrome. Hb has fallen from 86 g/L to 58 g/L. Requires urgent red cell transfusion. Previous transfusions with multiple antibodies

Patient 4: A 30-year-old man with lymphoma receiving chemotherapy. Hb: 69 g/L, WCC 16.7, Neutrophil 14, Platelets 450 and MCV 79.

Patient 5: A 76-year-old woman with myelodysplastic syndrome attending the Day Unit. Regular transfusion dependent. Hb: 72 g/L. Mild fatigue but clinically stable

Questions

- A. How would you prioritise allocation of the available red cells among these patients? Discuss the ethical and clinical principles guiding your decisions. (10 marks)
- B. What strategies would you introduce immediately to conserve red cells and reduce unnecessary demand? (5 marks)
- C. How would you communicate these decisions to clinical teams, patients, and hospital leadership while maintaining trust and transparency? (5 marks)

Transfusion case 21: 10 minutes-Write your answer

You are the Consultant Haematologist responsible for Transfusion in a large DGH.

The Trust has identified increasing pressure on the transfusion service, particularly out of hours.

Currently:

- The transfusion laboratory is staffed by biomedical scientists, but there is no dedicated transfusion practitioner available out of hours.
- Clinical teams frequently contact the on-call haematology registrar for advice about major haemorrhage, transfusion reactions, special blood requirements and complex compatibility problems.
- There have been several delays in obtaining appropriate blood components for patients with multiple red-cell antibodies.
- Some clinical areas have poor compliance with transfusion competency requirements.
- Blood components are sometimes requested but subsequently not required, contributing to wastage.
- The transfusion laboratory has reported increasing workload related to incident investigation, component traceability and clinical advice.
- The Trust is considering funding a dedicated Transfusion Practitioner/Transfusion Team, initially during core hours with a structured out-of-hours escalation pathway.

The Chief Operating Officer has asked you to prepare a business case demonstrating whether investment in the service would improve patient safety, efficiency and use of blood components.

Questions

A. What operational, clinical, financial and patient-focused data would you collect to support the business case? 06 marks

B. How would a dedicated transfusion practitioner/team improve transfusion safety and quality of care? 04 marks

C. What other strategies could improve transfusion safety and reduce workload, delays and blood-component wastage? 04 marks

D. How would you measure the impact of the new service after implementation? 06 marks

Transfusion case 22: 10 minutes-Write your answer

Your hospital transfusion laboratory receives a UK NEQAS Blood Transfusion report highlighting an unsatisfactory result.

Clinical details

- Patient: 74-year-old woman
- Clinical indication: Pre-operative blood grouping and antibody screening prior to emergency hip surgery
- Previous transfusion history: Transfused 3 months previously
- Test: ABO and RhD grouping

Parameter	Your laboratory	NEQAS expected
Forward ABO grouping	Group A	Group B
Reverse ABO grouping	Group B cells: 4+; Group A cells: 0	Group B cells: 0; Group A cells: 4+
RhD grouping	Positive	Positive
Antibody screen	Negative	Negative
ABO interpretation	Group A RhD positive	Group B RhD positive

Peer group performance

- 96% of participating laboratories correctly identified the patient's ABO group.
- 4% reported an incorrect ABO interpretation or an unresolved discrepancy.

Questions

- 1) What are the possible causes of an ABO grouping discrepancy or incorrect ABO interpretation? 05 marks
- 2) If the same discrepancy occurred in a real patient sample immediately before an urgent transfusion, how would you resolve it? 05 marks
- 3) The forward grouping demonstrates weak mixed-field agglutination. What are the possible explanations?
- 4) When would you escalate an EQA failure to the transfusion laboratory manager or transfusion committee?
- 5) The patient requires emergency surgery, and the ABO discrepancy cannot be resolved within 30 minutes. What red cells would you issue and why?

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