HEMATOLOGY BOARD REVIEW MANUAL

Transfusion Medicine

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QUESTIONS
1. Jane is a 42-year-old woman who has M5 acute leukemia and is 13 days from the start of her chemotherapy. She is stable with no fevers and no bleeding. At what morning platelet count should she receive a platelet transfusion?
   A.  $1 \times 10^9/L$
   B.  $10 \times 10^9/L$
   C.  $20 \times 10^9/L$
   D.  $50 \times 10^9/L$
   E.  $75 \times 10^9/L$

2. A patient who was admitted to the intensive care unit for a major gastrointestinal bleed receives a red cell transfusion. One hour after the transfusion, he complains of severe dyspnea. Over the next 30 minutes he develops respiratory failure and fevers with a chest x-ray showing infiltrates. He is intubated, but over the next 24 hours he improves and is extubated in 48 hours. What reaction is this scenario consistent with?
   A.  Acute hemolytic reaction
   B.  Allergic reaction
   C.  Delayed hemolytic transfusion reaction
   D.  Transfusion graft-versus-host disease
   E.  Transfusion-related acute lung injury

3. Which one of the following is never acceptable to give to a patient who is a Jehovah’s Witness?
   A. Albumin
   B. Cryoprecipitate
   C. Erythropoietin
   D. Fresh frozen plasma
   E. Intravenous iron

4. In which of the following patients would it be most appropriate to consider granulocyte transfusions?
   A. Patient with chronic lymphocytic leukemia with mucormycosis after receiving alemtuzumab with a white blood cell count of $1 \times 10^9/L$ (100% neutrophils)
   B. 3-year-old child 35 days out from start of chemotherapy for acute lymphocytic leukemia (ALL) with a neutrophil count of 0 and invasive aspergillosis
   C. 18-month old child with fevers and positive blood cultures for Staphylococcus aureus 3 days after starting chemotherapy for ALL with a neutrophil count of 0
   D. 45-year-old man 35 days out from start of chemotherapy for acute myeloid leukemia with a neutrophil count of 0 and invasive aspergillosis

5. Fresh frozen plasma is indicated for all of the following EXCEPT:
   A. As part of empiric therapy for massive transfusion
   B. Initial therapy of thrombotic thrombocytopenic purpura
   C. Liver disease with mild INR elevations
   D. Patient on warfarin who presents with an INR of 3 and a major bleed
   E. Severe factor V deficiency and upcoming surgery

ANSWERS
1. The correct answer is (B), $10 \times 10^9/L$. Studies have shown that a transfusion threshold of $10 \times 10^9/L$ is safe and effective for prophylactic transfusions in chemotherapy-related thrombocytopenia.\(^1\) A higher threshold such as $50 \times 10^9/L$ is appropriate for patients who are bleeding.

Reference

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2. **The correct answer is (E), transfusion-related acute lung injury.** The scenario of rapid onset of respiratory failure with transfusion that rapidly resolves over a short period of time is most consistent with transfusion-related acute lung injury. Fevers can also complicate acute hemolytic transfusion reactions, but this condition does not involve lung injury. Transfusion graft-versus-host disease involves many organs but not the lung, and onset is much later after transfusion.

**Reference**

3. **The correct answer is (D), fresh frozen plasma.** All Jehovah’s Witnesses refuse blood products directly from a donor, so whole blood and its constituents—red cells, plasma, and platelets—are not acceptable. Components such as albumin and cryoprecipitate are “matters of conscience” that some Jehovah’s Witnesses will accept. There are no issues with iron or with erythropoietin, especially products that do not contain albumin as a stabilizer.

**Reference**

4. **The correct answer is (B), 3-year-old child 35 days out from start of chemotherapy for acute lymphocytic leukemia (ALL) with a neutrophil count of 0 and invasive aspergillosis.** The patient described in scenario B would be the most likely to benefit from granulocytes, as documented infections, prolonged neutropenia, and small size predict a good response. In scenario A, the patient has profound immunosuppression but an adequate neutrophil count. The scenario C patient has not had antibiotics or growth factors yet, and these should be given before granulocyte transfusion is considered. The patient in scenario D is an adult and due to his larger size would not be expected to have a good granulocyte increase with transfusions.

**Reference**

5. **The correct answer is (C), liver disease with mild INR elevations.** Patients with liver disease and mild INR elevations do not respond to plasma and are unlikely to have significant coagulation defects. Patients with documented factor deficiency (congenital or due to warfarin) or thrombotic thrombocytopenic purpura benefit from warfarin, as do patients receiving massive transfusions.

**References**