Blood Transfusion in the Surgical Patient: Review Questions

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QUESTIONS

Choose the single best answer for each question.

1. **The term maximum surgical blood ordering schedule (MSBOS) refers to:**
   A) The maximum amount of blood that can be used for a surgical procedure
   B) The actual amount of blood that is typically transfused for a given case
   C) The maximum amount of blood that a surgeon uses during one work day
   D) The actual amount of blood that is ordered by the surgeon for a given case

2. **Which of the following factors is most important for determining when patients should be transfused?**
   A) When the hemoglobin level decreases to less than 7 g/dL
   B) When the surgeon decides transfusion is necessary
   C) When oxygen delivery must be increased
   D) When lost blood volume must be replaced

3. **A 65-year-old man is scheduled for elective repair of aortoiliac occlusive disease. The best transfusion plan for this patient should include which of the following sources of blood?**
   A) Allogeneic blood donation only
   B) Preoperative autologous blood donation only
   C) Cell salvage and preoperative autologous blood donation
   D) Directed blood donation

4. **Which of the following conditions is a contraindication to autotransfusion?**
   A) Infection
   B) Pancreatic surgery
   C) History of malignancy
   D) Trauma

5. **Which of the following statements about autologous predonation is TRUE?**
   A) Autologous predonation is contraindicated in patients with severe aortic stenosis.
   B) Autologous predonation may be facilitated by the use of aprotinin.
   C) Autologous predonation requires hospitalization.
   D) Autologous predonation should be avoided in most patients.

6. **Which of the following drugs is NOT helpful in decreasing reliance on allogeneic blood?**
   A) Vasopressor agents
   B) Antifibrinolytic agents
   C) Erythropoietin
   D) β-Blockers

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EXPLANATION OF ANSWERS

1. **(B) The actual amount of blood that is typically transfused for a given case.** The maximum surgical blood ordering schedule (MSBOS) is calculated and maintained by blood bank personnel to aid in releasing the appropriate number of units of blood for a particular case and/or for a particular surgeon. To arrive at this number, the transfusion medicine specialist tabulates and averages the number of units of blood actually used for many of the same procedures. When blood is ordered, only the number of units represented by the MSBOS is typed and crossed. For example, the surgeon may order 10 units of blood for a total hip replacement but has actually only used a maximum of three units (ie, the surgeon's MSBOS) in the last year for this type of case. The blood bank types and crosses the three units of blood for release and screens blood supplies in the event that more blood is needed. The use of the MSBOS helps conserve blood and allows blood to be available to all users rather than reserving blood for one case.
2. **(C) When oxygen delivery must be increased.** In the best of all possible worlds, blood should be used only to improve oxygen delivery in the case of a documented decrease. Blood should not be used to restore volume—crystalloids and colloids can perform this function adequately in most patients. Hemoglobin is only one determinant of when a patient should be transfused. Some patients can withstand hemoglobin values less than 7 g/dL without any adverse effects, whereas other patients may require higher levels of hemoglobin. The transfusion decision is never a simple choice—the surgeon must examine the patient's clinical condition and make a reasoned decision about using blood, weighing the potential benefit against the known risks.
3. **(C) Cell salvage and preoperative autologous blood donation.** In this case of a 65-year-old man with aortoiliac occlusive disease, the patient is at high risk for sustaining intraoperative blood loss that is sufficient to lead to transfusion. The first choice is between allogeneic, or banked blood, versus autologous, or the patient's own blood. The risks of autologous blood transfusion are minimal when compared with the risks of allogeneic transfusion; thus, alternatives that provide autologous blood transfusion should be used. This patient does not need emergency surgery and can afford to delay surgery for 2 to 3 weeks until he can donate 2 to 3 units of his own blood. Hematocrit recovery can be stimulated with the use of oral iron. Intraoperative autotransfusion using cell salvage is effective in cases such as in this patient for whom large volumes of blood loss within a closed cavity (ie, the abdomen) are expected. Washing and return of shed blood provides the patient with another source of autologous blood.
4. **(A) Infection.** Active infection, especially a bloodborne infection, is a contraindication to the use of autotransfusion. Although washing removes the bulk of the bacterial load, this technique may not remove all of the bacterial load. Endotoxin that adheres to erythrocytes may cause serious reactions if transfused in volume. History of a malignancy is not a contraindication, whereas the presence of an active malignancy is a relative contraindication. Autotransfusion has been used successfully in both trauma and pancreatic surgery.
5. **(A) Autologous predonation is contraindicated in patients with severe aortic stenosis.** The main medical contraindications to autologous predonation are the presence of severe, symptomatic angina and aortic stenosis. The issue of autologous predonation is typically moot in these patients because the majority of these patients are in the hospital undergoing treatment or awaiting surgery. Predonation is an outpatient procedure and is available to the majority of patients with planned surgery and anticipated blood loss that will lead to transfusion. Aprotinin is an antifibrinolytic drug used to control bleeding during open-heart surgery.
6. **(D) β-Blockers.** Vasopressor agents help control blood loss in both the intensive care unit and the operating room by promoting vasoconstriction in patients with gastrointestinal tract bleeding. Antifibrinolytic agents, such as aprotinin and tranexamic acid, are effective in decreasing bleeding, especially in patients who have received large doses of heparin during cardiac surgery. Recombinant human erythropoietin has been shown to increase erythrocyte mass both before and after surgery. All three of these drugs (ie, vasopressor agents, antifibrinolytic agents, recombinant human erythropoietin) have been proven to reduce reliance on allogeneic blood. β-Blockers may improve cardiac output and have an indirect effect on transfusion need by improving oxygen consumption, but β-blockers have never been shown to decrease allogeneic blood use directly.

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