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# Transfusion Reactions Treatment & Management

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## Medical Care

Continuous monitoring of vital signs during generalized anesthesia may prevent acute circulatory (volume) overload, but it may not detect early signs of other reactions (eg, acute hemolytic transfusion reactions).

The onset of red-colored urine in a transfused patient should raise the question of a hemolytic transfusion reaction. When performing checks to confirm that the correct blood was transfused to the correct patient, centrifuge a urine sample to determine whether the red color represents hematuria or hemoglobinuria (see image below).



Rapid test to distinguish hematuria from hemoglobinuria. The onset of red urine during or shortly after a blood transfusion may represent hemoglobinuria (indicating an acute hemolytic reaction) or hematuria (indicating bleeding in the lower urinary tract). If freshly collected urine from a patient with hematuria is centrifuged, red blood cells settle at the bottom of the tube, leaving a clear yellow urine supernatant. If the red color is due to hemoglobinuria, the urine sample remains clear red after centrifugation.

In addition, the onset of abnormal bleeding/generalized oozing during surgery in a transfused patient should raise the question of a hemolytic transfusion reaction with DIC.

- Acute hemolytic reactions (antibody mediated)
  - **Immediately discontinue the transfusion while maintaining venous access for emergency management.**
  - **Anticipate hypotension, renal failure, and DIC.**
  - Prophylactic measures to reduce the risk of renal failure may include **low-dose dopamine** (1-5 mcg/kg/min), **vigorous hydration** with crystalloid solutions (3000 mL/m<sup>2</sup>/24 h), and **osmotic diuresis** with 20% mannitol (100 mL/m<sup>2</sup>/bolus, followed by 30 mL/m<sup>2</sup>/h for 12 h).

- **If DIC is documented** and bleeding requires treatment, transfusions of frozen plasma, pooled cryoprecipitates for fibrinogen, and/or platelet concentrates may be indicated.
- Acute hemolytic reactions (nonantibody mediated)
  - The transfusion of serologically compatible, although damaged, RBCs usually does not require rigorous management.
  - Diuresis induced by an infusion of 500 mL of 0.9% sodium chloride per hour, or as tolerated by the patient, until the intense red color of hemoglobinuria ceases is usually adequate treatment.
- **Febrile, nonhemolytic reactions:** Usually, fever resolves in 15-30 minutes without specific treatment. If fever causes discomfort, oral acetaminophen (325-500 mg) may be administered. Avoid **aspirin** because of its prolonged adverse effect on platelet function.
- **Allergic reactions:** Diphenhydramine is usually effective for relieving pruritus that is associated with hives or a rash. The route (oral or intravenous) and the dose (25-100 mg) depend on the severity of the reaction and the weight of the patient.
- Anaphylactic reactions
  - A subcutaneous injection of epinephrine (0.3-0.5 mL of a 1:1000 aqueous solution) is standard treatment. If the patient is sufficiently hypotensive to raise the question of the efficacy of the subcutaneous route, epinephrine (0.5 mL of a 1:10,000 aqueous solution) may be administered intravenously.
  - Although no documented evidence exists that intravenous corticosteroids are beneficial for the management of acute anaphylactic transfusion reactions, theoretical considerations cause most clinicians to include an infusion of hydrocortisone or prednisolone if an immediate response to epinephrine does not occur.
- **TRALI**
  - Immediately discontinue the transfusion while preserving venous access.
  - Patients with mild episodes should respond to oxygen administered by nasal catheter or mask. If shortness of breath persists after oxygen administration, transfer the patient to an intensive care setting where mechanical ventilation can be administered.
  - In the absence of signs of acute volume overload or cardiogenic pulmonary edema, diuretics are not indicated.
  - No evidence exists that corticosteroids or antihistamines are beneficial.
  - Treat complications with specific supportive measures.
- **Circulatory (volume) overload**
  - Move the patient to a sitting position, and administer oxygen to facilitate breathing.
  - The most specific treatment is discontinuing the transfusion and removing the excessive fluid.
  - If practical, the unit of blood component being transfused may be lowered to reverse the flow and to decrease intravascular volume by a controlled phlebotomy.
  - Less urgent situations may be managed by a parenteral or oral diuretic (eg, furosemide).
  - If the patient has symptomatic anemia requiring additional transfusions of RBCs, select concentrated (ie, CPDA-1-anticoagulated) red cells (hematocrit = 80-85%). Avoid red cell components diluted with saline additives (ie, AS-1).
- Bacterial contamination (sepsis)
  - Immediately discontinue the transfusion, including all tubing, filters, and administration sets, and save the transfusion materials for cultures, while preserving venous access.
  - After appropriate blood cultures have been obtained, initiate treatment with intravenous broad-spectrum antibiotics. If a microbiologic stain or a culture of the contents of the transfused product identifies an organism, the initial broad-spectrum antibacterial approach may be modified accordingly.

## Consultations

- The possibility of an acute transfusion reaction should trigger an immediate consultation with the medical director of the hospital's blood bank or a designee (eg, a clinical pathology resident, transfusion medicine fellow). Depending on the findings, the blood bank consultant may arrange for microbiologic stains and cultures of the residual contents of the blood product container, clerical checks for patient and product identification in the laboratory, repeat compatibility testing using a freshly collected blood sample from the recipient, or other pertinent diagnostic studies.

- The diagnosis of an acute hemolytic transfusion reaction should trigger consultation with a nephrologist to ensure optimal prophylactic measures to prevent renal damage.<sup>[52]</sup>
- A hematology consultation is appropriate if a hemolytic transfusion reaction or bacterial contamination precipitated DIC.
- A clinical diagnosis of bacterial contamination of a transfused blood product should trigger an infectious diseases consultation.

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