

may also exist. Prevention involves identifying at-risk patients, close monitoring, a slow transfusion rate (1 RBCC over 3–4 h), and use of diuretics in hemodynamically stable patients with a history of TACO. Treatment requires stopping the transfusion and administering oxygen and diuretics.

Massive Transfusion-Associated Reactions/Electrolyte and Cold Toxicity Reactions

Reactions related to massive transfusion, i.e., transfusion of 50% of the patient's total blood volume over 3 h or >5–10 units of RBCCs (plus associated BCs), include citrate toxicity, hypothermia, hyperkalemia, and dilutional coagulopathy. Citrate, which is commonly used to anticoagulate BCs, chelates calcium. Hypocalcemia, manifested by circumoral paresthesia, and changes in cardiac function may result from multiple rapid transfusions. Although citrate is quickly metabolized to bicarbonate, calcium infusion (through a separate line) may be required. Rapid transfusion of BCs still at 4°C can result in hypothermia and cardiac dysrhythmias. Use of an inline warmer will prevent this complication. RBC leakage during storage, longer storage, and irradiation increase the concentration of potassium in the unit. Neonates and patients with renal failure or other comorbidities (e.g., hyperglycemia or hypocalcemia) are at risk of hyperkalemia and resulting acute cardiac toxicity. Treatment includes insulin, glucose, calcium gluconate, and furosemide, and prevention includes the use of washed or plasma-reduced RBCCs or a storage age of <7–10 days and the avoidance of RBCCs stored for >24 h after irradiation.

Iron Overload Each unit of RBCs contains 200–250 mg of iron. In frequently transfused recipients, iron accumulation that is left untreated will affect endocrine, hepatic, and cardiac function. Death may occur from cardiac failure or arrhythmia. Iron overload can be assessed by means of serum ferritin measurements, magnetic resonance imaging, and liver biopsy. Prevention and treatment of this frequently underreported transfusion adverse event rely on careful monitoring and iron chelation.