Adverse reactions of blood transfusion	
immune- mediated reactions	**Case 1** (Acute hemolytic transfusion reactions): -when recipient has preformed antibodies that lyse donor erythrocytes. -symptoms: hypotension, tachypnea, tachycardia, fever, chills, hemoglobinemia, hemoglobinuria, chest and/or flank pain, and discomfort at the infusion site. -Management: **step 1**:Transfusion must be stopped immediately, intravenous access maintained, and the reaction reported to the blood bank. **step 2:** The laboratory evaluation for hemolysis : 1-measurement of serum haptoglobin. 2-lactate dehydrogenase (LDH). 3-indirect bilirubin levels. **Step 3:** -immune complexes from RBC lysis —> Cause renal disfunction and failure —> diuresis with I.V fluid and furosemide or mannitol. -Tissue factor released from the lysed erythrocytes —> initiate DIC —> Coagulation studies should be monitored (PT - aPTT - fibrinogen - platelet count).
	Case 2 (Febrile nonhemolytic transfusion reaction) "FNHTR": -The most frequent reaction. -ssociated with the transfusion of cellular blood components (leucocytes). symptoms: 1-chills. 2-rigors. 3-a ≥1°C rise in temperature.
	Case 3 (Allergic reactions): -Donors plasma proteins —> Urticarial reactions (Mild reaction). -Management: 1-treated symptomatically by temporarily stopping the transfusion. 2-administering antihistamines (diphenhydramine).
	Case 4 (Anaphylactic reaction): -After transfusion of a few milliliters of the blood component —> "sever reaction". -Symptoms and signs: bronchospasm, SOB,coughing, nausea and vomiting, hypotension, loss of consciousness, respiratory arrest, and shock. -Management: 1-Stopping the transfusion 2-maintaining vascular access, 3-administering epinephrine 4-if severe: Glucocorticoids.
	Case 5 (Graft-versus-host-disease) "GVHD": -An allogeneic stem cell transplantation in which donor T lymphocytes attack host HLA antigens as a foreign and mount an immune response that cannot be eliminated by an immunodeficient host. -symptoms: fever, a characteristic cutaneous eruption, diarrhea, and liver function abnormalities.
	Case 6 (Transfusion-related acute lung injury): -Acute respiratory distress —> either during or within 6 h of transfusion. -Characterized by respiratory compromise and signs of noncardiogenic pulmonary edema, including bilateral interstitial infiltrates on chest x-ray. -management: Supportive, and patients usually recover without sequelae.

NONIMMUNOLOGIC REACTIONS

Case 1 (Fluid overload):

-transfusion may quickly lead to volume overload —> Because they are excellent volume expanders.

-Management:

1-Monitoring the rate and volume of the transfusion.

2-Diuretics.

Case 2 (Hypothermia):

-rapidly infused Refrigerated (4°C) or frozen (–18°C or below) blood components—> result in hypothermia which could cause cardiac dysrhythmias by the exposure of the sinoatrial node to cold fluid

-Management:

Use of an in-line warmer

case 3 (Electrolyte toxicity)

1- long time stored RBC —>↑k+ concentration in unit

2a- citrate in unit —> used for anticoagulation of blood component —> chelates ca++ —> thereby inhibits coagulation cascade.

2b- multiple rapid transfusions result in Hypocalcemia, manifested by circumoral numbness and/or tingling sensation of the fingers and toes

2c- citrate is quickly metabolize to bicarbonate—> because of that ca++ infusion is rarely required in this setting

case 4 (Iron overload) " normal total-body iron load of 20 g"

-after 100 units of RBCs have been transfused—> Symptoms and signs of iron overload affecting endocrine, hepatic, and cardiac function are common

-Each unit of RBCs contains 200–250 mg of iron

-Management:

1-using alternative therapies (e.g., erythropoietin)

2-judicious (good judgment) transfusion is preferable and cost effective.

3- chelating agent (binding agent with iron to lower its toxicity) such as deferoxamine and deferasirox but their response is often suboptimal.

INFECTIOUS COMPLICATIONS

Viral infections	Other infectious agents
1.Hepatitis C virus 2Human immunodeficiency virus type 1 3.Hepatitis B virus 4.Cytomegalovirus 5.Parvovirus B-19 6.Bacterial contamination	• Various parasites, including those causing malaria, babesiosis, and Chagas disease, can be transmitted by blood transfusion. • Dengue, chikungunya virus, variant Creutzfeldt-Jakob disease, and yellow fever ♦ Geographic migration and travel of donors shift the incidence of these rare infections.

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