Complications of Blood Transfusion

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Common Complications.

- The most common complications of transfusion are febrile nonhemolytic and chill-rigor reactions. The most serious complications are acute hemolytic reaction due to ABO incompatible transfusion and transfusion-related acute lung injury, which have very high mortality rates

What is the action ?

- Early recognition of symptoms suggestive of a transfusion reaction and prompt reporting to the blood bank are essential. The most common symptoms are chills, rigors, fever, dyspnea, light-headedness, urticaria, itching, and flank pain. If any of these symptoms (other than localized urticaria and itching) occur, the transfusion should be stopped immediately and the IV line kept open with normal saline. The remainder of the blood product and clotted and anticoagulated samples of the patient's blood should be sent to the blood bank for investigation.

Delayed hemolytic transfusion reaction

- Occasionally, a patient who has been sensitized to an RBC antigen has very low antibody levels and negative pretransfusion tests. After transfusion with RBCs bearing this antigen, a primary or anamnestic response may result (usually in 1 to 4 wk) and cause a delayed hemolytic transfusion reaction. Delayed hemolytic transfusion reaction usually does not manifest as dramatically as AHTR. Patients may be asymptomatic or have a slight fever. Rarely, severe symptoms occur. Usually, only destruction of the transfused RBCs (with the antigen) occurs, resulting in a falling Hct and a slight rise in LDH and bilirubin. Because delayed hemolytic transfusion reaction is usually mild and self-limited, it is often unidentified, and the clinical clue may be an unexplained drop in Hb to the pretransfusion level occurring 1 to 2 wk posttransfusion. Severe reactions are treated similarly to acute reactions.

Febrile nonhemolytic transfusion reaction

- Febrile reaction may occur without hemolysis. Antibodies directed against WBC HLA from otherwise compatible donor blood are one possible cause. This cause is most common in multitransfused or multiparous patients. Cytokines released from WBCs during storage, particularly in platelet concentrates, is another possible cause.
- Clinically, febrile reactions consist of a temperature increase of ≥ 1° C, chills, and sometimes headache and back pain. Simultaneous symptoms of allergic reaction are common. Because fever and chills also herald a severe hemolytic transfusion reaction, all febrile reactions must be investigated as above, as with any transfusion reaction.

Allergic reactions

- *:* Allergic reactions to an unknown component in donor blood are common, usually due to allergens in donor plasma or, less often, to antibodies from an allergic donor. These reactions are usually mild, with urticaria, edema, occasional dizziness, and headache during or immediately after the transfusion. Simultaneous fever is common

Volume overload

- The high osmotic load of blood products draws volume into the intravascular space over the course of hours, which can cause volume overload in susceptible patients (eg, those with cardiac or renal insufficiency). RBCs should be infused slowly. The patient should be observed and, if signs of heart failure (eg, dyspnea, rales) occur, the transfusion should be stopped and treatment for heart failure begun.

Acute lung injury TRALI

- Transfusion-related acute lung injury is an infrequent complication caused by anti-HLA and/or anti-granulocyte antibodies in donor plasma that agglutinate and degranulate recipient granulocytes within the lung. Acute respiratory symptoms develop, and chest x-ray has a characteristic pattern of noncardiogenic pulmonary edema. After ABO incompatibility, this is the 2nd most common cause of transfusion-related death. Incidence is 1:5,000–10,000, but many cases are mild. Mild to moderate transfusion-related acute lung injury probably is commonly missed.

Actions

- If AHTR is suspected, one of the first steps is to recheck the sample and patient identifications. Diagnosis is confirmed by measuring urinary Hb, serum LDH, bilirubin, and haptoglobin.
- Intravascular hemolysis produces free Hb in the plasma and urine; haptoglobin levels are very low. Hyperbilirubinemia may follow.
- After the acute phase, the degree of acute renal failure determines the prognosis. Diuresis and a decreasing BUN usually portend recovery. Permanent renal insufficiency is unusual. Prolonged oliguria and shock are poor prognostic signs.

Graft-vs-host disease (GVHD)

- Transfusion-associated GVHD is usually caused by transfusion of products containing immunocompetent lymphocytes to an immunocompromised host.
- The donor lymphocytes attack host tissues.
- GVHD can occur occasionally in immunocompetent patients
- Symptoms and signs include fever, skin rash (centrifugally spreading rash becoming erythroderma with bullae),
- vomiting, watery and bloody diarrhea, lymphadenopathy, and pancytopenia due to bone marrow aplasia.
- Jaundice and elevated liver enzymes are also common. GVHD occurs 4 to 30 days after transfusion and is diagnosed based on clinical suspicion and skin and bone marrow biopsies.
- GVHD has > 90% mortality because no specific treatment is available.

Complications of massive transfusion

- Massive transfusion is transfusion of a volume of blood greater than or equal to one blood volume in 24 h (eg, 10 units in a 70-kg adult).
- When a patient receives stored blood in such large volume, the patient's own blood may be, in effect, “washed out.” In circumstances uncomplicated by prolonged hypotension or DIC, dilutional thrombocytopenia is the most likely complication.
- Platelets in stored whole blood are not functional. Clotting factors (except factor VIII) usually remain sufficient.
- Microvascular bleeding (abnormal oozing and continued bleeding from raw and cut surfaces) may result. Five to 8 (1 unit/10 kg) platelet concentrates are usually enough to correct such bleeding in an adult. Fresh frozen plasma and cryoprecipitate may be needed.

Infectious complications

- Bacterial contamination of packed RBCs occurs rarely, possibly due to inadequate aseptic technique during collection or to transient asymptomatic donor bacteremia. Refrigeration of RBCs usually limits bacterial growth except for cryophilic organisms such as *Yersinia* sp, which may produce dangerous levels of endotoxin. All RBC units are inspected before issue for bacterial growth, which is indicated by a color change. Because platelet concentrates are stored at room temperature, they have greater potential for bacterial growth and endotoxin production if contaminated. To minimize growth, storage is limited to 5 days. The risk of bacterial contamination of platelets is 1:2500. Therefore, platelets are routinely tested for bacteria

Acute hemolytic transfusion reaction (AHTR)

- usually results from recipient plasma antibodies to donor RBC antigens. ABO incompatibility is the most common cause of AHTR. Antibodies against blood group antigens other than ABO can also cause AHTR. Mislabeling the recipient's pretransfusion sample at collection or failing to match the intended recipient with the blood product immediately before transfusion is the usual cause, not laboratory error.
- Mainly due to Clerical errors