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Transfusion reaction

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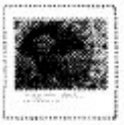

Surface proteins causing rejection

Blood donated by and for the same person

Blood in a bag, ready for infusion

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Alternative Names

blood transfusion reaction; incompatibility reaction

Definition

A complication of blood transfusion where there is an immune response against the transfused blood cells.

Causes, Incidence and Risk Factors

The immune response normally protects the body from potentially harmful substances. These substances ("antigens") trigger multiple responses, including production of antibodies (immunoglobulins, molecules that attach to a specific antigen and aid in its destruction) and sensitized lymphocytes that recognize a particular antigen and destroy it. The immune system normally can distinguish its own blood cells from other cells. These foreign proteins (antigens) produce an immune response.

The surface of red blood cells contain several proteins that can be identified by the body as antigens. In 1900, the German pathologist Karl Landsteiner identified 2 of these antigenic proteins, which he called A and B. Blood is classified according to the presence of

these antigens, resulting in blood types A, B, AB (contains both antigens), and O (contains neither antigen). Blood plasma contains antibodies against the opposite antigen. A person with Type A blood, for example, has antibodies against the B antigen.

In 1940, Dr. Landsteiner discovered another group of antigens. They were named Rhesus factors (Rh factors) because they were discovered during experiments on Rhesus monkeys. People with Rhesus factors in their blood are classified as "Rh positive," while persons without the factors are classified as "Rh negative." Rh negative persons form antibodies against the Rh factor if they are exposed to Rh positive blood. This is of major importance in an Rh negative mother who is pregnant with an Rh positive baby. There are other antigens as well, besides ABO and Rh antigens.

The presence of antibodies against blood antigens results in blood group compatibility or incompatibility. Transfusion of blood between compatible groups usually causes no problem. Blood transfusion between incompatible groups causes an immune response against the cells carrying the antigen, resulting in transfusion reaction.

The immune system attacks the donated blood cells, causing them to burst (hemolyze). This may cause serious symptoms, including kidney failure and shock. Antigens also occur on other blood components, including white blood cells, platelets, and plasma proteins. These components also cause a similar type of transfusion reaction.

Today, all blood is carefully screened. Modern lab methods and redundant checks have helped make transfusion reactions extremely rare.

Symptoms

- fever
- chills
- rash
- flank pain or back pain
- bloody urine
- fainting or dizziness

Symptoms of transfusion reaction usually appear during or immediately after the transfusion. Occasionally, they may develop after several days (delayed reaction). Symptoms may remain mild or progress to kidney failure, delayed anemia, or shock. This disease may also alter the results of the following tests:

- RBC count
- hemoglobin: serum
- hemoglobin
- hematocrit
- haptoglobin
- fibrin degradation products
- Coombs' test, indirect
- Coombs' test, direct
- CBC
- bilirubin

Treatment

The goal of treatment is to prevent or treat severe effects of transfusion reaction. If symptoms occur during the transfusion, the transfusion is stopped. Blood samples from the person receiving the transfusion (and from remaining donor blood) may be tested *to confirm that symptoms are caused* by transfusion reaction.
Mild symptoms may be treated according to the symptom. Antihistamines such as diphenhydramine may reduce itching and rash. Acetaminophen may be recommended to reduce fever and discomfort. Corticosteroids such as prednisone or dexamethasone may be given to reduce the immune response. Intravenous fluids and various medications may be used to treat/prevent kidney failure and shock.

Expectations (Prognosis)

The outcome varies depending on the severity of the reaction. The disorder may disappear completely and without problems; however, it may be severe and life threatening.

Complications

- discomfort

- anemia
- acute kidney failure
- shock

Calling Your Health Care Provider

Notify your health care provider if a blood transfusion is planned and previous transfusion reaction has occurred.

Prevention

Typing of donated blood into ABO and Rh groups has reduced the risk of transfusion reaction.
Prior to a transfusion, blood is usually crossmatched to further confirm that the blood is compatible. A small amount of donor blood is mixed with a small amount of recipient blood and the mixture is examined under a microscope for signs of antibody reaction.