Chapter 9

BLOOD COMPONENTS AND TRANSFUSION PRINCIPLES

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For a successful transfusion procedure, blood bank and apheresis unit should be well organized and operate effectively. In this paper, general principles regardig the use of blood products will be discussed.

I. WHOLE BLOOD

Whole blood is a blood product containing all blood components and approximately 70 mL of anticoagulation solution. After being taken from the donor, it is stored without being subjected to any separation process. It has a shelf life of 35 days in the whole blood (Citrate-Phosphate-Dextrose-Adenine; CPDA-1) solution and has a volume of about 500±50 mL. The most important cellular component in whole blood is the erythrocytes. Leukocytes and platelets lose their vitality within the first 24 hours. Whole blood contains all other coagulation factors in the plasma of blood except Factor V and Factor VIII. Indications include patients with acute and massive blood loss due to trauma and surgical operations that may result in massive blood loss (such as liver and heart transplantations).

II. RED BLOOD CELL SUSPENSIONS

Red blood cell (RBC) suspension is a blood product obtained by separating plasma from whole blood. The volume of one unit of erythrocyte suspension is approximately 300±50 mL, and and contains 200-250 mL of erythrocyte.Each unit of erythrocyte suspension contains approximately 20-90 mL of plasma. One unit of erythrocyte suspension increases the amount of hemoglobin (Hb) by about 1 g/dL and Hct by about 3% in an adult with an average weight of 70 kg. All blood transfusions given for erythrocyte replacement should be erythrocyte suspension. Whole blood should be used rarely for this purpose. Erythrocyte suspension is the blood component that should be preferred in the treatment of patients with deep anemia. There is no stable hemoglobin value for erythrocyte transfusion. The majority of patients with a hemoglobin value of >10 g/dL do not require

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Granulocyte suspensions should be stored at 22 ° C and without agitation. The product should absolutely be irradiated to prevent transfusion-associated graft-versus-host disease. The mandatory microbiological screening tests of the product should be completed before transfusion. Because of its high erythrocyte content, ABO and Rh should be compatible and cross-comparison test should be performed before transfusion. Although it has a shelf life of 24 hours, transfusion should be performed as soon as possible.The dose should be administered within 1-2 hours and leukocyte filter should not be used. The transfusion is repeated until the neutrophil count increases and/or recovery from infection. If severe reaction to granulocyte transfusion occurs or if recovery is not attained despite a minimum of 3 days of transfusion, the treatment is discontinued. Mild fever and tremor may arise during granulocyte transfusion. The rate of more severe side effect, such as hypotension and respiratory failure, is 1%. Potential side effects may include alloimmunization or development of GVHD.

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