Types of Blood Products

Different types of blood products are used to manage various hematologic diseases and may be necessary for some surgical procedures or trauma settings. Blood products are used as a temporary intervention until the patient's underlying issue is addressed. These products can be potentially dangerous, thus healthcare providers should obtain consent before administration. It is important to note that the term "blood transfusion" describes giving a patient whole blood, while blood component therapy describes giving packed red blood cells, fresh frozen plasma, or platelets.



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Types

Whole Blood
Whole-unseparated Blood
Whole blood contains red blood cells (RBCs), white blood cells (WBCs), and platelets in plasma. This is generally unprocessed and patients being administered whole blood need to be cross-matched to prevent a hemolytic transfusion reaction.

Packed Red Blood Cells
Packed RBCs
Packed red blood cells are derived from whole blood when it is centrifuged. The blood cells are removed from the plasma and can be stored for up to 35 days. Packed RBCs are used for severe anemia or in situations of acute blood loss. The rule of thumb is that one unit of RBCs raises hemoglobin levels by 1g/dL or the hematocrit by 3%. This blood product may be preferred if there is a danger of fluid overload, as it does not contain the blood products platelets, plasma and albumin. Note that a unit of RBCs can replace approximately a 500 mL blood loss.

Fresh Frozen Plasma
Frozen Plasma-TV
Fresh frozen plasma (FFP) describes the liquid portion of whole blood, minus the blood cells. This is rich in clotting factors and proteins and is indicated in patients who have bleeding caused by a deficiency in clotting factors. Examples include patients with liver disease, vitamin K deficiency, warfarin overdose, DIC, or in the case of a massive transfusion (> 1L). Plasma may also be separated into its derivatives to isolate albumin, concentrated clotting factors, or immunoglobulins. Once the fresh frozen plasma is thawed it must be used within 24 hours.

Immunoglobulins
Globulin-Goblin
Purified immunoglobulins can be derived from plasma, but fresh frozen plasma (FFP) can also be used to administer immunoglobulins. FFP is useful in infants with secondary immunodeficiency associated with severe protein-losing enteropathy and in whom total parenteral nutrition is ineffectual. FFP also can be used as a source of immunoglobulin for children and adults with humoral immunodeficiency.

Clotting Factors
Clogs
Those who have bleeding due to a clotting factor deficiency, such as disseminated intravascular coagulation (DIC), hemorrhage, liver disease, vitamin K deficiency, or warfarin toxicity can be given fresh frozen plasma, as it contains important coagulation factors. There are also clotting products available to treat specific clotting disorders and deficiencies, such as von Willebrand factor and cryoprecipitate.

Albumin
Album-man
Albumin is a blood product prepared from plasma and is used in patients with hypoalbuminemia or hypovolemic shock. This is because albumin is a hyperosmolar solution, which moves water from the extravascular space to the intravascular space.

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Platelets

Plates

Another type of blood component derived from whole blood is platelets. Platelets are used to treat bleeding caused by thrombocytopenia and a single unit of platelets typically increases a patient’s platelet count by 10,000 uL/unit. Platelet administration is contraindicated in thrombotic thrombocytopenic purpura (TTP) and heparin-induced thrombocytopenia (HIT).

Considerations

Use within 24 Hours

24hr-clock

It is important to note that fresh frozen plasma must be administered within 24 hours after thawing, else Factors V and VII will deteriorate (but it can be stored in its frozen form for up to a year.) At this point, the product is referred to as “Thawed Plasma”. Cryoprecipitate, which is made from FFP, must be used within 6 hours after thawing.

Washing Removes Antibodies

Washing Off Ant-tie-bodies

A unit of packed red blood cells or blood components is washed or filtrated to reduce plasma proteins. This reduces the risk for allergic transfusion reactions. Washing or leukocyte depletion by filtration reduces the amount of immunoglobulins, which decreases febrile or mild allergic reactions for patients who receive frequent transfusions.

Irradiation Destroys WBCs

Irradiating White Mac-man

Irradiation is needed to destroy all living leukocytes (white blood cells), particularly lymphocytes that could cause acute transfusion reactions. Patients who at risk for developing transfusion associated graft versus host disease (TAGVD) should be given irradiated blood products.

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