Contraindications

Leukocyte-reduced components do not prevent TA-GVHD. Leukocyte-reduction filters are not to be used in the administration of Apheresis Granulocytes.

Side Effects and Hazards

The use of blood components that are leukocyte reduced at the bedside may cause unexpected severe hypotension in some recipients, particularly those taking angiotensin-converting enzyme inhibitor medication.

Specific Leukocyte-Reduced Components

All components resulting from the leukocyte reduction process will bear the labeling attribute "leukocytes reduced."

Irradiation

Description

Blood components that contain viable lymphocytes may be irradiated to prevent proliferation of T lymphocytes, which is the immediate cause of TA-GVHD. Irradiated blood is prepared by exposing the component to a radiation source. The standard dose of gamma irradiation is 2500 cGy targeted to the central portion of the container with a minimum dose of 1500 cGy delivered to any part of the component.

Indications

Irradiated cellular components are indicated for use in patient groups that are at risk for TA-GVHD. At-risk groups include: fetal and neonatal recipients of intrauterine transfusions, selected immunocompromised recipients, recipients of cellular components known to be from a blood relative, recipients who have undergone marrow or peripheral blood progenitor cell transplantation, and recipients of cellular components whose donor is selected for HLA compatibility. Transfused patients receiving purine analogues (eg, fludarabine, cladribine) or certain other biological immunmodulators (eg, alemtuzumab, antithymocyte globulin) may be at risk for TA-GVHD, depending on clinical factors and the source of the biological agent.

Side Effects and Hazards

Irradiation induces erythrocyte membrane damage. Irradiated red cells have been shown to have higher supernatant potassium levels than nonirradiated red cells. Removal of residual supernatant plasma before transfusion may reduce the risks associated with elevated plasma potassium. The expiration date of irradiated red cells is changed to 28 days after irradiation if remaining shelf life exceeds 28 days. There are no known adverse effects

following irradiation of platelets; the expiration date is unchanged.

Specific Irradiated Components

All components that have been irradiated will bear the labeling attribute "irradiated."

Washing

Description

Washed components are typically prepared using 0.9% Sodium Chloride, Injection (USP) with or without small amounts of dextrose. Washing removes unwanted plasma proteins, including antibodies and glycerol from previously frozen units. There will also be some loss of red cells and platelets, as well as a loss of platelet function through platelet activation. The shelf life of washed components is no more than 24 hours at 1 to 6 C or 4 hours at 20 to 24 C. Washing is not a substitute for leukocyte reduction, and only cellular components should be washed.

Indications

Washing may be used to reduce exposure to plasma proteins, acellular constituents or additives (such as mannitol). It is indicated to reduce exposure to antibodies targeting known recipient antigens (such as an Apheresis Platelet unit containing incompatible plasma collected from a mother for the treatment of neonatal alloimmune thrombocytopenia), or to remove constituents that predispose patients to significant or repeated transfusion reactions (eg, the removal of IgA-containing plasma in providing transfusion support for an IgA-deficient recipient or in rare recipients experiencing anaphylactoid/anaphylactic reactions to other plasma components).

Specific Washed Components

WASHED RED BLOOD CELLS (RED BLOOD CELLS WASHED)
WASHED APHERESIS RED BLOOD CELLS (RED BLOOD CELLS PHERESIS WASHED)
WASHED PLATELETS Ω (PLATELETS WASHED)
WASHED APHERESIS PLATELETS Ω (PLATELETS PHERESIS WASHED)
WASHED APHERESIS PLATELETS PLATELET ADDITIVE SOLUTION ADDED LEUKOCYTES REDUCED Ω (PLATELETS PHERESIS PLATELET ADDITIVE SOLUTION ADDED LEUKOCYTES REDUCED)

Volume Reduction

Description

Volume reduction is a special manipulation of cellular blood products using centrifugation. The process involves the aseptic removal of a portion of the supernatant, containing plasma and storage medium. Volume reduction removes excess plasma, thereby reducing unwanted plasma proteins, including antibodies. It is more commonly used in pediatric and in-utero transfusions. There will be some loss of platelet function through platelet activation as a result of volume reduction. The shelf life of volume-reduced components is no more than 24 hours at 1 to 6 C or 4 hours at 20 to 24 C.

Indications

Reducing the plasma volume of cellular components is indicated in cases where the volume status of a patient is being aggressively managed, such as in infants with compromised cardiac function. Component volume reduction is also used to mitigate adverse transfusion reactions such as TACO and allergic reactions, and ABO incompatibilities.

Contraindications

Volume reduction is not a substitute for washing or for dosing with small aliquots.

Specific Volume-Reduced Components

RED BLOOD CELLS PLASMA REDUCED Ω (VOLUME REDUCED RED BLOOD CELLS)
RED BLOOD CELLS SUPERNATANT REDUCED Ω (VOLUME REDUCED RED BLOOD CELLS)
APHERESIS RED BLOOD CELLS PLASMA REDUCED Ω (VOLUME REDUCED RED BLOOD CELLS PHERESIS)
APHERESIS RED BLOOD CELLS SUPERNATANT REDUCED Ω (VOLUME REDUCED RED BLOOD CELLS PHERESIS)
PLATELETS PLASMA REDUCED Ω (VOLUME REDUCED PLATELETS)
APHERESIS PLATELETS PLASMA REDUCED Ω (VOLUME REDUCED PLATELETS PHERESIS)
APHERESIS PLATELETS PLATELET ADDITIVE SOLUTION ADDED LEUKOCYTES REDUCED SUPERNATANT REDUCED Ω (VOLUME REDUCED PLATELETS PHERESIS PLATELET ADDITIVE SOLUTION ADDED LEUKOCYTES REDUCED)

Further Testing to Identify CMV-Seronegative Blood

Description

CMV-seronegative blood is selected by performing testing for antibodies to CMV. Transmission of CMV disease is associated with cellular blood components. Plasma, cryoprecipitate, and other plasma-derived blood components do not transmit CMV; therefore, CMV testing is not required for these components.

Indications

Transfusion of CMV-negative blood is indicated in CMV-seronegative recipients who are at risk for severe CMV infections. These at-risk groups include pregnant women and their fetuses, low-birthweight infants, hematopoietic progenitor cell transplant recipients, solid-organ transplant recipients, severely immunosuppressed recipients, and HIV-infected patients.

Leukocyte-reduced components are considered an alternative to CMV-seronegative transfusion.

Table 7. Summary Chart of Blood Components

Category	Major Indications	Action/Recipient Benefit	Not Indicated for	Special Precautions	Hazards*	Rate of Infusion
Red Blood Cells	Symptomatic anemia; red cell exchange transfusion.	Increases oxygen-carrying capacity.	Pharmacologically treatable anemia. Volume expansion.	Must be ABO compatible.	Infectious diseases. Hemolytic, septic/toxic, allergic, febrile reactions. Iron overload. TACO. TRALI. TA-GVHD.	As fast as patient can tolerate but less than 4 hours.
Deglycerolized Red Blood Cells	See Red Blood Cells. IgA deficiency with anaphylactoid/anaphylactic reaction.	See Red Blood Cells. Deglycerolization removes plasma proteins. Risk of allergic and febrile reactions reduced.	See Red Blood Cells.	See Red Blood Cells.	See Red Blood Cells. Hemolysis due to incomplete deglycerolization can occur.	See Red Blood Cells.

Continued

Table 7. Summary Chart of Blood Components (Continued)

Category	Major Indications	Action/Recipient Benefit	Not Indicated for	Special Precautions	Hazards*	Rate of Infusion
Red Blood Cells Leukocytes Reduced	See Red Blood Cells. Reduction of febrile reactions, HLA alloimmunization and CMV infection.	See Red Blood Cells.	See Red Blood Cells. Leukocyte reduction should not be used to prevent TA-GVHD.	See Red Blood Cells.	See Red Blood Cells. Hypotensive reaction may occur if bedside leukocyte-reduction filter is used.	See Red Blood Cells.
Washed Red Blood Cells	See Red Blood Cells. IgA deficiency with anaphylactoid/anaphylactic reaction. Recurrent severe allergic reactions to unwashed red cell products.	See Red Blood Cells. Washing reduces plasma proteins. Risk of allergic reactions is reduced.	See Red Blood Cells. Washing is not a substitute for leukocyte reduction.	See Red Blood Cells.	See Red Blood Cells.	See Red Blood Cells.

Whole Blood	Symptomatic anemia with large volume deficit.	Increases oxygen-carrying capacity. Increases blood volume.	Condition responsive to specific component. Treatment of coagulopathy.	Must be ABO identical.	See Red Blood Cells.	As fast as patient can tolerate but less than 4 hours.
Fresh Frozen Plasma (FFP)	Clinically significant plasma protein deficiencies when no specific coagulation factor concentrates are available. TTP.	Source of plasma proteins, including all coagulation factors.	Volume expansion. Coagulopathy that can be more effectively treated with specific therapy.	Must be ABO compatible.	Infectious diseases. Allergic, febrile reactions. TACO. TRALI.	Less than 4 hours.
Plasma Frozen Within 24 Hours After Phlebotomy (PF24)	Clinically significant deficiency of stable coagulation factors when no specific coagulation factor concentrates are available. TTP.	Source of nonlabile plasma proteins. Levels of Factor VIII are significantly reduced and levels of Factor V and other labile plasma proteins are variable compared to FFP.	Volume expansion. Deficiencies of labile coagulation factors including Factors V and VIII and Protein C.	Must be ABO compatible.	See FFP.	Less than 4 hours.

Continued

Table 7. Summary Chart of Blood Components (Continued)

Category	Major Indications	Action/Recipient Benefit	Not Indicated for	Special Precautions	Hazards*	Rate of Infusion
Plasma Frozen Within 24 Hours After Phlebotomy Held At Room Temperature Up To 24 Hours After Phlebotomy (PF24RT24)	Clinically significant deficiency of stable coagulation factors when no specific coagulation factor concentrates are available. TTP.	Source of nonlabile plasma proteins. Levels of Factor V, Factor VIII, and Protein S are significantly reduced, and levels of other labile plasma proteins are variable compared with FFP.	Volume expansion. Deficiencies of labile coagulation factors including Factors V and VIII and Protein S.	Must be ABO compatible.	See FFP.	Less than 4 hours.

Plasma Cryoprecipitate Reduced	TTP.	Plasma protein replacement for plasma exchange in TTP. Deficient in fibrinogen, vWF, Factors VIII and XIII. Deficient in high-molecular-weight vWF multimers as compared to FFP.	Volume expansion. Deficiency of coagulation factors known to be depleted in this product: fibrinogen, vWF, Factors VIII and XIII.	Must be ABO compatible.	See FFP.	Less than 4 hours.
Thawed Plasma Ω	Clinically significant deficiency of stable coagulation factors when no specific coagulation factor concentrates are available. TTP.	Source of plasma proteins. Levels and activation state of co-agulation proteins in thawed plasma are variable and change over time.	Not indicated as treatment for isolated coagulation factor deficiencies or specific plasma protein deficiencies.	Must be ABO compatible.	See FFP.	Less than 4 hours.

Continued

Table 7. Summary Chart of Blood Components (Continued)

Category	Major Indications	Action/Recipient Benefit	Not Indicated for	Special Precautions	Hazards*	Rate of Infusion
Thawed Plasma Cryoprecipitate Reduced Ω	TTP.	Plasma protein replacement for plasma exchange in TTP. Deficient in fibrinogen, vWF, Factors VIII and XIII.	Volume expansion. Deficiency of coagulation factors known to be depleted in this product: fibrinogen, vWF, Factors VIII and XIII.	Must be ABO compatible.	See FFP.	Less than 4 hours.
Liquid Plasma	Initial treatment of patients undergoing massive transfusion.	Coagulation support for life-threatening trauma/ hemorrhages.	Not indicated as treatment for coagulation factor deficiencies where other products are available with higher factor concentrations.	Must be ABO compatible.	See FFP.	Less than 4 hours.

		The profile of plasma proteins in Liquid Plasma is not completely characterized. Levels and activation state of coagulation proteins are dependent upon production methods and storage.			
Cryoprecipitated AHF; Pooled Cryoprecipitated AHF	Hypofibrinogenemia. Factor XIII deficiency. Second-line therapy of von Willebrand disease, hemophilia A, and uremic bleeding.	Provides fibrinogen, vWF, Factors VIII and XIII.	Not indicated if specific concentrates are available. Deficiency of any plasma protein other than those enriched in Cryoprecipitated AHF.	Infectious diseases. Allergic, febrile reactions.	Less than 4 hours.

Continued

Table 7. Summary Chart of Blood Components (Continued)

Category	Major Indications	Action/Recipient Benefit	Not Indicated for	Special Precautions	Hazards*	Rate of Infusion
Platelets/Apheresis Platelets	Bleeding due to thrombocytopenia or platelet function abnormality including antiplatelet drugs. Prevention of bleeding from marrow hypoplasia.	Improves hemostasis. Apheresis platelets may be HLA (or other antigen) selected.	Plasma coagulation deficits. Some conditions with rapid platelet destruction (eg, ITP, TTP) unless life-threatening hemorrhage.	Should only use platelet-compatible filters (check manufacturer's instructions).	Infectious diseases. Septic/toxic, allergic, febrile reactions. TACO. TRALI. TA-GVHD.	Less than 4 hours.
Platelets Leukocytes Reduced/ Apheresis Platelets Leukocytes Reduced	See Platelets. Reduction of febrile reactions, HLA alloimmunization and CMV infection.	See Platelets.	See Platelets. Leukocyte reduction should not be used to prevent TA-GVHD.	See Platelets.	See Platelets.	See Platelets.

Apheresis Platelets Platelet Additive Solution Added Leukocytes Reduced	See Platelets Leukocytes Reduced.	See Platelets.	See Platelets Leukocytes Reduced.	See Platelets.	See Platelets.	See Platelets.
Apheresis Granulocytes Ω	Neutropenia with infection, unresponsive to appropriate antibiotics.	Provides granulocytes and platelets.	Infection responsive to antibiotics, eventual marrow recovery not expected.	Must be ABO compatible. Use only filters specifically approved by a manufacturer for granulocyte transfusions (check manufacturer's instructions).	Infectious diseases. Hemolytic, allergic, febrile reactions. TACO. TRALI. TA-GVHD. Maintain caution. Pulmonary reactions may occur in patients receiving concomitant amphotericin B.	One unit over 2-4 hours. Closely observe for reactions.

Continued

*For all cellular components there is a risk the recipient may become alloimmunized and experience rapid destruction of certain types of blood products. Red-cell-containing components and thawed plasma (thawed FFP, thawed PF24, thawed PF24RT24, or Thawed Plasma) should be stored at 1-6 C. Platelets, Granulocytes, and thawed Cryoprecipitate should be stored at 20-24 C. Disclaimer: Please check the corresponding section of the *Circular* for more detailed information. TACO = transfusion-associated circulatory overload; TRALI = transfusion-related acute lung injury; TA-GVHD = transfusion-associated graft-vs-host disease; CMV = cytomegalovirus; TTP = thrombotic thrombocytopenic purpura; AHF = antihemophilic factor; ITP = immune thrombocytopenic purpura; vWF = von Willebrand factor; HLA = Human Leukocyte Antigen; IUT = intrauterine transfusion.

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