Transfusion Guidelines

Blood Product	Dose	Response	Utilization Guidelines
Red Blood Cells	**Adult dose**: 1 unit **Neonatal dose**: 5 -15ml/kg	• 1 g/dL increase Hgb 3% increase in Hct • H&H - 1 hour post transfusion	• Hgb < 8g/dl • Blood loss > 30%
Platelets	**Adult dose**: > $3x10^{11}$plts **Pool Random Donors (RDP) vs. Single Donor Pheresis (SD)** **Neonatal dose**: 10 ml/kg	• Increase in count 30 – 60,000/µL/dose • Assay 10 min - 1 hour post transfusion	• Plt < 50,000/µL - bleeding or invasive procedure • Plt < 10 – 20,000/µL - HemOnc Patients • Plt < 30,000/µL - BMT patients • Plt < 100,000/µL – Neurosurgery, Platelet dysfunction with bleeding
Plasma	**<u>Warfarin reversal</u>** 5 – 8 ml/kg **<u>Factor replacement</u>** **Adult dose:** 2 - 4 units **Neonatal dose:** 10 -15 ml/kg	• Decrease in PT, INR • Replace coagulation factors	• PT > 1.5 x the upper limit of normal or the midpoint of normal range • aPTT > 1.5 x the upper limit of normal with bleeding or invasive procedure • Factor deficiency ***ONLY if no concentrate available***
Cryoprecipitate	**Adult dose**: 1 dose (pre-pooled from blood supplier) **Neonatal dose**: 1 unit/10kg	• Increase in fibrinogen • Increase vWF (Von-Willebrand's factor) • Increase factor VIII • Increase factor XIII	• Fibrinogen < 100mg/dL • Von Willebrand's Disease ***if other safer products not available*** • Uremic platelet dysfunction with bleeding

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Clinical Response for Transfusion Reactions

1. **STOP TRANSFUSION** / check patient ID against bag / Keep IV open with 0.9% NaCl / Document vital signs.
2. Notify provider and Blood Bank. Document provider's decision process in medical record.
3. Complete documentation in Cerner. By checking 'YES' for a reaction, system generates work-up orders.
4. Send a pink/purple (EDTA) top tube and the remaining blood product with any attached tubing to Blood Bank. (For mild allergic reaction see below)

Reaction Type	Signs and Symptoms	Etiology	Clinical Action
Allergic (mild)	-Urticaria, isolated -Skin flushing -Pruritis	Antibodies to transfused plasma proteins	-Administer antihistamines -Resume transfusion if improved -Notify TM; ***no samples necessary*** ** If no improvement in 30 minutes treat as moderate to severe ***Do not use unit of blood***
Allergic (moderate to severe)	-Urticaria, multiple sites/generalized -Bronchospasm -Respiratory distress, mild to severe (hypoxemia, dyspnea, wheezing) -Hypotension -Abdominal pain -Nausea	Antibodies to plasma proteins usually IgE; Can be IgA	-Administer antihistamines, epinephrine, vasopressors and/or corticosteroids as needed ***Do not use unit of blood***
Febrile non-hemolytic	-Fever -Temperature rise of >1˚C or 2˚F -Chills/Rigors -Headache -Vomiting	Cytokines released from WBC	-Mild: administer antipyretics as needed -Recurrent or severe; require consultation with Transfusion Medicine Director or designee **May occur after transfusion complete
Acute Hemolytic	-Hemoglobinuria -Renal failure with oliguria -Bleeding, unexplained -Fever/Chills -Anxiety -Chest/Flank pain -Shock/Cardiac arrest	Intravascular hemolysis usually due to ABO incompatibility; check for patient ID/clerical error	-Maintain airway -Treat shock with vasopressors -Monitor for renal failure; increase renal blood flow, administer fluids and maintain brisk diuresis -If DIC is present, consider heparin **Administer blood products as needed after etiology is clear
Septic	-Fever -Temperature rise of $\geq$ 2°C or 3°F -Hypotension, sudden -Shock	Bacteria in donor bag (Risk greater for platelets vs. RBCs)	-Send bag to Blood Bank -Order blood culture as needed -Pressors support if necessary -Broad-spectrum antibiotics
TRALI – Transfusion Related Acute Lung Injury	-Respiratory distress - acute (within 1-2 hours of transfusion) -Hypoxemia -Hypotension -Pulmonary edema (non-cardiogenic)	Usually donor HLA/neutrophil specific antibodies from transfused plasma; Recipient has corresponding antigens	-Respiratory support -Steroids -Diuretics; no known benefit -Diagnosis of exclusion ** Most will resolve within 24 – 96 hours (Donors deferred from donation if positive for HLA antibodies)

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CMV Seronegative Components

- Reduce exposure to cytomegalovirus (CMV)
- Donor serum screened for CMV antibodies

To determine patient CMV immune status – order CMV IgG antibody

Indications:

1. CMV seronegative BMT / PBSC transplant candidates & recipients
2. Infants < 4 months of age
3. Intrauterine transfusions
4. Congenital immunodeficiencies
5. CMV seronegative children receiving CMV seronegative solid organ transplants
6. HIV positive patients who are also CMV seronegative
7. Seronegative pregnant women

Alternative: Leukoreduced components

****** White cells which harbor CMV are removed (Considered CMV "safe" equivalent)

Hemoglobin S Negative Red Cells

- Prevent the transfusion of abnormal Hgb S

Indications:

1. Neonates < 4 months of age
2. Patients with sickle cell disease

Premedication

Acetaminophen/Benadryl Caution:

- Premedication should be given only when indicated, not as a routine for all patients.
- Premedication may mask symptoms such as fever which is the first indication of an acute hemolytic transfusion reaction.

Informed Transfusion Consent

- Obtained by MD, DO, PA, NP; witnessed
- Complete form: check "I do" vs. "I do not" consent
- Required for ALL blood products
- Permit adequate lead time for special donations: Autologous donations, Patient Selected Donations (PSD), family/friends

Caution: Consent form includes option **"I do not consent"** (Jehovah's witnesses)

Leukoreduced Components

- All blood products are prestorage leukoreduced
- Requires a standard blood administration set
- Evidence based indications are listed below for reference

Reduces Incidence:

1. HLA alloimmunization / platelet refractoriness
2. Febrile transfusion reactions, recurrent
3. Cytomegalovirus (CMV) transmission = ** **CMV "safe" equivalent**

Indications:

1. Hematologic malignancies
2. Bone Marrow (BM) or Peripheral Blood Stem Cell (PBSC) transplant recipients / candidates
3. Patients w/ history of multiple febrile reactions
4. Chronically transfused patients (i.e. Sickle cell disease)
5. Patients receiving multiple rounds chemotherapy
6. Living liver donor
7. Patients on cardiac bypass
8. Patients undergoing cardiac transplant
9. Cardiac patients on LVAD or mechanical heart

Irradiated Components

- Prevents transfusion associated Graft v. Host Disease (GVHD)
- **Fatal** complication – need to prevent, no cure
- Indicated for immunocompromised recipients
- Prevents immunocompetent donor T-cell replication

Notify Transfusion Medicine to flag patient's record to always receive irradiated products

Required for cellular products, not plasma

Indications:

1. BM or PBSC transplant recipient
2. Hematologic malignancies
3. High dose chemotherapy and/or radiation therapy w/bone marrow suppression or receiving Fludarabine
4. Congenital immunodeficiencies
5. HLA / crossmatched platelets
6. Patient selected donation (PSD)
7. Intrauterine transfusions
8. Infants who received intrauterine transfusions
9. Infants < 1 year of age

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