

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 Bridge. 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)	<ul style="list-style-type: none"> • Urticaria, <i>isolated</i> • Skin flushing • Pruritis 	Antibodies to transfused plasma proteins	Administer antihistamines, resume transfusion if improved Notify TM; no samples necessary <ul style="list-style-type: none"> • If no improvement in 30 minutes treat as moderate to severe Do not use unit of blood
Allergic (moderate to severe)	<ul style="list-style-type: none"> • Urticaria, <i>multiple sites/generalized</i> • Respiratory distress, mild to severe (hypoxemia, dyspnea, wheezing) • Bronchospasm • Hypotension • Nausea, abdominal pain, anaphylaxis 	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	<ul style="list-style-type: none"> • Fever • Temperature rise of $>1^{\circ}\text{C}$ or 2°F • Chills/Rigors 	Cytokines released from WBC	Mild: Administer antipyretics as needed Recurrent or severe: Requires consultation with Transfusion Medicine physician <ul style="list-style-type: none"> • May occur after transfusion complete
Acute Hemolytic	<ul style="list-style-type: none"> • Renal failure with oliguria • Hemoglobinuria, hemoglobinemia • Fever • Anxiety • Chest/Flank pain • Shock/Cardiac arrest 	Intravascular hemolysis usually due to ABO incompatibility; check for patient ID/clerical error	Treat shock with vasopressors, monitor for acute renal failure, increase renal blood flow Administer fluids and maintain brisk diuresis If DIC is present, consider heparin <ul style="list-style-type: none"> • Administer blood products as needed after etiology is clear
Septic	<ul style="list-style-type: none"> • Temperature rise of $\geq 2^{\circ}\text{C}$ 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, pressor support if necessary, broad-spectrum antibiotics
TRALI – Transfusion Related Acute Lung Injury	<ul style="list-style-type: none"> • Respiratory distress (usually within 1-2 hours of transfusion, up to 6 hours after transfusion) • Pulmonary edema (non-cardiogenic), unresponsive to diuretics • Hypoxemia 	Usually donor HLA/neutrophil specific antibodies from transfused plasma; Recipient has corresponding antigens	Respiratory support Diagnosis of exclusion Diuretics; no known benefit <ul style="list-style-type: none"> • Most will resolve within 24 – 96 hours (Donors deferred from donation if positive for HLA antibodies)
TACO – Transfusion Associated Circulatory Overload	<ul style="list-style-type: none"> • Pulmonary edema responsive to diuretics • Dyspnea, hypoxemia • Jugular Vein distension • Hypertension • Tachycardia • Orthopnea 	Risk highest in individuals with cardiopulmonary or renal disease, the very young and the elderly	Administer diuretics Provide respiratory support Transfuse minimum volumes needed to achieve therapeutic goals, transfuse slowly

Leukoreduced Components

- All blood products at VCU are prestorage leukoreduced
- A standard blood administration set is required
- 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 (TA-GVHD)
- **Fatal** complication – need to prevent, no cure
- Indicated for immunocompromised recipients
- Prevents immunocompetent donor T-cell replication

Order irradiated products if indicated for the patient

Required for cellular products, not plasma

Equivalent Alternative: pathogen reduced platelets

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
10. Congenital structural cardiac anomalies

For more information, please call Transfusion Medicine at 828-0256

VCUHS Transfusion Guidelines
Revised July 2020

Blood Product	Dose	Response	Utilization Guidelines
RBC	<p>Adult dose: 1 unit</p> <p>Neonatal and pediatric dose: 5-15 ml/kg (up to one unit of RBC)</p>	<ul style="list-style-type: none"> • Adult: 1 g/dl increase Hgb, 3% increase in Hct • H&H – 1 hr post transfusion • Peds: 1-3g/dl increase in Hgb, varies with unit type 	<ul style="list-style-type: none"> • Hgb < 7g/dl • Massive blood loss Defined as any of the following conditions: <ul style="list-style-type: none"> – Half of the patient’s blood volume is replaced within 3 hours – More than four units of red blood cells are transfused within 4 hours with continued bleeding – Blood loss greater than 150ml/min
Platelets	<p>Adult dose: >3x10¹¹ plts Single donor pheresis SD</p> <p>Neonatal and pediatric dose: 10 ml/kg</p> <p>*PAS and Pathogen reduced platelets- can give to any blood type. Pathogen reduced are equivalent to irradiated and CMV negative</p>	<ul style="list-style-type: none"> • Increase in count: 30 – 60,000/μL/dose • Perform post transfusion platelet count 10 min- 1 hr post transfusion • Peds: Increase by 50-100,000/μL/dose 	<ul style="list-style-type: none"> • Plt < 50,000/μL – bleeding or invasive procedure • Plt < 10 – 30,000/μL – HemOnc/BMT Patients • Plt < 100,000/μL – Neurosurgery • Platelet qualitative defect, regardless of platelet count
Plasma	<p><u>Warfarin reversal:</u> Consider using prothrombin complex +/- Vitamin K</p> <p><u>Bleeding AND coagulopathy</u></p> <p>Neonatal and pediatric dose: 10-15 ml/kg (up to one unit)</p>	<ul style="list-style-type: none"> • Decrease in PT, INR • Replace coagulation factors 	<ul style="list-style-type: none"> • PT/aPTT > 1.5 x the upper limit of normal <u>with</u> bleeding or invasive procedure • Specific factor deficiency <i>ONLY if no concentrate available</i> • In critically ill children, no benefit if INR < 2.5 and/or aPTT < 60 sec.
Cryoprecipitate	<p>Adults: 1 dose (received pre-pooled from blood supplier)</p> <p>Neonatal and pediatric dose: 1 unit/10kg</p>	<ul style="list-style-type: none"> • Increase in fibrinogen • Increase vWF (von Willebrand’s factor) • Increase factor VIII • Increase factor XIII 	<ul style="list-style-type: none"> • Fibrinogen < 100mg/dL • Von Willebrand’s Disease <i>if other safer products not available</i> • Uremic platelet dysfunction with bleeding

Risk/unit by Nucleic Acid Testing (NAT) and serology combined:

~HCV 1:1.1 Million ~HIV 1:1.5 Million ~HBV 1:843,000 - 1:1.2 Million

Risk of West Nile Virus varies by location, year, and season; testing by NAT

Risk of Chagas: dependent on geographic location; testing by serology (one-time testing)

Risk of Zika: testing by NAT (not required if pathogen reduced product)

Risk of Babesia: varies by location; testing by NAT in some locations (not required if pathogen reduced product)

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

Equivalent Alternative: Leukoreduced components or pathogen reduced platelets

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
- 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)

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