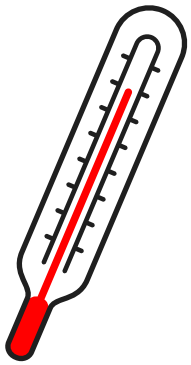
Acute Transfusion Reactions: Signs, Symptoms and Nursing Actions

A transfusion reaction is defined as any adverse event or complication that occurs in relation to the transfusion of a blood component. Reactions can be classified as either Acute or Delayed. Acute reactions most often occur within the first 15 minutes of the blood transfusion; but can occur up to 24 hours after completion.

Nursing Interventions for acute reactions:
Anytime there is a change in patient assessment from baseline, even if symptoms seem minor, a reaction may be developing. It is important to STOP the transfusion and reassess the patient. Early recognition leads to rapid intervention and better outcomes for the patient.

At a minimum, nurses should follow these universal steps if a reaction is suspected, while also adhering to hospital policies[3,4]:
- STOP the transfusion
- Obtain vital signs; reassess patient
- Keep IV patent (new tubing & 0.9% Normal Saline)
- Verify all patient & product information
- Notify provider & Transfusion Services
- Follow provider orders (administer medications, draw labs, etc.)
- Send blood bag and any paperwork to lab as requested
- Complete documentation in the medical record

	Reaction	Signs/Symptoms	Cause/Descriptions
 FEVER	Febrile, Non-Hemolytic Transfusion Reaction (FNHTR) Incidence: 91 in 100,000 transfusion events	• Fever (greater than or equal to 38°C/100.4°F oral and a change of at least 1°C/1.8°F) from pre-transfusion value • Chills/rigors	Most commonly due to passively transfused cytokines or a reaction between recipient antibodies directed against Human Leukocyte Antigen (HLA) on transfused donor white cells or platelets.
	Acute Hemolytic Transfusion Reaction (AHTR) Incidence: 1 in 100,000 transfusion events	• Fever • Chills/rigors • Back/flank pain • Red or very dark urine (hemoglobinuria) • Pain at IV site • Feeling of doom More severe signs include: • Renal failure • Disseminated intravascular coagulation (DIC) • Shock/Hypotension	Antibodies in the recipient's plasma bind to antigens on the transfused donor red cells causing hemolysis. Most severe reactions involve RBC transfusions that are ABO incompatible with recipient (e.g. Group A RBCs given by mistake to Group O recipient). Most often the result of human errors: • Misidentification of the blood sample, blood component or patient • Improper labeling of the blood sample or blood product • Sample testing errors NEVER restart a transfusion if suspect this type of reaction.
	Transfusion-transmitted bacterial infection (AKA Transfusion–related sepsis) Incidence: <1 in 100,000 transfusion events	• Fever (typically ≥ 38.5°C or 101°F) • Chills/rigors • Hypotension More severe symptoms may include: • Shock • Renal failure • DIC	Bacterial contamination of blood component. Contamination with gram-negative bacteria typically cause more severe symptoms. Same organism cultured from patient at time of reaction and from blood component. Reaction is rare but when observed most commonly occurs with platelet transfusion. NEVER restart a transfusion if suspect this type of reaction

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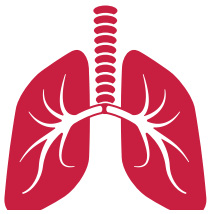
	Reaction	Signs/Symptoms	Cause/Descriptions
 URTICARIA or RASH	Allergic Transfusion Reaction Incidence: 92 in 100,000 transfusion events	**Mild Allergic:** • Rash • Pruritis (itching) • Urticaria (hives) • Generalized flushing **Severe or Anaphylactic type:** • Angioedema • Swelling of lips, tongue and/or uvula • Periorbital edema • Wheezing/respiratory distress • Hypotension	Often the result of release of histamine from an IgE-mediated reaction to a suspected allergen (e.g. ingested food or drug by the donor). **NOTE:** With mild Allergic reactions, it may be possible to restart the transfusion after administration of antihistamine and relief of itching/hives with provider order and no respiratory symptoms are present. Refer to your ihospital policy. NEVER restart a transfusion if full body hives or wheezing or respiratory distress is present.
 DYSPNEA	Transfusion-Associated Circulatory Overload (TACO) Incidence: 11 in 100,000 transfusion events	• Dyspnea • Orthopnea • Hypoxemia (e.g. SpO2 <90% on room air) • Hypertension • Jugular venous distension • Evidence of left heart failure (e.g. CXR shows evidence of acute or worsening pulmonary edema) • Evidence of fluid overload (e.g. positive fluid balance, weight gain) • Increased levels of Brain Natriuretic Peptide (BNP) or NT-proBNP	Caused by a rapid infusion or excessive volume of blood or blood components in patients with limited cardiac reserve (e.g. very young, elderly), renal failure or impaired tolerance to fluids. Often seen during or within 12 hours after transfusion completed. NEVER restart a transfusion if respiratory distress is present.
	Transfusion-Related Acute Lung Injury (TRALI) Incidence: 1 in 100,000 transfusion events	• Dyspnea • Acute onset of hypoxemia (O2 saturation <90% on room air) • Hypotension • No evidence of circulatory overload • Bilateral infiltrates on chest x-ray	Cause not fully understood. May be due to immune (donor antibodies react against recipient WBCs) or non-immune (biological mediators) mechanisms resulting in increased pulmonary capillary permeability and noncardiogenic pulmonary edema during or within 6 hours of transfusion. NEVER restart a transfusion if respiratory distress is present.
 HYPOTENSION	Hypotensive Transfusion Reaction Incidence: 3 in 100,000 transfusion events	• Hypotension during or within 1 hour of stopping transfusion o **Adults:** ≥ 30 mmHg drop in systolic BP and systolic BP ≤ 80 mmHg o **Pediatrics:** >25% drop in systolic BP from baseline	Patient has no other criteria that could explain hypotension and all other adverse reactions presenting with hypotension are excluded. In general, blood pressure improves rapidly when transfusion is stopped and/or with supportive care.

Resources

1. CDC National Healthcare Safety Network. Biovigilance Component Manual Protocol March 2021 https://cdc.gov/nhsn.
2. Hod EA, Francis RO. (2020) Noninfectious complications of blood transfusion. In Cohn C, Delaney M, Johnson ST, Katz LM. (Ed) Technical Manual. (20th Edition, pp 627-657). Bethesda MD: AABB Press.
3. Delaney M et al. Transfusion reactions: prevention, diagnosis and treatment. Lancet 2016;388:2825-2836.
4. Gorski L et al. Infusion Therapy Standards of Practice 2021. Infusion Nurses Society. Section 9 Standard 191.
5. Frazie SK et al. Adverse reactions to transfusion of blood products and best practices for prevention. Crit Care Nurs Clin N Am 2017;29:271-290.
6. Kracalik, I, et al. Transfusion-related adverse reactions: Data from the National Healthcare Safety Network Hemovigilance Module — United States, 2013–2018. Transfusion. 2021;61:1424–1434. https://doi.org/10.1111/trf.16362

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