# ADVERSE TRANSFUSION REACTION TABLE (BB.04.0810)

Preliminary Laboratory testing of all reported adverse reactions includes a clerical check, visual check for plasma hemolysis, Direct Antiglobulin Test (DAT) and re-confirmation of ABO/RH type.

| TYPE | ETIOLOGY | CASE DEFINITION | POSSIBLE ADDITIONAL TESTING IF INDICATED (to be ordered by pathologist or clinician after case review) | POSSIBLE THERAPIES |
|---|---|---|---|---|
| **Acute hemolytic transfusion reaction (AHTR)** | An acute hemolytic transfusion reaction is the rapid destruction of red blood cells that occurs during, immediately after, or within 24 hours of a transfusion when a patient is given an incompatible blood type. The recipient's body immediately begins to destroy the donated red blood cells resulting in fever, pain, and sometimes severe complications such as kidney failure. | **Definitive:**<br>Occurs during, or within 24 hours of cessation of transfusion with new onset of **ANY** of the following signs/symptoms:<br>• Back/flank pain<br>• Chills/rigors<br>• Disseminated intravascular coagulation (DIC)<br>• Epistaxis<br>• Fever<br>• Hematuria (gross visual hemolysis)<br>• Hypotension<br>• Oliguria/anuria<br>• Pain and/or oozing at IV site<br>• Renal failure<br>**AND**<br>**2** or more of the following:<br>• Decreased fibrinogen<br>• Decreased haptoglobin<br>• Elevated bilirubin<br>• Elevated LDH<br>• Hemoglobinemia<br>• Hemoglobinuria<br>• Plasma discoloration c/w hemolysis<br>• Spherocytes on blood film<br>**AND EITHER**<br>**(IMMUNE-MEDIATED)**<br>Positive direct antiglobulin test (DAT) for anti-IgG or anti-C3<br>**AND**<br>Positive elution test with alloantibody present on the transfused red blood cells<br><br>**OR**<br>**(NON-IMMUNE MEDIATED)**<br>Serologic testing is negative, and physical cause (e.g., thermal, osmotic, mechanical, chemical) is confirmed. | Repeat antibody screen on pre and post transfusion samples. Perform elution and AB ID if posttransfusion DAT is (+) and pre- is (-). Repeat crossmatches. Fibrinogen, Haptoglobin, Bilirubin, LDH | Insure adequate urine output. Analgesics Pressors for hypotension. Blood components PRN bleeding. |

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| **Allergic reaction - Minor** | Antibody to donor plasma proteins | Minor allergic reactions (non-severe), such as urticarial, do not have to be reported. Transfusion may be restarted after antihistamines if symptoms resolve. | | Antihistamines |
| **Allergic reaction - Severe** | Antibody to donor plasma proteins, e.g. IgA deficiency | **Definitive:**<br>**2 or more** of the following occurring during or within 4 hours of cessation of transfusion:<br>• Conjunctival edema<br>• Edema of lips, tongue and uvula<br>• Erythema and edema of the periorbital area<br>• Generalized flushing<br>• Hypotension<br>• Localized angioedema<br>• Maculopapular rash<br>• Pruritus (itching)<br>• Respiratory distress; bronchospasm<br>• Urticaria (hives) | Anti-IgA<br>IgA, quantitative | Epinephrine, antihistamines, corticosteroids, beta-2 agonists as indicated.<br>Supportive care<br>IgA deficient blood products |
| **Delayed hemolytic transfusion reaction (DHTR)** | A delayed hemolytic transfusion reaction occurs when the recipient develops antibodies to red blood cell antigen(s) between 24 hours and 28 days after a transfusion. Symptoms are usually milder than in acute hemolytic transfusion reactions and may even be absent. DHTR is diagnosed with laboratory testing. | **Definitive:**<br>Positive direct antiglobulin test (DAT) for antibodies developed between 24 hours and 28 days after cessation of transfusion<br>**AND EITHER**<br>Positive elution test with alloantibody present on the transfused red blood cells<br>**OR**<br>Newly-identified red blood cell alloantibody in recipient serum<br>**AND EITHER**<br>Inadequate rise of post-transfusion hemoglobin level or rapid fall in hemoglobin back to pre-transfusion levels<br>**OR**<br>Otherwise unexplained appearance of spherocytes | Repeat antibody screen.<br>Bilirubin, LDH | Transfuse compatible RBCs |

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| **Delayed serologic transfusion reaction (DSTR)** | A delayed serologic transfusion reaction occurs when a recipient develops new antibodies against red blood cells between 24 hours and 28 days after a transfusion without clinical symptoms or laboratory evidence of hemolysis. Clinical symptoms are rarely associated with DSTR | **Definitive:**<br>Absence of clinical signs of hemolysis<br>**AND**<br>Demonstration of new, clinically-significant antibodies against red blood cells<br>**BY EITHER**<br>Positive direct antiglobulin test (DAT)<br>**OR**<br>Positive antibody screen with newly identified RBC alloantibody. | Antibody panel<br>Antigen type previously transfused RBCs | Transfuse compatible RBCs |
| **Febrile non-hemolytic transfusion reaction (FNHTR)** | Febrile non-hemolytic transfusion reactions are the most common reaction reported after a transfusion. FNHTR is characterized by fever and/or chills in the absence of hemolysis (breakdown of red blood cells) occurring in the patient during or up to 4 hours after a transfusion. These reactions are generally mild and respond quickly to treatment. Fever can be a symptom of a more severe reaction with more serious causes and should be fully investigated. | **Definitive:**<br>Occurs during or within 4 hours of cessation of transfusion<br>**AND EITHER**<br>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<br>**OR**<br>Chills/rigors are present. | Culture product if bacterial contamination is a possibility | Antipyretics<br>Leukodepleted blood<br>Antibiotics if suspect/confirmed sepsis |
| **Hypotensive transfusion reaction** | A hypotensive transfusion reaction is a drop in systolic blood pressure occurring soon after a transfusion begins that responds quickly to cessation of the transfusion and supportive treatment. Hypotension also can be a symptom of a more severe reaction and should be fully investigated. | **Definitive:**<br>All other adverse reactions presenting with hypotension are excluded<br>**AND**<br>Hypotension occurs during or within 1 hour after cessation of transfusion.<br>• **Adults (18 years and older):** Drop in systolic BP of greater than or equal to 30 mmHg and systolic BP less than or equal to 80 mmHg.<br>• **Infants, children and adolescents (1 year to less than 18 years old):** Greater than 25% drop in systolic BP from baseline (e.g., drop in systolic BP of | Test as needed to rule out febrile, hemolytic and bacterial contamination reactions | Responds quickly to cessation of transfusion and supportive care |

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| | | 120mmHg to below 90mmHg).<br>• **Neonates and small infants (less than 1 year old OR any age and less than 12 kg body weight):**<br>Greater than 25% drop in baseline value using whichever measurement is being recorded (e.g., mean BP). | | |
| **Post transfusion purpura (PTP)** | PTP is a rare but potentially fatal condition that occurs when a transfusion recipient develops antibodies against platelets, resulting in rapid destruction of transfused and the patient's own platelets with a severe decline in the platelet count. PTP usually occurs 5-12 days after a transfusion and is more common in women than in men. | **Definitive:**<br>Alloantibodies in the patient directed against HPA or other platelet specific antigen detected at or after development of thrombocytopenia<br>**AND**<br>Thrombocytopenia (i.e., decrease in platelets to less than 20% of pre-transfusion count). | Send specimen to reference lab for platelet antibody screen. | HPA-1 negative units<br>Plasmapheresis<br>IVIG |
| **Transfusion-associated circulatory overload (TACO)** | Transfusion-associated circulatory overload occurs when the volume of blood or blood components are transfused cannot be effectively processed by the recipient. TACO can occur due to an excessively high infusion rate and/or volume or due to an underlying heart or kidney condition. | **Definitive:**<br>New onset or exacerbation of 3 or more of the following within 6 hours of cessation of transfusion:<br>• Acute respiratory distress (dyspnea, orthopnea, cough)<br>• Elevated brain natriuretic peptide (BNP)<br>• Elevated central venous pressure (CVP)<br>• Evidence of left heart failure<br>• Evidence of positive fluid balance<br>• Radiographic evidence of pulmonary edema | BNP<br>Evidence of left heart failure<br>Chest X-Ray | Upright position<br>Oxygen<br>Diuretics<br>Phlebotomy |
| **Transfusion-related acute lung injury (TRALI)** | Transfusion-related acute lung injury is a serious but rare reaction that occurs when fluid builds up in the lungs but is not related to excessive volume of blood or blood products transfused. The mechanism of TRALI is not well understood but is thought to be associated with the | **Definitive:**<br>NO evidence of acute lung injury (ALI) prior to transfusion<br>**AND**<br>ALI onset during or within 6 hours of cessation of transfusion<br>**AND**<br>Hypoxemia defined by any of these methods:<br>• PaO2/FiO2 less than or equal to 300 mm Hg<br>• Oxygen saturation less than 90% on room air<br>• Other clinical evidence | Chest X-Ray for evidence of bilateral infiltrates<br>WBC antibody screen in donor and recipient<br>HLA antigen typing<br>WBC crossmatch | Supportive respiratory and general care until recovery. Blood Bank will notify blood center for donor follow-up |

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| | presence of antibodies in donor blood. | **AND** Radiographic evidence of bilateral infiltrates<br><br>**AND**<br>No evidence of left atrial hypertension (i.e., circulatory overload) | | |
| **Transfusion-associated dyspnea (TAD)** | Transfusion associated dyspnea is the onset of respiratory distress within 24 hours of transfusion that cannot be defined as TACO, TRALI, or an allergic reaction. | **Definitive:**<br>Acute respiratory distress occurring within 24 hours of cessation of transfusion<br>**AND**<br>Allergic reaction, TACO, and TRALI definitions are not applicable. | Chest X-Ray<br>Other tests as needed to rule out TRALI, TACO and allergic reactions | Supportive respiratory and general care until recovery |
| **Transfusion-associated graft vs. host disease (TAGVHD)** | Transfusion-associated graft vs. host disease is a rare complication of transfusion that occurs when donor T-lymphocytes (the "graft") introduced by the blood transfusion rapidly increase in number in the recipient (the "host") and then attack the recipient's own cells. | **Definitive:**<br>A clinical syndrome occurring from 2 days to 6 weeks after cessation of transfusion characterized by:<br>• Characteristic rash: erythematous, maculopapular eruption centrally that spreads to extremities and in severe cases may progress to generalized erythroderma and hemorrhagic bullous formation.<br>• Diarrhea<br>• Fever<br>• Hepatomegaly<br>• Liver dysfunction (i.e., elevated ALT, AST, Alkaline phosphatase, and bilirubin)<br>• Marrow aplasia<br>• Pancytopenia<br>**AND**<br>Characteristic histological appearance of skin or liver biopsy. | Liver function tests<br>Liver biopsy | Corticosteroids |
| **Transfusion-transmitted infection (TTI)** | A transfusion-transmitted infection occurs when a bacterium, parasite, virus, or other potential pathogen is transmitted in donated blood to the transfusion recipient | **Definitive:**<br>Laboratory evidence of a pathogen in the transfusion recipient. | Gram stain/Culture unit<br>Blood bank will notify blood center<br>Blood cultures from patient<br>Test for blood borne pathogens | Antibiotic or other therapy appropriate for the infection<br>Treat complications |

References:

NHSN Biovigilance Component Hemovigilance Module Surveillance Protocol v2.4 https://www.cdc.gov/nhsn/pdfs/biovigilance/bv-hv-protocol-current.pdf

CDC Centers for Disease Control and Prevention Blood Safety https://www.cdc.gov/bloodsafety/basics.html