

# Algorithm for Transfusion Reactions



<http://novascotia.ca/dhw/nspbcp/cp/>

## PATIENT EXHIBITS SIGNS AND SYMPTOMS OF A TRANSFUSION REACTION

1. **STOP THE TRANSFUSION!!!!**
2. **If patient is experiencing serious signs and symptoms, disconnect the transfusion**
3. Maintain IV patency with appropriate IV fluid
4. Contact the physician for medical assessment
5. Check vital signs every 15 minutes until stable
6. Perform Clerical check to ensure there is no clerical discrepancy by verifying that the armband and blood tag match with the patient's name and medical record number. Verify the patient's ABO/Rh type is compatible/identical to the unit ABO/Rh type and the unit is not expired.

### Serious Signs and Symptoms?

#### IF PATIENT HAS ANY ONE OF THE FOLLOWING:

- Onset of any symptom in the first 15 minutes of transfusion
- Fever
- Chills/Rigors
- Hypotension/shock
- Hypertension
- Unexplained anxiety
- Any pain
- Headache
- Dyspnea/respiratory distress
- Tea colored urine
- Bleeding from IV site
- Nausea/vomiting
- Tachycardia/arrhythmias
- Generalized flushing
- Hives/rash covering body greater than 1/4 body
- Patient states he/she feels unwell

**NOTE:** Consider bacterial contamination if the patient exhibits any of the following during or within 4 hours post transfusion:

1. Temperature rise  $\geq 1^{\circ}\text{C}$  and  $\geq 38^{\circ}\text{C}$  PLUS any of the following:
  - rigors
  - hypotension
  - shock
  - tachycardia
  - dyspnea
  - nausea/vomiting
2. Temperature rise  $> 39^{\circ}\text{C}$  and  $\geq 1^{\circ}\text{C}$ ; with or without other signs or symptoms
3. Temperature rise not responding to antipyretics and/or suspicion of sepsis

### Clerical Discrepancy?

1. **DO NOT RESTART THE TRANSFUSION**
2. Institute patient management
3. Notify the patient's physician immediately
4. Notify Blood Transfusion Services (BTS) immediately
5. The following should be sent to BTS:
  - a. Tubes of blood as per BTS reaction investigation policy \*
  - b. Completed Blood Transfusion Report/Tag
  - c. Blood product & administration set/fluid
  - d. Additional samples as requested by BTS
6. Include:
  - a. Blood and product cultures (done by BTS) if bacterial contamination is suspected as indicated by physician
  - b. Chest x-ray for dyspnea/respiratory distress

**CONSIDER: ACUTE HEMOLYTIC, SEVERE ALLERGIC, ANAPHYLACTIC/ANAPHYLACTOID, TRANSFUSION ASSOCIATED CIRCULATORY OVERLOAD (TACO), TRANSFUSION RELATED ACUTE LUNG INJURY (TRALI) OR BACTERIAL CONTAMINATION**

### Minor Symptoms?

Temperature rise  $\geq 1^{\circ}\text{C}$  and  $\geq 38^{\circ}\text{C}$  with no other signs or symptoms

#### BTS MUST BE NOTIFIED OF ALL SUSPECTED TRANSFUSION REACTIONS

- Consider medicating with antipyretics or Analgesics
- Note: Requires a physician order*
- Document assessment and intervention on patient's chart and on transfusion tag
- Resume transfusion cautiously ONLY as directed by physician
- Patient should be directly observed for the first 5 minutes after resuming transfusion then every 5 minutes for the next 10 minutes

**IMMEDIATELY stop the transfusion if the patient develops any SERIOUS signs and symptoms**

If remainder of transfusion is uneventful, upon completion the following should be sent to BTS:

- a. Tubes of blood as per BTS reaction investigation policy \*
  - b. Blood Transfusion Report/Tag
  - c. Blood product & administration set/fluid
  - d. Completed Blood Transfusion Report/tag
- ENSURE MOST CLINICALLY SIGNIFICANT INFORMATION IS DOCUMENTED ON TRANSFUSION TAG AND PATIENT'S CHART**

*\* Note: Possible exception for pediatric patients: lab testing will be performed at discretion of Physician*

Hives/Rash over  $\leq 1/4$  of body with no other symptoms

#### BTS MUST BE NOTIFIED OF ALL SUSPECTED TRANSFUSION REACTIONS

- Consider medicating with antihistamines or antipyretics
- Note: Requires a physician order*
- Document assessment and intervention on patients chart and on transfusion tag
- Resume transfusion cautiously ONLY as directed by physician
- Patient should be directly observed for the first 5 minutes after resuming transfusion then every 5 minutes for the next 10 minutes

**IMMEDIATELY stop the transfusion if the patient develops any SERIOUS signs and symptoms**

If remainder of transfusion is uneventful, documentation on Blood Transfusion Report/Tag should be completed and returned to BTS once transfusion is complete

**ENSURE MOST CLINICALLY SIGNIFICANT INFORMATION IS DOCUMENTED ON TRANSFUSION TAG AND PATIENT'S CHART**

**CONSIDER: FEBRILE NON-HEMOLYTIC or MINOR ALLERGIC**

# Investigation of Adverse Transfusion Reactions

Suspected Reaction	Signs and Symptoms	Testing Requirements	Laboratory Tier Testing <i>Note: Possible exception for pediatric patients: lab testing will be performed at discretion of Physician</i>	
Minor Allergic	Rash/hives over ≤ 1/4 of body <b>with no</b> other symptoms	None	<p style="text-align: center;"><b><u>Tier One Testing</u></b>- performed to rule out hemolytic reactions.</p> <ul style="list-style-type: none"> <li>Clerical check for procedural or identification errors</li> <li>Visual check of post-transfusion serum for hemolysis</li> <li>Perform ABO/Rh on post-transfusion sample and compare to pre-transfusion sample ABO/Rh</li> <li>Direct Antiglobulin Test (DAT) on post-transfusion sample *</li> <li>Request urine sample (if above test results suggest a hemolytic event)</li> </ul> <p><i>Alert the hemato-pathologist/attending physician if Tier one testing is positive or if a Hemolytic Event is suspected. Proceed to Tier two testing if indicated by the hematopathologist.</i></p>	
Severe Allergic/ Anaphylactic/ Anaphylactoid	<p><b>Rash/hives with any one or more of the following:</b></p> <ul style="list-style-type: none"> <li>- Airway compromise (tightness in throat, hoarseness, stridor, dyspnea, cough, wheezing, hypoxemia)</li> <li>- Profound hypotension (loss of consciousness, circulatory collapse, death)</li> </ul>	<p style="text-align: center;"><b>Tier Testing Consider:</b></p> <ul style="list-style-type: none"> <li>Haptoglobin</li> <li>Chido/Rogers</li> <li>Serum IgA</li> </ul>		
Does Not Meet TTISS Definition of a Reaction	Temperature rise ≥1°C and <38°C with <b>no</b> other signs or symptoms and onset greater than 15 minutes into transfusion	None Testing will only be performed upon request of a Physician	<p style="text-align: center;"><b><u>Reports</u></b></p> <p>If Tier one testing is negative, generate a report to support ongoing transfusion. If Tier one testing is positive, investigation must be complete prior to any further transfusion. Further release can only occur with the approval of the hematopathologist/attending physician.</p> <p style="text-align: center;"><b><u>Tier Two Testing</u></b></p> <ul style="list-style-type: none"> <li>Repeat pre-transfusion sample ABO/Rh</li> <li>DAT on pre- transfusion sample *(if post-transfusion DAT is positive)</li> <li>Perform ABO/Rh type &amp; DAT on the unit in question*</li> <li>Repeat Antibody Screen on pre/post samples</li> <li>Perform antiglobulin crossmatches on the pre and post blood specimens with the unit(s)</li> <li>Perform urine dipstick for hemoglobin</li> </ul> <p><i>When results are indicative of a Hemolytic reaction continue to Tier three Testing or perform Tier three testing as appropriate, based on findings.</i></p> <p style="text-align: center;"><b><u>Tier Three Testing</u></b></p> <ul style="list-style-type: none"> <li>Antibody Investigation (phenotype donor unit &amp; pre-transfusion sample)</li> <li>Eluate (pre and post samples)</li> <li>Antibody Investigation on donor units</li> <li>Investigate transfusion technique and blood component storage conditions*</li> </ul> <p><b>Other tests that may be considered to categorize the adverse reaction may include:</b> CBC, coagulation studies, serum urea/creatinine, Haptoglobin, LDH, bilirubin, electrolytes, serology, virology, iron studies, TRALI investigation.</p> <p style="text-align: center;"><i><u>*Items to be sent if referring DAT testing</u></i></p> <p style="text-align: center;"><b>Samples Required for Tier One Adverse Reaction Investigation</b> 1 EDTA                      1 clotted</p> <p style="text-align: center;"><b>Samples required for TRALI Investigation</b> Pre-transfusion: 1 clotted specimen (if not available EDTA should be sent) Post Transfusion: 1 clotted <b>and</b> 1 EDTA</p> <p style="text-align: center;"><b>BTS may request additional samples</b> <i>Refer to DHA/IWK hospital policy</i></p> <p style="text-align: center;"><b>Complete lab/facility specific adverse reaction forms.</b> If transfusion reaction is due to an ERROR, follow DHA/IWK policy for reporting and investigation of transfusion errors.</p> <p><b>BTS to notify CBS of all <b>SERIOUS</b> reactions as per <i>The Provincial Standard for Hospitals to Report Adverse Reactions to Blood /Blood Components and Blood Products in NS located at <a href="http://novascotia.ca/dhw/nsbpcpl/">http://novascotia.ca/dhw/nsbpcpl/</a>.</i></b></p>	
Febrile Non-Hemolytic Reaction (FNHR)	Temperature rise ≥1°C and ≥38°C with <b>no</b> other signs or symptoms	Tier Testing		
FNHR  Acute Hemolytic  Bacterial Contamination	<p style="text-align: center;">Temperature rise ≥1°C and ≥38°C and/or any of the following:</p> <p style="text-align: center;">1. Rigors                                      3. Dyspnea 2. Hypotension, shock                      4. Nausea/vomiting 5. Tachycardia</p> <p style="text-align: center;"><b>OR:</b></p> <p>Temperature rise &gt;39°C and ≥1°C even in the absence of other signs or symptoms</p> <p style="text-align: center;"><b>OR:</b></p> <p>Temperature rise not responding to antipyretics and/or suspicion of sepsis in absence of fever</p>	<p style="text-align: center;">Tier Testing</p> <ul style="list-style-type: none"> <li>Blood Cultures from a different IV site</li> <li>Product Cultures (Include a Gram Stain)</li> </ul>		
Acute Hemolytic IVIG Headache Other	<p style="text-align: center;"><b>Any one or more of the following:</b></p> <p>Chills/Rigors, sensation of cold, any pain, headache, bleeding from IV site, nausea/vomiting, jaundice, tea colored urine, unexplained anxiety, cardiac arrhythmias, tachycardia, generalized flushing, patient states feels unwell</p>	Tier Testing		
Hypotensive Reaction  <i>** (Hypotension in Pediatrics is highly variable)</i>	<p style="text-align: center;"><b>Any one of the following:</b></p> <p>-Drop in systolic BP greater or equal to 30 mmHg -Systolic less than 80 mmHg -Signs of shock</p> <p style="text-align: center;">Advise BTS if patient on ACE Inhibitors</p> <p style="text-align: center;"><b>**In Pediatrics look for any significant change in BP</b></p>	Tier Testing		
Transfusion Associated Circulatory Overload (TACO)  Transfusion Associated Dyspnea (TAD)	<p style="text-align: center;"><b>Any one of the following:</b></p> <p>Shortness of breath, dyspnea, cyanosis, hypertension, respiratory distress, tachycardia, congestive heart failure during or within 6 hours of completion of transfusion</p>	Tier Testing AND Chest X-Ray		
TRALI (Transfusion Related Acute Lung Injury)	Acute onset of respiratory distress, during or within 6 hours of completion of transfusion. O <sub>2</sub> Saturation less than 90% on room air, bilateral lung infiltrates confirmed by Chest X-Ray, No evidence of circulatory overload	Tier Testing AND Chest X-Ray <b>Initiate TRALI Investigation</b>		
<p><b>Key: ≥: Greater than or equal to &lt;: Less than &gt;: Greater than    CBC: Complete Blood Count</b> <b>LDH: Lactate Dehydrogenase    CBS: Canadian Blood Services    BTS: Blood Transfusion Services</b> <b>TTISS Transfusion Transmitted Injuries Surveillance System</b></p>				
<p><b>Consider signs and symptoms and investigation required for other suspected/delayed transfusion reactions</b></p> <p style="text-align: center;"><b>November 2014</b></p>				