# BEEBE HEALTHCARE

Patient Care Manual

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| BLOOD: Adverse Transfusion Reactions | Date Issued: 12/95 |
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| [X] Condition of Participation 08:#482.23(c)<br>[ ] Joint Commission Standard<br>[X] Department Specific Regulation | Reviewed: |

**PURPOSE**
Any adverse symptoms or physical signs during or after the transfusion of a blood product must be considered a potential life-threatening reaction and immediate clinical actions must be taken. The purpose of this procedure is to provide written guidelines for detecting, reporting and evaluating a suspected reaction for Nursing and the Transfusion Service. In the event of a suspected transfusion reaction, the personnel attending the patient will immediately notify a responsible physician and blood bank. The reactions will be evaluated promptly and to the extent considered appropriate by the Medical Director or designee but should not delay proper clinical management of the patient.

**SCOPE**
Patient Care and Blood Bank

**POLICY**
**Immediate Complications** Listed below are signs and symptoms that may be associated with acute transfusion reactions. The list is not inclusive but these are most commonly reported. Personnel involved in ordering and administering blood and blood components must be able to recognize a transfusion reaction. See Appendix I for additional information.

- Fever with or without chills, defined as a greater than 1°C (2°F) increase in body temperature from baseline
- Chills with or without rigors
- Pain at infusion site, chest, abdomen, back or flank
- Blood pressure changes, usually acute, either hypertension or hypotension
- Respiratory distress, including wheezing, coughing, dyspnea, and cyanosis
- Acute onset hypoxemia with bilateral lung infiltrates on chest x-ray with no sign of circulatory overload occurring during transfusion or within 6 hours of completion
- Skin manifestations, including flushing, urticaria, rash, pruritus and localized edema
- Nausea with or without vomiting
- Jaundice or hemoglobinuria
- Abnormal bleeding
- Oliguria or anuria

**Delayed Complications** may occur as the result of weak antibodies in the recipient's plasma directed against antigens on the donor's red blood cells undetectable at the time of pre-transfusion testing, but may appear following transfusion. See the Procedural Notes section of this procedure for additional information.

Reported cases of suspected infectious disease transmission must be evaluated. Confirmed cases are reported to the collecting facility by blood bank. All cases of unexplained acute liver dysfunction occurring within 2 weeks to 6 months after a transfusion must also be investigated and recorded.

In conjunction with the blood bank reports, adverse reactions are documented using the hospital Safety Tracking Tool. Blood Bank personnel will complete the Safety Tracking Tool once the investigation is complete.

## PROCEDURE

### 1. SPECIMEN COLLECTION AND HANDLING

- Specimen requirements include one properly labeled pink top blood bank tube collected after signs / symptoms were noted **and** one post-reaction urine sample.
- No special preparation of the patient is required prior to specimen collection.
- Refer to procedures: "Laboratory – Blood Collection Guidelines" and "Patient Identification" for additional details
- Additional specimen / material requirements include: Pre-transfusion blood bank specimen, blood product container (whether or not it contains un-transfused product or not), transfusion set (tubing) and saline, retained segments for RBCs (if attached segments from blood product container are not available)

### 2. REAGENTS and MATERIALS (Blood Bank Only)

Refer to Transfusion Service procedures: ABO Blood Group and Rh Typing (Tube Method) and Direct Antiglobulin Testing (DAT).

### 3. NURSING PROCEDURE

3.1. When a Transfusion Reaction is suspected, the NURSE will:

3.1.1. STOP the transfusion. Keep IV lines open. Disconnect and maintain sterility of blood administration set from adapter or hub of venous access device. Initiate new bag of 0.9% normal saline using a standard administration set at a "keep vein open rate" to maintain patency of venous access device.

3.1.2. Obtain vital signs immediately and document.

3.1.3. Notify ordering (or another responsible) provider immediately.

3.1.4. Notify Transfusion Service (Blood Bank at extension 3569).

3.1.5. Re-confirm the identity of:

- The recipient
- The donor unit
- The product requested

3.1.6. Assess patient; obtain and document subsequent vital signs based on the patient's condition.

3.1.7. Administer supportive therapies as ordered.

3.1.8. Resume transfusion only if ordered by the provider.

3.2. When a transfusion is terminated due to a suspected adverse reaction, the NURSE will:

3.2.1. Document the signs and symptoms in the Bridge application. During computer downtime, complete the nursing section of the ADVERSE TRANSFUSION REACTION REPORT (Form #10291, available from Blood Bank).

3.2.2. Use the SP Transfusion Reaction Orderset to place a **TRANSFUSION REACTION and URINALYSIS** order in Cerner (test codes TRANSFUSION REACTION INITIAL and

URINALYSIS). **All suspected reactions, with the exception of mild urticaria and hives, must have a Transfusion Reaction Workup ordered and testing performed**. Mild urticaria and hives are **only** worked up if the physician requests the workup be performed. The signs and symptoms must be documented in the patient's medical record (Bridge application) **even if a workup is not ordered for mild urticaria / hives**.

3.2.3. Page Phlebotomy (extension 8351) or collect 1 full pink top tube.
- Label the tube with a pre-printed patient ID label
- Complete the electronic specimen collection process in Cerner ***or*** document legibly on the labeled specimen the date and time of collection and the first initial and **complete** last name of the person drawing the sample
- Attach a red sticker from the patient's blood bank wristband to the tube

3.2.4. Collect and properly label the first urine specimen voided after signs / symptoms developed.

3.2.5. Send the following to Transfusion Service:
- Properly labeled pink top tube
- Blood product container, blood administration set and saline that was running with the blood product
- The first post-reaction urine sample
- Completed Adverse Transfusion Reaction Report (Form #10291, during computer downtime)

**Spiked blood product containers, blood administration sets and spiked saline bags are not to be sent via the pneumatic tube system. Page Transport to have these items hand delivered to blood bank.**

## 4. BLOOD BANK PROCEDURE

4.1. Transfusion Service will be made aware of suspected reactions when a call is received from the patient care area stating the patient is exhibiting signs of a reaction. The ordering physician is to be notified immediately by the patient care provider. A Transfusion Reaction workup must be ordered by patient care staff for all suspected reactions, with the exception of mild hives or itching. If necessary, patient care staff should notify phlebotomy to draw the post-reaction blood specimen and return the product or component bag, blood administration set (tubing) and solutions running during the transfusion to the Transfusion Service. **Spiked units are not to be sent via the pneumatic tube system**.

4.2. **CHECK FOR IDENTIFICATION ERRORS**. The label on the blood container and all other records must be examined to detect whether there has been an error in identifying the patient or the blood product. Check for clerical errors on the patient's Pre- and Post- samples, Label on the Blood Container and Blood Product Transport Request form. Patient Care and Phlebotomy must ensure the identity of the patient through the patient identification bracelets attached to the patient.

4.3. **VISUAL CHECK FOR HEMOLYSIS**. Inspect pre-and post-transfusion samples for visual hemolysis. Pink or red discoloration after, but not before, the reaction suggests destruction of red blood cells and release of free hemoglobin. Intravascular hemolysis of as little as 5-10mL of red cells may produce visible hemoglobinemia. **Hemolysis due to poor collection technique or other medical interventions can cause hemoglobinemia; if hemolysis is noted in the post sample and faulty collection is possible, a second specimen should be requested**.

4.4. **EXAMINATION OF POST-REACTION URINE**. In examining a post reaction urine specimen, it is important to differentiate among hematuria (intact red cells in the urine), hemoglobinuria (free hemoglobin in the urine), and myoglobinuria (free myoglobin in the urine). Urine examination should include dipstick analysis for occult blood and microscopic examination.

4.5. **SEROLOGIC CHECK FOR INCOMPATIBILITY.**
- ABO and Rh testing on the patient's pre- and post-reaction samples
- ABO and Rh testing on blood from the unit using an attached segment (RBCs only).
- A DAT on the pre-and post-reaction specimens. Test first using polyspecific Anti-Human Globulin. If positive, continue testing with Monospecific IgG and Anti-C3b,C3d; if negative,

no further testing is necessary. Should the pre-transfusion specimen test negative for IgG and the post-transfusion specimen test positive for IgG, an eluate is performed.

If the investigation detects no error or apparent incompatibility, the work-up may be stopped at this point; an Adverse Transfusion Reaction Report is completed by the Transfusion Service Technologist and reviewed by the lead technologist, or designee, then forwarded to the Medical Director or designee along with a printed copy of the patient's transfusion history and a preliminary Transfusion Reaction Workup Report. A transfusion reaction should still be considered even though the workup is negative if the patient's clinical presentation strongly suggests.

If the workup detects no error or apparent incompatibility, further transfusions may be continued if requested by the patient's provider.

The blood bank Medical Director or designee is to be notified immediately if any incompatibility is discovered.

Risk Management, Hospital Administration and the blood bank Medical Director must be notified immediately of any reactions resulting from ABO incompatibility. Notification is to occur regardless of day or time. The Blood Bank Technologist will contact the Medical Director and will verify the Nursing Supervisor contacts Administration and Risk Management.

4.6. **ADDITIONAL LABORATORY EVALUATION**. At the discretion of the pathologist, other tests may be requested.

- Antibody detection test on the pre- and post-reaction patient samples and antigen testing on donor blood for positive DATs.
- Repeat crossmatch test with pre- and post- samples using the full antiglobulin technique for positive DATs.
- Perform hemoglobin and hematocrit checks
- Perform microbiology testing on the patient and the remaining product in the unit bag when bacterial contamination is suspected. Reference Microbiology procedure MP2-14.
- Perform DAT and antibody detection tests on additional specimen(s) obtained at intervals after the transfusion reaction.
- Markers of hemolysis including LDH, bilirubin, and/or haptoglobin may be useful, if pre- and multiple post-reaction measurements are available.
- Examine blood remaining in unit and the administration tubing for hemolysis.

## 5. RESULTS REPORTING

5.1. Nursing will document findings in the Bridge application. The Adverse Transfusion Reaction Report Form (#10291) is utilized during computer downtime.

5.2. Transfusion Service personnel: Refer to Transfusion Reaction Workup workflow for lab result reporting

## 6. PROCEDURAL NOTES

6.1. **Delayed Adverse Transfusion Reactions** are defined as adverse effects that manifest greater than 24 hours after transfusion. Suspected cases may be reported to the Transfusion Service through the Look-Back process, Infection Control, physician's office, patient care personnel, patient's history check or current laboratory results.

6.2. Listed below are signs and symptoms that may be associated with delayed transfusion reactions:

- fever of unknown origin
- declining hemoglobin
- mild unexplained jaundice

- hemoglobinuria (occasionally)
- detection of alloantibody (ies) not present in previous history check
- absence of anticipated hemoglobin or hematocrit elevation after transfusion
- hemolysis

6.3. When a delayed adverse transfusion reaction is suspected:

6.3.1. Collect and properly label one pink top blood bank tube after signs / symptoms are noted and one post-reaction urine sample.

6.3.2. Obtain as much patient history as possible and current physical findings to assist in the investigation of the cause of the reaction.

6.3.3. The Transfusion Service Medical Director must be notified of possible instances of transfusion-associated disease transmission detected by the patient's physician, another hospital or blood supplier.

6.3.4. Verify all testing requested by the attending physician and/or the Transfusion Services Medical director is completed.

6.3.5. Should transmission of disease be confirmed, the collecting facility will be notified by telephone followed by a written report.

6.3.6. Perform clerical checks of the pre- / post-transfusion specimen(s), donor unit, transfusion set and IV solutions, if available.

6.3.7. Perform a DAT and Antibody Screen on the post-transfusion specimen. Perform testing using the pre-transfusion specimen, if available.

6.3.8. Perform a routine urinalysis on the post-reaction urine sample, if available

6.3.9. Results are entered into the Laboratory computer system.

6.3.10. In conjunction with the Transfusion Service report, adverse reactions are documented using the hospital Safety Tracking Tool.

**REFERENCES**

1. Fung, M.F., & Eder, A. (2017). AABB Technical Manual (19th ed.). American Association of Blood Banks.
2. American Association of Blood Banks Standards Program Committee. (2020). Standards for Blood Banks and Transfusion Services (32nd ed.). American Association of Blood Banks.
3. Circular of Information for the use of Human Blood and Blood Components, October 2017. https://bbmc.ellucid.com/documents/view/6851

Appendix I

| REACTION | SIGNS / SYMPTOMS | PREVENTION | NURSING ACTIONS |
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| **Allergic**<br>(Patient sensitivity to plasma proteins) | • Urticaria<br>• Hives<br>• Pruritus<br>• Wheezing<br>• Hypotension | • Pre-medicate with steroids or antihistamines | • Stop transfusion and call MD. May resume transfusion on MDs order<br>• **If symptoms are limited to mild urticaria or hives, testing of blood and urine is not required**<br>• Document signs and symptoms in the Bridge application – **even if testing will <u>not</u> be performed** |
| **Anaphylactic**<br>(Patient sensitivity to plasma proteins) | • Hypotension<br>• Respiratory distress<br>• Wheezing | • Pre-medicate with steroids or antihistamines | • Stop transfusion and call MD and Blood Bank.<br>• Trendelenberg (feet up) position<br>• Epinephrine<br>• Order **Transfusion Reaction**<br>• Submit properly labeled pink top tube and 1st voided urine to the lab<br>• Page Transporter to have the blood product bag, saline and tubing delivered to Blood Bank.<br>• Document signs and symptoms in the Bridge application |
| **Febrile**<br>(Patient sensitive to leukocytes in blood) | • Chills<br>• >1°C / 2°F increase in temperature from baseline | • Pre-medicate with antipyretic | • Stop transfusion immediately<br>• Call MD and Blood Bank<br>• Hang new IV saline<br>• Recheck all patient and unit identifiers at bedside<br>• Monitor and document vitals<br>• Place **Transfusion Reaction** order in computer<br>• Page Phlebotomy or collect 1 full pink top tube. Label using a pre-printed patient ID label. Indicate the time and date sample was collected and initials of person who drew the sample. **Attach a red sticker from the patient's blood bank wristband to the tube.**<br>• Collect first urine specimen post-reaction.<br>• Document signs and symptoms in the Bridge application.<br>• Send properly labeled specimens and Forms via the pneumatic tube to the laboratory.<br>• Page Transporter to have the blood product bag, saline and tubing delivered to Blood Bank. |
| **Hemolytic**<br>(Most usually due to ABO incompatibility) | • Low back pain<br>• Hypotension<br>• Chills<br>• Hemoglobinuria<br>• Pain at IV site<br>• Cardiovascular collapse | • Verify patient and blood product identifiers to ensure match<br>• Start transfusion rate less than 50 mL/hr; check patient vitals after 15 minutes | |
| **Bacterial**<br>(Bacterial contamination of product) | • Severe chills<br>• High fever<br>• Nausea, vomiting<br>• Sudden, severe hypotension | • Check product for bubbles, cloudiness, sediment prior to start of transfusion | |
| **Circulatory Overload**<br>(Occurs with decreased cardiac function) | • Cough<br>• Chest and back pain<br>• Dyspnea<br>• Cyanosis | • Pre-medicate with antidiuretics<br>• Transfuse slowly<br>• Monitor input / output | |
| **TRALI**<br>(Transfusion Related Acute Lung Injury caused by donor WBC antibodies) | • Fever / Chills<br>• Hypotension<br>• Hypoxemia<br>• Pulmonary edema without cardiac or respiratory failure<br>• Usually occurs during or within 2 hours post transfusion | • Defer implicated donors | |
| **Patients under the effects of anesthesia** require increased monitoring for an adverse transfusion event. Monitoring of vital signs from baseline and the appearance of catheter urine for hemolysis are essential to early detection of an adverse transfusion event. | | | |