11.0 REPORTING SUSPECTED TRANSFUSION COMPLICATIONS

11.1 REPORTING ADVERSE REACTIONS

Contact Information:

Reference and Transfusion Services Department
Phone: (817) 412-5740 Fax: (817) 412-5749

11.1.1 Definition

The term "**transfusion reaction**" refers to a group of complications that may arise during or after the administration of blood components to a patient. The severity of these complications may range from mild discomfort to serious life-threatening hemolytic or septic reactions. Fatal transfusion reactions can occur in spite of technical perfection.

11.1.2 Types of Adverse Transfusion Reactions

Allergic Reactions

Mild allergic reactions may occur in 1-3% of transfused recipients. These reactions are usually caused by antibodies (IgE) in the recipient directed against foreign proteins in the transfused plasma. Mild symptoms of allergic reaction include urticaria (hives), rash and itching. Such reactions may be treated with an antihistamine medication and the transfusion resumed when symptoms subside. More serious signs or symptoms are swelling of the lips, face or tongue, itching of the throat, or difficulty breathing. These symptoms should cause immediate discontinuation of the transfusion and close attention to avoid anaphylactic shock. Units of blood involved in reactions with allergic symptoms other than mild skin reactions should not be used for further transfusion.

Febrile Nonhemolytic Reactions

Febrile nonhemolytic reactions are defined by a rise in body temperature of $\geq$ 1°C with no other known cause for fever. These reactions may occur in 0.5 – 1.5% of transfusion recipients and may be more common in frequently transfused patients. These reactions are usually caused by antibodies of the recipient directed against white blood cell antigens in the transfused blood component. These reactions are seldom dangerous, but they can mimic the onset of hemolytic reactions. Therefore, it is necessary to establish the cause of the fever as soon as possible. Carter BloodCare provides leukocyte reduced blood components, in part, to help reduce recurrent febrile nonhemolytic reactions.

Acute Hemolytic Transfusion Reaction

An acute hemolytic transfusion reaction usually occurs when the donor's red blood cells are destroyed by antibodies in the recipient's plasma. This process is also mediated by the neuroendocrine response, which activates the components of complement and the coagulation systems. Such a reaction may also rarely occur with ABO incompatible plasma. The neuroendocrine response is triggered by hypotension that results in the release of vasoactive amines responsible for many of the initial symptoms of a hemolytic reaction. If the complement cascade proceeds to completion, intravascular hemolysis can lead to the lysis of red blood cells and the release of hemoglobin and RBC stroma. The presence of RBC stroma may activate the intrinsic clotting cascade, causing the formation of thrombi within the microvasculature or fibrinolysis, the formation of fibrin split products, and uncontrolled bleeding (Disseminated intravascular coagulopathy or DIC).

Acute hemolytic transfusion reactions are most common with alloantibodies that fix complement to the RBC surface. Such antibodies include anti-A, anti-B, and the Kidd (anti-Jk^a and anti-Jk^b) blood group antibodies.

Some alloantibodies **do not** typically give rise to serious transfusion reactions. These include anti-M, anti-N, anti-P_1, anti-Lu^a, anti-Lu^b, anti-i, anti-I, anti-IH, anti-Le^a, and anti-Le^b.

Other alloantibodies **may cause** acute hemolytic reactions, but more commonly can cause a delayed hemolysis. These include: any antibodies in the Rh system (D, C, c, E, e, C^w), anti-K, anti-k, anti-Fy^a, anti-Fy^b, anti-Jk^a, anti-Jk^b, anti-S, anti-s, anti-U, etc.

Symptoms of acute hemolytic reactions include:

- Chills
- Fever
- Increased pulse rate (tachycardia)
- Decreased blood pressure
- Shock
- Chest tightness or pain
- Dyspnea or tachypnea
- Pulmonary rales
- Nausea and vomiting
- Flank or back pain
- Urticaria
- Hemoglobinuria

An acute hemolytic reaction is a severe emergency. The transfusion must be stopped immediately and supportive measures instituted as ordered by a physician.

Delayed Hemolytic Transfusion Reaction

With a delayed hemolytic transfusion reaction, pretransfusion testing reveals no demonstrable unexpected recipient antibody and a transfusion occurs. However, the transfused red blood cells act as a secondary antigenic stimulus that can cause an anamnestic antibody response in a previously sensitized patient. Antibodies in the Kidd system (anti-Jk^a and anti-Jk^b) and some Rh antibodies are most often implicated. The severity of hemolysis depends upon the quantity of antibodies produced and the number of transfused red blood cells remaining in the circulation.

As soon as one to five days or as long as 10 to 14 days after transfusion, the patient may experience fever, an unexplained drop in hemoglobin and mild jaundice. Serologically, the DAT result may be positive and serum antibodies may or may not be detectable.

Other Types of Reactions

- Circulatory overload
- Noncardiogenic pulmonary edema (please refer to 4.3 Reporting of Suspected Transfusion Related Acute Lung Injury)
- Anaphylactic reaction
- Bacterial contamination

11.1.3 Transfusion Related Fatalities

Fatalities resulting directly from transfusion complications must initially be reported to the Food and Drug Administration, Center for Biologics Evaluation and Research within 24 hours. Notification must be given by telephone as soon as possible. A written report must be submitted within seven days. Please refer to http://www.fda.gov/cber/guidelines.htm for more information. Additionally, Carter BloodCare must be notified.

11.1.4 Reporting a Suspected Transfusion Reaction

The facility who performed the compatibility testing and crossmatch should investigate the transfusion reaction. Carter BloodCare' s Reference and Transfusion Services staff will perform a Transfusion Reaction Investigation Work-up at your request, to aid you in the transfusion reaction investigation.

Any blood components that are compatibility tested and crossmatched by Carter BloodCare, and are involved in a suspected transfusion reaction, should be immediately reported to the Reference and Transfusion Services department. Once notified, Carter BloodCare will perform a Transfusion Reaction Investigation Work-up on units crossmatched by our staff.

The management of transfusion reactions depends on prompt recognition of the signs and symptoms of the affected patient. Any adverse symptoms or abnormal physical signs during the course of the transfusion of blood or its components should be suspected as a potentially life-threatening situation.

Carter BloodCare Reference and Transfusion Services staff cannot make the decision whether or not to initiate a transfusion reaction work-up. The nursing staff should consult the patient's physician. Carter BloodCare physicians are available for consultation if desired.

11.1.5 Recommended Actions if a Suspected Transfusion Reaction Occurs

Please refer to your internal procedures for transfusion reaction investigations.

- Immediately discontinue the transfusion.
- Keep the IV line open with normal saline (0.9% sodium chloride) or other FDA approved blood administration solution
- Notify the attending physician
- Check all forms, labels, and patient identification

11.1.6 To Initiate a Transfusion Reaction Investigation Work up

Notify the Carter BloodCare Reference and Transfusion Services department.

Collect and properly label post-transfusion specimens:

- Collect one 7 mL EDTA (purple) tube. Minimum required sample is 3 ml.
- Clearly label the specimen tubes with the following information:
- Patient name
- Patient identification number
- Facility Name
- Date and time of collection
- Phlebotomist initials

Complete form RTF215.01A, Transfusion Reaction Investigation according to the instructions on the front of the form.

Send the samples, blood component container with attached administration set and intravenous solutions, and the completed Transfusion Reaction Investigation form in a sealed container marked "BIOHAZARDOUS" to Carter BloodCare, Reference and Transfusion Services as soon as possible. Any additional crossmatched red cell units reserved for the implicated patient should immediately be sent to Carter BloodCare for further testing.

11.1.7 Carter BloodCare Transfusion Reaction Investigation

Upon receipt of the post-transfusion samples, blood component container, and completed form, the Reference and Transfusion Services department will evaluate the event on a case-by-case basis to determine the appropriate investigation steps. The investigation may include, but is not limited to:

- Visual inspection of the blood component
- Clerical check of the crossmatch tag (if the component was crossmatched by Carter BloodCare)
- Segment number verification
- Patient pre-transfusion retesting and post-transfusion testing:
  - ABO/Rh
  - Antibody screen and identification
  - DAT
  - Crossmatch
- Component retesting including:
  - ABO/Rh
  - Antibody screen and identification
  - DAT
  - Gram stain and bacterial culture, if indicated
- Additional testing as indicated

Preliminary testing results will be called and form RTF195.03A, (example of report with forms) will be faxed as soon as possible. A written investigation report, RTF195.03B, (example of report with forms) will follow in the mail. Reference and Transfusion Services staff will work closely with you to ensure proper communication during this critical investigation.

Please contact the Reference and Transfusion Services department at (817) 412-5740 for additional information, consultation, or to initiate a Transfusion Reaction Investigation Work-up.

11.2 Suspected Cases of Transfusion-Associated Infection

Contact Information:

Donor Notification Department
Phone: (817) 412-5604
Fax: (817) 412-5609

Suspected cases of transfusion-associated infections, including hepatitis, HIV, and WNV should be reported to Carter BloodCare as soon as possible after recognition.

11.2.1 Notification to Carter BloodCare

As soon as possible after recognition of suspected infection, notify Carter BloodCare' s Donor Notification department. The following information will be requested at the time of the notice:

- Patient name, or other form of identification (optional)
- Type of infection
- Most recent pertinent laboratory results and confirmatory test results documenting patient infection
- Pretransfusion test results documenting patient did not have an infection prior to transfusion
- Name and phone number of the patient's attending physician
- List of unit numbers for all blood components transfused
- Hospital name where the transfusion(s) occurred
- Dates of transfusion(s)
- Other risks, if known, for possible infection

Complete Carter BloodCare form **DNF106.02A, Report of Suspected Transfusion Associated Infection**, giving as much information as possible. This notification form serves to provide us with relevant information including a complete list of all units transfused. A copy of the form is included at the end of this section. The form may be copied for your use. Additional copies may be obtained from the Hospital Relations department.

Send a follow-up letter confirming unit administration and the completed notification form to Donor Notification.

11.2.2 Other Notification

In the state of Texas, all cases of Hepatitis B, Hepatitis C, and HIV that occur after transfusion should be reported to the nearest public health agency. We strongly recommend that in addition to notifying Carter BloodCare, you also report suspected cases of transfusion-associated hepatitis B virus, hepatitis C virus, or HIV to the applicable county health department.

11.2.3 Carter BloodCare Investigation

Carter BloodCare will immediately initiate a full investigation of all implicated blood components and donors.

Carter BloodCare Donor Notification staff will work closely with you throughout the investigation to ensure you and the patient's physician receive all information regarding the possible transfusion-associated infection.

11.3 Reporting Transfusion Related Acute Lung Injury (TRALI)

Contact Information:

Donor Notification Department
Phone: (817) 412-5604
Fax: (817) 412-5609

Patients receiving plasma-containing units of blood that experience acute-unexplained pulmonary complications within 6 hours of transfusion may be suffering a complication of transfusion called “Transfusion Related Acute Lung Injury” (TRALI). The reaction is thought to occur because of transfused donor antibodies, or patient antibodies to white blood cell antigens.

If TRALI is suspected, contact the Donor Notification department to initiate an investigation. The implicated donor(s) will be assessed for risk of carrying white cell antibodies.

Fill out form **DNF106.30A Report of Transfusion-Related Acute Lung Injury**. Hospital staff is requested to report details of patient pre-transfusion status, symptoms of suspected TRALI, pre- and post-transfusion chest x-ray results, and post transfusion status. Carter BloodCare may request that the patient be tested for HLA and granulocyte antigens. The information requested on form DNF106.30A is essential in differentiating TRALI from other forms of transfusion reaction. A copy of this form is included at the end of this section. Send the completed form and any other pertinent information to Donor Notification (see address, above). Form **DNF106.30D Suspected TRALI Investigation Summary** will be provided to reporting facility to communicate outcome(s) of the TRALI investigation.

11.4 Forms

- RTF215.01A Transfusion Reaction Investigation
- RTF195.03A Transfusion Reaction Investigation Preliminary Report
- RTF195.03BTransfusion Reaction Investigation Final Report
- DNF106.02A Report of Suspected Transfusion Associated Infection
- DNF106.30A Report of Transfusion-Related Acute Lung Injury Investigation
- DNF106.30D Suspected TRALI Investigation Summary