5.6 Performing a Blood Transfusion

I. Getting Blood or Blood Products from the Blood Bank

A Cerner Order is placed for BDR: Blood Delivery Request and must be used to obtain the blood or blood products from the Blood Bank. The first item that is completed is to verify that the order is being placed on the correct patient.

Next the nurse will be asked to complete several key pieces of information:

1) Drop down for what product is being requested? (ie: Red Cells, Plasma, Platelets)
2) Quantity (free text field)
3) Delivery Method: Pick-up or Pneumatic Tube
   If Pneumatic Tube is selected the next field for Tube Station Number, must be completed prior to submission.
4) Consent of Chart? Yes or No

Once all of the required items are completed the order is signed. The BDR order will be generated to a laboratory printer for review by Blood Bank staff. The electronic Blood Delivery Request is placed in all areas of the hospital and only during Emergent Trauma / Massive Transfusion cases will the paper BDR be used.
The person who signs the order is responsible for any errors detected.

The blood or blood product may be obtained by a nurse or hospital courier who arrives at the Blood Bank with a chart label identifying the patient for product pick-up. Under normal circumstances, only one (1) unit of packed cells, plasma, or platelets will be issued. If the second unit is needed, a second form must be filled out, and so forth.

II. Signing out blood
Hospital employees who have been trained and a complete and accurate Blood Delivery Request order has been submitted may sign out blood or blood components. Volunteers may not sign out blood. The following procedure must be followed:

A. Signing out blood IN PERSON
1. The Blood Bank technologist on duty will verify all information with the person signing out blood and examine the unit of blood at this time.
   a. Carefully check the information on the blood unit label and blood product tag. All patient information must match the information on the “Blood Delivery Request” requisition.
1) Verify patient’s name and medical record number
2) Verify patient ABO and Rh
3) Verify donor unit number and ABO and Rh
4) Verify crossmatch compatible portion of the blood product tag
5) Check the unit for any unusual color or appearance (e.g. clots, bubbles or red supernatant) and expiration date.

b. No discrepancies should exist. Any discrepancies must be resolved before the unit or product is issued.

c. The technologist will initial and record badge number on the blood product tag indicating that the product is in date. The courier will sign and record badge number in the Transported By section of the blood product tag.

B. Signing out blood BY PNEUMATIC TUBE (critical care and outpatient areas ONLY)

1. The completed Cerner Order for Blood Delivery Request is submitted with complete and accurate information which will generate on the laboratory printer.

2. The Blood Bank technologist on duty will verify all information and examine the unit of blood at this time.

   a. The Blood Bank tech will carefully check the information on the blood unit label and blood product tag. All patient information must match the information on the “Blood Delivery Request” requisition.
      1) Verify patient’s name and medical record number
      2) Verify patient ABO and Rh
      3) Verify donor unit number and ABO and Rh
      4) Verify crossmatch compatible portion of the blood product tag
      5) Check the unit for any unusual color or appearance (e.g. clots, bubbles or red supernatant) and expiration date.

   b. No discrepancies should exist. Any discrepancies must be resolved before the unit or product is issued. In the case where the unit is too large (>350 mls) for the carrier, the floor will be notified to pick the unit up in person.

   c. The technologist will initial and record badge number on the blood product tag indicating that the product is in date. The technologist will also sign and record badge number in the Delivered via Pneumatic Tube section on the blood product tag.
d. The Blood Bank technologist will phone the individual requesting the product to alert them the product will be sent in the pneumatic tube system so they will be available to receive it and return the BDR immediately.

e. The blood product, blood product tag, and the printed requisition of the “Blood Delivery Request” will be tubed to the station indicated on the request.

f. Immediately upon receipt the blood product must be inspected. The “Blood Delivery Request” form must be completed and returned to the laboratory tube station

Notes: No blood will be released for two different patients at the same time. The person transporting the blood must make a second trip if this situation arises.

Except under unusual circumstances or blood products going to the OR, no more than one unit of blood will be released for the same patient at the same time.

Blood must not be picked up until it is needed. Once it is taken out of the Blood Bank, transfusion must be started within 15 minutes. Any product that cannot be hung within the 15 minutes should be brought back to the Blood Bank immediately until transfusion can take place.

Blood should not be stored in any refrigerator other than the Blood Bank. Blood which has been out of the Blood Bank for longer than 30 minutes or reaches temperature > 10 C will not be accepted for return. If this occurs, the unit of red blood cells is disposed and wasted.

III. Before Starting Blood Transfusion

A. Inspect unit carefully for possible abnormalities (purple color, large clots, etc). The expiration date means the blood product expires at midnight of the day posted. The unit may be transfused after midnight as long as the transfusion started prior to the expiration time.

B. In the presence of the patient, two nurses must verify the patient identification by checking wristband for name and medical record number. Ask the patient his/her name and compare the information with the blood product tag.

C. Check information on blood product tag to crossmatch label on the back of the blood product. The crossmatch label must remain attached to unit at all times.

1. Packed red blood cells and autologous blood
Under usual circumstances, ABO and Rh identical blood is transfused. When ABO and Rh identical blood is not available ABO/Rh compatible packed red blood cells may be used.

<table>
<thead>
<tr>
<th>Recipient’s ABO</th>
<th>Identical Blood to be transfused</th>
<th>Compatible PRBC that may be transfused</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td>0</td>
</tr>
<tr>
<td>AB</td>
<td>AB</td>
<td>A, B, 0</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>None</td>
</tr>
</tbody>
</table>

Rh negative blood is always used for Rh-negative female patients of child-bearing age or younger.

Rh positive crossmatch compatible blood may be used for Rh negative post-menopausal women or men of any age, when Rh-negative blood is not available or if there is massive transfusions - provided that the recipient has not been immunized to Rh (D) antigen.

Rh-negative crossmatch compatible blood may be used for Rh-positive individuals.

2. **Platelets**

With the exception of Rh-negative women of child-bearing age or younger with a nonmalignant disease (who should receive only Rh-negative platelets), the platelets used need not be ABO and Rh identical; however, ABO compatible will be used whenever possible.

3. **Frozen Plasma**

<table>
<thead>
<tr>
<th>Recipient’s ABO</th>
<th>Fresh Frozen Plasma to be transfused</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A, AB</td>
</tr>
<tr>
<td>B</td>
<td>B, AB</td>
</tr>
<tr>
<td>AB</td>
<td>AB</td>
</tr>
<tr>
<td>0</td>
<td>A, B, AB, 0</td>
</tr>
</tbody>
</table>

Fresh frozen plasma is given regardless of Rh type.
4. Cryoprecipitate

<table>
<thead>
<tr>
<th>Recipient’s ABO</th>
<th>Cryoprecipitates to be transfused</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A, AB</td>
</tr>
<tr>
<td>B</td>
<td>B, AB</td>
</tr>
<tr>
<td>AB</td>
<td>AB</td>
</tr>
<tr>
<td>0</td>
<td>A, B, AB, 0</td>
</tr>
</tbody>
</table>

D. The two (2) persons (doctor/nurses) starting the transfusion must sign the blood product tag.

E. If a discrepancy or error is found, or if the unit looks abnormal, return the unit to the Blood Bank before spiking into the unit. Contact Blood Bank technologist for further instructions.

F. Mix the unit thoroughly before transfusion.

IV. Rate of Transfusion

The speed of transfusion is indicated by the medical condition of the patient. In general, one unit of packed cells should be transfused in one (1) to three (3) hours but no longer than four (4) hours. After 4 hours the unit must be discontinued. If clinical conditions require an infusion time of greater than four (4) hours, the unit should be divided into 2 aliquots for transfusion.

In emergency situations (major surgery, bleeding, shock, etc.) the blood may have to be transfused much faster. Blood may be transfused in 15 minutes to 3 hours during dialysis and is administered by the Davita nurse performing the dialysis.

One unit of whole blood is approximately 500 ml. One unit of packed cells is approximately 225 ml - 400 ml. The product volume is noted on each blood product tag.

Special Care Needed for:
1. Infants
2. Adults over 60
3. Cardiac and pulmonary patients
4. Debilitated patients
5. Patients with severe chronic anemia

Danger: Circulatory overload, heart failure, and pulmonary edema.
V. Adding Medications to Blood

Under no circumstances should medications or other substances (except normal saline) be added to the blood before or during transfusion, nor should medications or solutions be injected into the blood intravenous set while blood is being transfused.

The reasons for this are:

1. The danger of bacterial contamination of the blood.
2. The possibility of pharmacologic incompatibility between the drug and the blood or anticoagulant solution.
3. In case of a reaction, it becomes more difficult to establish the cause of the reaction (drug injected vs. blood transfused).
4. Practice prohibited by accrediting agencies.

VI. Administration of Blood and Blood Components

A. General Guidelines

Blood and blood products should be administered intravenously. A vein should be selected which will be large enough to accommodate the infusion needle, but as comfortable as possible for the patient. Usually the veins of dorsum of hands and around the wrists are the best. If no good vein can be used in these areas, check the forearm then the antecubital fossa and then upper arm. Veins of the lower extremities are not to be used for transfusion because these veins are more prone to develop thrombophlebitis.

If patient has an IV line running, the blood and blood products may be infused through the IV line, provided that the IV line is running smoothly. The IV line should be flushed with normal saline to avoid mixing blood and IV solution. If the patient does not have an IV line, start one with 0.9% normal saline first.

Use a 20-gauge or larger, thin wall needle such as Cathalon IV 20-gauge needle to start the IV if the patient is going to receive packed red blood cells or whole blood. A smaller needle 23-gauge may be used if patient has a difficult vein or if only platelets, cryoprecipitates or fresh frozen plasma are to be given. You may also use an existing IV or med-lock if the med-lock is removed.

The venipuncture site should be antiseptically scrubbed thoroughly and the entire transfusion procedure must be carried out to preserve sterility. Y-type IV tubing is good for 2 units. Change the tubing if you encounter a problem. All IV equipment should be red bagged and discarded after use.
B. Administration of Whole Blood and Packed Red Blood Cells
   1. Attach a Y-tube blood filter to a bag of 250 ml. Injectable 0.9% normal saline.
   2. Select a good vein. Prep the area by antiseptically scrubbing thoroughly. Make venipuncture using a 20 gauge or larger Cathalon.
   3. If the saline runs smoothly, connect it to the IV site. Run the saline KVO rate.
   4. Obtain the vital signs. If the patient is febrile, notify the physician before requesting a unit of blood. If not, request the blood and check (double signatures) before hanging the blood product.
   5. Make sure the blood goes all the way through the tubing.
   6. Start the transfusion.
   7. Adjust the transfusion rate according to patient need.
   8. When multiple units of blood are to be transfused - The Y-tuning is good for 2 units, provided the tubing continues to give a desirable rate of infusion. Because of the hazards of hemolysis and bacterial contamination, the tubing should not be left for extended periods and then reused.

C. Administration of Fresh Frozen Plasma
   1-6. Same as above for transfusion of whole blood or packed cells except that a smaller 23 gauge needle may be used.
   7. Adjust the transfusion rate. The rate of infusion should be as rapid as possible, but depends upon the patient’s ability to tolerate the volume. In general, a unit of fresh frozen plasma (250 mls.) may be given within 30 minutes. If patient exhibits poor tolerance, it may be given slowly up to 1 ½ hours.

D. Administration of Platelets
   1-6. Same as above for transfusion of whole blood or packed cells except that a smaller 23-gauge needle may be used.
   7. Rate of infusion - the platelets should be infused as rapidly as possible. A volume of 150 ml., may be infused within 15-20 minutes and should not last longer than one hour.

E. Administration of Cryoprecipitate
   1-6. Same as above for transfusion of whole blood or packed cells except that a smaller 23-gauge needle may be used.
   7. Rate of infusion - the cryoprecipitate should be infused as rapidly as possible. A volume of 50 ml may be infused within 5-10 minutes.
F. Administration of Rh Immune Globulin

2. Rhophylac brand Rh Immune Globulin can be given intramuscularly (IM) or intravenously (IV).

VII. Care of the Patient

A. Be sure the blood is running well and that there is no extravasation.

B. The arm should be positioned well. The patient should be as comfortable as possible and on bedrest until the transfusion is complete.

C. Start transfusion slowly for first 15-30 minutes and observe patient closely.
   • If no reaction is present, go to rate indicated.
   • If a reaction develops, only a little blood has been given, making the reaction less severe and less dangerous to patient.

D. Vital signs should be taken and recorded on the Transfusion Service Record (non-CPOE areas) or in Cerner (CPOE areas).
   • Pre-transfusion
   • 15 minutes into the transfusion
   • Every hour until the transfusion is completed.
   • Immediately after the transfusion is complete.

E. All information in the top section of the blood product tag is mandatory and must be filled out. This top section is a large label that must be placed onto the Transfusion Service Record.
   • Complete the bedside verification questions.
   • The signature and badge number of the transfusionist and coverifier must be complete.
   • Date and time the unit was started.
   • Date and time the unit was ended.
   • Record the amount administered during transfusion.
   • Document any transfusion reaction that has occurred.

Note: Patients frequently complain of being cold during transfusion. This is usually because they are receiving cold blood just coming out of the blood bank refrigerator. Usually an extra blanket solves the problem. Do not confuse the cold feeling with the chills of a transfusion reaction, thus discontinuing the transfusion unnecessarily. Use an extra blanket and observe the patient. The chills of a transfusion reaction are usually
following or associated with other symptoms such as temperature elevation, chest pain, nausea, etc. In case of doubt, ask for assistance.

VIII. Warming of Blood

Blood is usually transfused cold and shortly after it is taken out of the blood bank refrigerator. Blood may only be warmed using a hospital approved, in-line blood warmer. To obtain a blood warmer you must contact the Blood Bank. All patients who require the use of a blood warmer will be issued one with instructions by the Blood Bank when the unit of blood is issued.

The use of the blood warmer is indicated only in:

- Massive transfusion.
- Patients with cold agglutinins - Blood Bank will recommend using the blood warmer.
- Intraoperative transfusion if the surgery lasts three hours or longer.
- Arrhythmias.

Once blood is warmed, it cannot be returned to the Blood Bank for future transfusions.

IX. Returning Blood to the Blood Bank

A. Patient vital signs should be checked before blood is signed out.
B. Do not sign out blood until patient is ready for transfusion.
C. Do not disturb or enter the unit if the blood is not going to be used.
D. If blood is not used for whatever reason, the unit should be returned to the Blood Bank within 15 minutes after it was signed out.