Blood Administration and Transfusion Reactions

Presented by:

RN.com
12400 High Bluff Drive
San Diego, CA 92130

This course has been approved for two (2.0) contact hours.
This course expires on March 25, 2007.

Copyright © 2005 by RN.com.
All Rights Reserved. Reproduction and distribution of these materials are prohibited without the express written authorization of RN.com.

First Published: March 25, 2005
ACKNOWLEDGEMENTS

RN.com acknowledges the valuable contributions of...

...Tanna R. Thomason, RN, MS, CCRN, the primary author of Blood Administration and Transfusion Reactions. Tanna has over 20 years of experience as a clinician in the hospital setting. After completing her Master’s Degree as a Clinical Nurse Specialist from San Diego State University in 1993, Tanna functioned as a critical care Clinical Nurse Specialist for Sharp Memorial Hospital in San Diego, CA. In addition to her Clinical Nurse Specialist role, Tanna has been teaching nursing students since 1998 in an adjunct faculty position at Point Loma Nazarene University. In 2001, Tanna became President of Smart Med Ed, an educational consulting business. Before taking her current positions, Tanna worked in the role of Cardiac Surgical Case Manager at Sharp Grossmont Hospital and as a Clinical Nurse Specialist at Sharp Cabrillo Hospital. Tanna’s publications center on research in caring for the acute myocardial infarction, congestive heart failure, and interventional cardiology patient populations. Tanna is a member of the American Association of Critical Care Nurses (AACN) and has served in various leadership roles for the San Diego Chapter of AACN. Other memberships include Sigma Theta Tau and the Cardiovascular Council of the American Heart Association.
PURPOSE & OBJECTIVES

The purpose of this course is to provide the learner with information about blood products, blood product administration, and risks of transfusion.

After successful completion of this course, you will be able to:

1. State the rational for the selection of specific blood transfusion products including whole blood, packed red blood cells, and platelets.

2. Describe pre-administration nursing priorities to assure safe administration of blood products.

3. Discuss potential pre-administration medications and rationale for use.

4. Identify six critical pieces of information that must be co-assessed by two licensed personnel prior to blood administration.

5. Describe the essential steps with the administration of blood products including tubing, filter, priming solution, and rate of administration.

6. Identify signs and symptoms of suspected acute and late transfusion reactions.

7. State immediate nursing action required for the patient with a suspected hemolytic transfusion reaction.
INTRODUCTION

As many as 15 million blood transfusions are given each year in the United States. A variety of medical conditions result in the need for a patient to receive a blood and/or blood product transfusion. The nursing care of this patient is centered on the knowledge of the various blood products, thorough pre-assessment skills, and through accurate infusion parameters. Knowledge of potential acute and late transfusion reactions is also key. This module reviews the key nursing considerations for all stages of blood administration including the pre-assessment, equipment needed, blood product administration tips, and review of potential post-transfusion reactions.
SOURCES OF BLOOD PRODUCTS

There are three basic sources of blood products. These include autologous blood, donor specific, and banked blood. A description of each is provided below.

Autologous Blood

One of the safest and most effective ways to treat blood loss is to give patients their own blood through the process of preoperative donation. Replacement of lost blood with previously donated blood eliminates most transfusion-associated risks. This type of blood source is typically coordinated in the setting of a pre-arranged, elective surgery, when the physician anticipates a need for a post-operative blood transfusion. To allow for the adequate time needed for testing and processing, it is important to remember that autologous blood must be donated at least 3 days prior to the surgical date. Limitations for autologous donations also include a low hemoglobin level (< 11 g/dL) or certain cardiac conditions.

Donor Specific Blood

This type of blood source is also called “donor directed” blood. The blood source is from an individual, designated by a patient or a patient’s family, who is interested in donating blood for the patient. The blood donor must meet both the eligibility criteria and have a compatible blood type. Donor specific blood must be donated at least 3 days prior to administration. The donated blood will be tested by the blood collection agency according to the guidelines determined by the American Association of Blood Banks, American Blood Centers, and the American Red Cross.

Bank Blood

Bank blood is simply a blood product that is donated by the general public. The donor must meet the donor eligibility criteria. This blood is tested by the blood collection agency according to national guidelines from the agencies listed above.
The patient’s physician will evaluate which blood product is best for treatment of the underlying medical or surgical condition. It is important for you to understand the vast range of blood products available for treatment.

**Whole Blood**

A whole blood transfusion replenishes both the volume and the oxygen-carrying capacity of the circulatory system. This type of transfusion treats decreased hemoglobin and hematocrit levels, but is typically used in the setting of hemorrhage. This product does contain cellular debris, requiring in-line filtration during administration. Transfusion of whole blood is not common, but may be ordered when a needed blood component is unavailable, such as in the setting of the Emergency Department when an acute trauma patient is hemorrhaging and there is not enough time to wait for the blood type and cross match to be performed. Whole blood typically contains approximately 500 mL of volume.

**Packed Red Blood Cells**

To avoid potential circulatory overload with whole blood transfusions, packed red blood cells (PRBCs) are given when decreased hemoglobin and hematocrit levels accompany a normal blood volume. Transfusion of PRBCs (from which 80% of the plasma has been removed) restores the oxygen-carrying capacity of the blood with less volume. The normal hemoglobin level is between 12-18 g/dL. Elderly patient’s values are normally slightly decreased. If a patient’s hemoglobin level is < 7 g/dl and they are also symptomatic, a transfusion is generally indicated. It is generally NOT appropriate to transfuse a patient with PRBCs when the hemoglobin is > 10 g/dL.

Each unit should raise the patient’s hematocrit by approximately 3%. One unit is approximately 250 mL of volume and is typically infused over 2-4 hours. Patients who are prone to congestive heart failure (CHF) or circulatory overload may require a slower rate of infusion, but not to exceed 4 hours. Like whole blood, this product also contains some cellular debris, thereby requiring an in-line filtration during administration.

**Washed Packed Red Blood Cells**

This type of blood product is used for patients previously sensitized to transfusions. The blood is rinsed with a special solution that removes white blood cells and plasma proteins, thus decreasing the chance of a transfusion reaction. This product typically contains approximately 250 mL of volume.

**Leukocyte-poor Red Blood Cells**

This product is similar to PRBCs combined with the removal of approximately 95-99% of the leukocytes. The removal of leukocytes helps to prevent a febrile reaction from leukocyte antibodies. This product typically contains approximately 200 mL of volume.
Platelets

The transfusion of platelets is given to treat a decreased platelet count (thrombocytopenia) due to either a decreased platelet production or increased platelet destruction. Platelet transfusions are also given to treat acute leukemia and bone marrow aplasia. A typical platelet transfusion contains 35-50 mL per unit. Up to 10 units can be transfused at a time.

You may have heard of the term, plateletpheresis. Plateletpheresis is when platelets come from a single donor and all of the leukocytes are removed by the blood bank. This is equivalent to 6-8 units of platelet concentrations. Platelets can be infused over 30-45 minutes, depending on the patient condition and physician order.

Fresh Frozen Plasma

Fresh frozen plasma (FFP) is a product in which plasma is separated from RBCs. This plasma is rich in coagulation factors V, VIII and IX and may be given to expand plasma volume, treat post-operative hemorrhage/shock or to correct an undetermined coagulation factor deficiency. **FFP is indicated for urgent warfarin reversal** and in liver disease with coagulopathy and bleeding. This product is kept frozen until needed and then thawed in the blood bank. FFP typically contains 200 to 250 mL of volume and can be infused over 30-45 minutes.

Less Common Blood Products

*Factor VIII (Cryoprecipitate or Cryo)*

This product is the insoluble portion of plasma recovered from FFP. It is typically transfused to treat hemophilia A and to control bleeding associated with factor VIII and/or fibrinogen deficiency. A normal fibrinogen level is between 200-400 mg/dL or 2.0-4.0 g/L. If the patient’s fibrinogen level is < 100 mg/dl, a cryoprecipitate transfusion may be indicated. The amount given depends on the patients underlying disease and the “goal” fibrinogen level.

*Cytomegalovirus (CMV) Negative Blood*

This type of blood product does not contain CMV antibodies. Leukoreduced products, which are prepared by leukocyte reduction filters, are considered to be CMV safe products and are equivalent to CMV negative blood. CMV negative blood may be used for premature infants, intrauterine transfusions, and CMV negative patients with an immunosuppressed system or at risk for other reasons.
COMPATIBILITY TESTING

Keeping the United States blood supply the world's safest is the ultimate responsibility of the nation's more than 3,000 blood establishments, which collect and process 14 million units of whole blood donated by volunteers each year. The Food and Drug Administration, however, has the vital role of ensuring that the millions of patients who receive a blood transfusion in a year are protected by layers of overlapping safeguards. Some of these safeguards include accurate blood typing and crossmatch testing.

Blood Typing

With blood typing, ABO and Rh antigens can be detected in the blood of prospective blood donors and potential blood recipients. The ABO system, Rh factors, and blood crossmatching are critical factors in blood transfusion.

**ABO System**

Human blood is grouped according to the presence or absence of these specific antigens. The two major antigens, A and B, form the basis of the ABO system.

It is important that the recipient not have antibodies to the donor’s RBCs. If this were to occur, there could be a hypersensitivity reaction, which can vary from mild fever to anaphylaxis with severe intravascular hemolysis.

To prevent an acute hemolytic transfusion reaction (AHTR), blood for transfusion must be of a compatible ABO blood type (see the following table). Patients should receive blood that matches their blood type. “Type O -” whole blood or RBCs may be used for any patient in an emergent situation and is known as the “universal donor”. Persons with “Type AB +” can receive blood from any blood type and are considered the “universal recipient”.

**Compatible Red Blood Cell Types**

<table>
<thead>
<tr>
<th>RECIPIENT</th>
<th>Type O</th>
<th>Type A</th>
<th>Type B</th>
<th>Type AB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type AB</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Type B</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Type A</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type O</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Rh factor Testing**

The presence or absence of the Rh antigen on the surface of the RBCs determines the classification of Rh-positive or Rh-negative. Rh factor is the next most important antigen associated with blood transfusion and ABO compatibility. If the Rh factor is absent, the patient is considered Rh-negative. If present, the person is considered Rh-positive. All persons are either Rh positive or negative. Rh-negative patients may develop antibodies to Rh antigens if exposed to Rh-positive blood and should always receive Rh-negative blood. Rh-positive patients may receive either Rh-positive or Rh-negative blood. The table below indicates the most common ABO and Rh factor types in the general population.

### Blood Types

<table>
<thead>
<tr>
<th>Blood Type (ABO &amp; Rh)</th>
<th>% of General Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>O, +</td>
<td>35%</td>
</tr>
<tr>
<td>O, - *</td>
<td>7%</td>
</tr>
<tr>
<td>A, +</td>
<td>35%</td>
</tr>
<tr>
<td>A, -</td>
<td>7%</td>
</tr>
<tr>
<td>B, +</td>
<td>8%</td>
</tr>
<tr>
<td>B, -</td>
<td>2%</td>
</tr>
<tr>
<td>AB, + ~</td>
<td>4%</td>
</tr>
<tr>
<td>AB, -</td>
<td>2%</td>
</tr>
</tbody>
</table>

*Universal donor
~Universal recipient

**Blood Crossmatching**

Although typing for major ABO and Rh antigens is no guarantee that a reaction will not occur, it does greatly reduce the possibility of such a reaction. Many potential minor antigens are not routinely detected during blood typing. If allowed to go unrecognized, these minor antigens also can initiate a blood transfusion reaction. Therefore, blood is not only typed, but is also crossmatched to identify mismatch of blood caused by minor antigens. Crossmatching consists of the mixing of the recipient’s serum with the donor’s RBCs in a saline solution followed by the addition of the Coomb’s serum test. Only blood products containing RBCs need to be crossmatched. Plasma products DO NOT need to be crossmatched, but should be ABO compatible because other cells (WBCs and platelets) have ABO antigens.

**Additional Blood Testing**

There are a few additional tests which donated blood must undergo. Blood is tested for Human T-Lymphotrophic Virus, Types I and II, which can cause infections that can lead to leukemia or a variety of neurologic diseases. Donated blood is also tested for both active and previous infections with the bacteria that cause Syphilis.
PRE-TRANSFUSION NURSING PRIORITIES: AN EIGHT STEP APPROACH

The following eight steps outline the appropriate procedure to safely administer blood.

Step One

Double check the patient has a physician order for the actual transfusion of the product. This may come as a surprise, but there have been nurses who have been confused by the physician order to “type and cross 2 units of PRBCs” compared to the order of “administer 2 units of PRBCs.” The first order is to only prepare the products (should the transfusion be needed at a future time), and not to actually administer the product. The second order is to actually administer the blood product. It is important for the nurse to differentiate between these two types of orders.

You should also evaluate the patient’s need for a blood product. Think, “are the laboratory results and patient symptoms consistent with the need for a blood product transfusion?” If the rationale is unclear, call the prescribing physician to clarify.

**Equipment Needed for Blood Product Administration**

The nurse will need the following supplies and equipment:

- Blood administration tubing with in-line filter
- IV pole or infusion pump
- Gloves
- Gown
- Face shield
- 250 mL .9% normal saline solution
- Venipuncture equipment (if the patient does not have a central or peripheral line in place)

Step Two

Assess that the patient has a blood bank identification armband. **Blood must never be administered to a patient who has a “no blood” designation.** Some hospitals have a “blood conservation” armband. These patients have elected to not use blood products except in a medical emergency. Typically the “No Blood” or “Blood Conservation” armbands will only be removed if a patient has changed an existing advance directive to indicate that blood products are acceptable. Follow your hospital’s policy for all specific types of armbands and the process used to alter the armbands.
Step Three

Explain the procedure to the patient. Make sure there is a signed informed consent form (per hospital policy) before the therapy is initiated. The physician is required (via the Paul Gann Act) to discuss with patient (or legal representative), the benefits, risks, and possible alternatives to transfusion. The physician is also required to document this information in the medical record.

Step Four

Obtain the patients vital signs. Febrile reactions are the most common reaction to blood transfusions. Ideally, it is helpful if the transfusion begins when the patient is afebrile or has a only low-grade temperature of < 100-101 degrees Fahrenheit. For temperatures exceeding 101 degrees, it is common for facility policies to guide you to re-clarify timing of the transfusion with the prescribing physician and proceed as directed.

Step Five

Assess hospital and unit policy to evaluate if the blood product is to be given via gravity flow or through an infusion pump. For gravity infusions, a 20-gauge catheter is recommended. For transfusions administered via an infusion pump, a 22-gauge catheter may be adequate (check with infusion pump manufacturer’s recommendations for specific catheter requirements and your facility policy). Prepare the transfusion tubing. Only 0.9% intravenous sodium chloride solution should be allowed into the blood tubing or blood bag. Dextrose solutions may lyse RBCs and decrease RBC survival. The calcium contained in the Lactated Ringers (LR) solution may cause clotting.

Step Six

Obtain whole blood, packed RBCs, or other blood product from the blood bank within 30 minutes of the transfusion start time. If there is an unexpected delay with the initiation of the transfusion, return the blood to the blood bank approved refrigerator ASAP. Most hospitals have a policy that the blood product will be discarded and wasted if there is greater than a 30-minute delay in returning the blood. Although tempting, remember that blood cannot be stored in the medication refrigerator on your unit. Blood can only be stored in refrigerators continuously monitored by the hospital’s blood bank department.

Step Seven

Perform a visual check of the product. Assess the blood product for any abnormalities in color, RBC clumping, gas bubbles or extraneous material. Return outdated or abnormal blood to the blood bank.

Step Eight

Perform a bedside patient identification and blood product verification by two licensed individuals. Check your facility’s policy for the definition of “licensed” personnel, but this typically includes RNs, MDs, LVNs, and Perfusionists.
Compare the name and number on the patient’s wristband with those on the blood bag label. Verify the following information:

- Patients full name
- Medical record number or other designated number
- Blood bank armband number
- Unit number
- Blood component type
- ABO/RH type compatibility
- Expiration date

Note: Upon completion of bedside verification, both persons verifying the accuracy of the patient identification and blood product information will sign the transfusion record.

**Pre-Administration Medications**

The patient may have a history of an allergic reaction to a previous blood transfusion. In this situation, the physician may order a medication to be given before the transfusion begins. Common medicines include acetaminophen (Tylenol) and/or diphenhydramine (Benadryl). If there is a high potential of fluid overload associated with the blood product transfusion, the physician may order furosemide (Lasix) or another diuretic of choice.
BLOOD ADMINISTRATION TIPS

It is always a good idea to review your hospital’s blood administration policy before administering blood products. The following recommendations are generic and typically found in the policies of most facilities.

♦ After the blood product has been co-assessed, put on gloves, a gown, and a face shield. Using a Y-type IV tubing set (with built-in filter), close all clamps. Insert the spike of one Y line into the bag of the 9% NS solution. Next, open the port on the blood bag and insert the other Y spike of the line into the blood products. Both Y tubings should be clamped.

♦ Hang the saline and blood products on an IV pole. Open the clamp on the line of the saline solution and squeeze drip chamber until at least half full. Prime the tubing with the NS.

♦ Remember that the blood tubing cannot be piggybacked into an existing IV line. Do not add medications or IV fluids other than normal saline to blood transfusions. Blood and blood products may be administered through a needleless device.

♦ Assure the IV catheter is patent by infusing enough saline to determine patency. Once patency is assured, close the saline clamp and open the clamps to the blood product and to the patient. Adjust the flow clamp closest to the patient to deliver the blood at the calculated rate. It is generally recommended to begin the infusion slowly… no more than 30 mL in the first 15 minutes.

♦ Remain with the patient for approximately 10-15 minutes and observe for signs and symptoms of a potential transfusion reaction. If such signs develop, record vital signs and stop the transfusion. Infuse the saline solution at a moderately slow infusion rate and notify the doctor ASAP.

If no signs of reaction appear within 15 minutes, adjust the flow clamp or infusion pump to the ordered infusion rate. A unit of RBCs may be given over 2-4 hours. When transfusing platelets, FFP, or cryoprecipitate, infuse these blood products as fast as tolerated by the patient or as defined by the physician and or facility policy.

♦ Record the patient’s vial signs per facility policy.

♦ Periodic observations of the patient should be maintained throughout the transfusion.

♦ After completing the transfusion, put on gloves and remove the blood tubing and bag. Dispose of the IV tubing and empty blood bag in the biohazardous containers or per your facility policy.
Blood Administration Filters

The standard blood administration set Y blood tubing has a built-in 170-260 micron filter designed to remove debris and clots. This tubing must be used for administration of all blood and blood components. The entire surface of the filter must be filled with the component to improve flow rates. Each standard blood administration set with built-in filter can be used for the transfusion of up to 2 units of PRBC or for a maximum of 6 hours of total hang time. It is felt that microbial growth may increase within the tubing when hanging for >6 hours.

Leukocyte removal filters are used for leukocyte removal from the RBCs when pre-filtered products are not available. Filters are generally issued from the blood bank. Each filter can be used for only one unit of RBCs.

Microaggregation filters are a 40-micron filter. These filters are used in conjunction with autotransfusions.

- When administering multiple units of blood under pressure, use a blood warmer to avoid hypothermia.
- If a transfusion needs to be given slower than over a 4-hours period (for potential CHF or hypervolemia), the unit of RBCs should be separated into smaller aliquots or split units in the blood bank. This separation should NOT be done by nursing on your unit.
RISKS ASSOCIATED WITH BLOOD TRANSFUSION: 
TRANSFUSION REACTIONS

Technical advances in laboratory testing of donor blood and enforcement of strict donor-selection criteria have helped make transfusions today safer than ever. However, it is important to remember that significant risks continue to be associated with blood transfusions. Despite improvements in crossmatching precautions, transfusion reactions can still occur. For simplification, potential transfusion reactions will be discussed in two separate categories… Acute Reactions and Delayed Reactions.

Acute Reactions

There are many types of potential transfusion reactions that are detected during the early administration of the blood product. The most common include Allergic, Febrile, Hemolytic and Sepsis-related acute reactions.

Acute Transfusion Reactions

<table>
<thead>
<tr>
<th>Reaction and Causes</th>
<th>Clinical Presentation</th>
<th>Nursing Interventions &amp; Treatments</th>
</tr>
</thead>
</table>
| Allergic            | Flushing, itching, rash, urticaria, hives, fever, wheezing, laryngeal edema, anaphylaxis | • Stop infusion, keep vein open with Normal Saline.  
• Notify MD.  
• Administer antihistamines as prescribed  
• Monitor patient for potential anaphylactic reaction and administer epinephrine and corticosteroids if indicated.  
• If stable, the typical treatment is an antipyretic and an antihistamine. If symptoms are relieved, the transfusion may be restarted.  
• Consult with blood bank about decisions surrounding either leaving the blood product hanging or returning the product to the blood bank. Facility policy may also impact this decision. |

Note: Before administering blood product, ask patient about previous transfusion reactions. Alert physician if history is positive and anticipate MD prescribing pre-medications.
<table>
<thead>
<tr>
<th>Reaction and Causes</th>
<th>Clinical Presentation</th>
<th>Nursing Interventions &amp; Treatments</th>
</tr>
</thead>
</table>
| **Febrile, non-hemolytic**  | Chills, fever headache, flushing, palpitations, cough, chest tightness, increased heart rate, flank pain | • Stop infusion, keep vein open with Normal Saline.  
• Notify MD.  
• Relieve symptoms with antipyretic, antihistamine, and/or meperdine (Demerol) as prescribed.  
• If the patient requires future transfusions, use frozen RBCs and add a special leukocyte removal filter to the blood IV line. Most likely pre-medication with acetaminophen (Tylenol) will be ordered. |
| • Recipient antibodies react against donor white blood cells or platelets |                                                                                       |                                                                                                    |
| **Hemolytic**               | Chills, fever, chest pain, dyspnea, flushing, diaphoresis, increased heart rate, flank pain, blood oozing at infusion site, burning sensation along vein receiving blood, feeling of doom, acute renal failure (oliguria), abnormal bleeding | • Stop infusion, keep vein open with Normal Saline.  
• Notify MD.  
• Notify Blood Bank.  
• Monitor and support blood pressure.  
• Manage shock with IV fluids, oxygen, epinephrine, or vasopressors as ordered.  
• Obtain post transfusion reaction blood samples and urine specimens for analysis.  
• Observe for signs and symptoms of hemorrhage resulting from disseminated intravascular coagulation (DIC). |
| • ABO or RH incompatibility |                                                                                       |                                                                                                    |
| • Improper Crossmatching     |                                                                                       |                                                                                                    |
| • Improperly stored blood    |                                                                                       |                                                                                                    |
| **Sepsis**                  | Sudden onset of chills, very high fevers, abdominal cramping, diarrhea, shock, and signs of renal failure | • Prevention:  
  ▪ Strictly adhere to sterile technique.  
  ▪ Change blood administration set and filter every 4 hours or after every 2 units of PRBCs.  
  ▪ Infuse each unit of blood over 2 to 4 hours; stop the infusion if time exceeds 4 hours.  
  ▪ Maintain strict blood storage control.  
• Treatment:  
  ▪ Stop infusion, keep vein open with NS.  
  ▪ Notify MD.  
  ▪ Notify Blood Bank.  
  ▪ Anticipate orders for a broad-spectrum IV antimicrobial.  
  ▪ Vasopressor (B/P) support may be needed. |
| (Bacterial contamination)   |                                                                                       |                                                                                                    |
| • Contamination of the product |                                                                                       |                                                                                                    |
| • Sources of contamination: blood processing, storage or administration. (Note: Organisms such as staphylococcus and pseudomonas can survive the cold temperatures and may be found in the blood product.) |                                                                                                    |
| • Most common cause of morbidity and mortality related to blood transfusions |                                                                                       |                                                                                                    |
A soon as a transfusion reaction is suspected, the transfusion should be immediately stopped. With new IV tubing, use NS at a rate to keep vein open for future IV access. **Do not discard the blood or blood tubing as the blood bank will want these back for future testing.** Follow the following steps (or similar guidelines from your facility):

- Notify the physician.
- Monitor vital signs every 5-15 minutes or as indicated by the severity and type of reaction.
- Compare the labels on all blood containers with corresponding patient identification forms to verify the transfusion was the correct blood or blood product.
- **Notify the blood bank when a possible hemolytic or septic transfusion reaction is suspected.** Collect blood and urine samples as ordered. Immediately send the samples, all transfusion containers (even if empty), and the blood tubing to the blood bank. The blood bank will re-type and cross the patient with the new blood specimen. The first voided urine specimen is analyzed for the presence of hemoglobin, which indicates a hemolytic reaction.
- Closely monitor intake and output. Note evidence of oliguria or anuria because hemoglobin deposits in the renal tubules can cause renal damage.
- If prescribed, administer oxygen, epinephrine, or other drugs and apply hypothermia blanket to reduce fever.
- Make the patient as comfortable as possible and provide reassurance.
- Document the following:
  - Time of the transfusion reaction
  - Type and amount of infused blood or blood product
  - Clinical signs of the transfusion reaction in order of occurrence
  - Vital signs
  - Specimens sent to the lab
  - Treatments given and patient’s response to treatment.
  - If required by your facility policy, complete the transfusion reaction form and any quality variance forms.

**Late Reactions**

Late reactions may go undetected for days, weeks or even months. Delayed reactions generally occur greater than 48 hours after the transfusion. Upon discharge, instruct patient to report any changes in health to their MD.

**Hepatitis**

Hepatitis is the most common transfusion-transmitted infection. The tests that detect both hepatitis B and C can produce false-negative results, and may allow some hepatitis cases to go undetected. These viruses have a long seronegative period when they cannot be detected by screening. Thus, donors may test negative for hepatitis, but in fact are infected with the virus. By the time the hepatitis is detected, the donor blood may already be in use.

**Pharmacological Agents for Anemia**

Despite the previous and current research studies in this field, a viable blood substitute is not yet available. The use of the recombinant human EPO makes it possible to increase hemoglobin concentrations without transfusions. Epoetin alfa (Brand names such as Procrit & Epogen) can increase hemoglobin levels and have been shown to reduce the need for blood transfusion, improve and maintain RBC levels, and improve quality of life.
Hepatitis C accounts for more than 90% of transfusion-transmitted hepatitis cases, whereas 2% are attributed to Hepatitis B. All blood components and most blood products, except albumin, can transmit Hepatitis. High risk factors for hepatitis can be identified through pre-donation screening questions that make certain patients ineligible to donate, thereby helping decrease the chances of transmitting hepatitis. The risk of acquiring hepatitis C is approximately 1 in 103,000 transfusions.

**HIV**

The estimated risk of acquiring human immunodeficiency virus (HIV) from a blood product is approximately 1 in 493,000 transfusions. Although less than 20 HIV cases per year are transfusion-related, this virus remains one of the most feared transfusion-transmitted infections for patients. Identification of high-risk behaviors among potential donors, and the improved use of sensitive lab assays have decreased the risk of HIV infection from donor blood. When testing for the antibodies to HIV, the challenge is that these specific antibodies are not detectable until 6 to 12 weeks after exposure.

**CMV**

Many blood banks screen blood for cytomegalovirus (CMV). Blood with CMV is especially dangerous for an immunosuppressed or critically ill patient. An estimated 60% of blood donors carry the virus. Transfusion of infected blood can cause CMV infection in the recipient. All leukocyte-containing blood products, including whole blood and RBCs, transmit the virus.

In critically ill patients, CMV is a major cause of increased morbidity and mortality. Post transfusion infection with CMV can manifest within 2-4 weeks in immunocompetent patients, but more quickly in critically ill patients. Symptoms include fever lasting 2 to 3 weeks, varying degrees of hepatitis, splenomegaly, and atypical lymphocytosis resembling that of mononucleosis.
CONCLUSION

Administration of blood and blood products is a common nursing activity, but carries with it certain risks. Knowledge about blood products and following proper procedures for blood administration are critical. Recognition of reactions and rapid treatment are the final component of having a solid knowledge base about blood product administration. The nurse is the central health care provider who performs the pre-administration assessment, safely infuses the product, monitors for potential adverse outcomes and supports the patient through the entire process. Although accurate typing and testing of donor blood have made transfusions safer, there are still numerous early and late transfusion reaction risks associated with transfusions process.
RESOURCES


POST TEST VIEWING INSTRUCTIONS

In order to view the post test you may need to minimize this window and click “TAKE TEST”. You can then restore the window in order to review the course material if needed.