Unit 5: Blood Transfusion

Blood transfusion (BT) therapy:
Involves transfusing whole blood or blood components (specific portion or fraction of blood lacking in patient). Learn the concepts behind blood transfusion therapy and the nursing management and interventions before, during and after the therapy.

Objectives of BT
1. To increase circulating blood volume after surgery, trauma, or hemorrhage.
2. To increase the number of RBCs and to maintain hemoglobin levels in clients with anemia.
3. To provide selected cellular components as replacements therapy (e.g. clotting factors, platelets, albumin).

Principles of blood transfusion therapy
1. Whole blood transfusion
Generally indicated only for patients who need both increased oxygen-carrying capacity and restoration of blood volume when there is no time to prepare or obtain the specific blood components needed.

2. Packed RBCs
Should be transfused over 2 to 3 hours; if patient cannot tolerate volume over a maximum of 4 hours, it may be necessary for the blood bank to divide a unit into smaller volumes, providing proper refrigeration of remaining blood until needed. One unit of packed red cells should raise hemoglobin approximately 1%, hematocrit 3%.
3. **Platelets**

   Administer as rapidly as tolerated (usually 4 units every 30 to 60 minutes). Each unit of platelets should raise the recipient’s platelet count by 6000 to 10,000/mm³; however, poor incremental increases occur with all immunization from previous transfusions, bleeding, fever, infection, autoimmune destruction, and hypertension.

4. **Granulocytes**

   May be beneficial in selected population of infected, severely granulocytopenic patients not responding to antibiotic therapy and who are expected to experienced prolonged suppressed granulocyte production.

5. **Plasma**

   Fresh frozen plasma should be administered as rapidly as tolerated because coagulation factors become unstable after thawing.

6. **Albumin**

   Indicated to expand to blood volume of patients in hypovolemic shock and to elevate level of circulating albumin in patients with hypoalbuminemia.

7. **Cryoprecipitate**

   Indicated for treatment of hemophilia A, Von Willebrand’s disease, disseminated intravascular coagulation (DIC), and uremic bleeding.

8. **Factor IX concentrate**

   Indicated for treatment of hemophilia B; carries a high risk of hepatitis because it requires pooling from many donors.

9. **Factor VIII concentrate**

   Indicated for treatment of hemophilia A; heat-treated product decreases the risk of hepatitis and HIV transmission.
10. Prothrombin complex
   Indicated in congenital or acquired deficiencies of these factors.

Advantages of blood component therapy
1. Avoids the risk of sensitizing the patients to other blood components.

2. Provides optimal therapeutic benefit while reducing risk of volume overload.

3. Increases availability of needed blood products to larger population.

Complications of Blood Transfusion
1. Allergic Reaction
   It is caused by sensitivity to plasma protein of donor antibody, which reacts with recipient antigen.

   Assess for:
   - Flushing
   - Rash, hives
   - Pruritus
   - Laryngeal edema, difficulty of breathing

2. Febrile, Non-Hemolytic
   It is caused by hypersensitivity to donor white cells, platelets or plasma proteins. This is the most symptomatic complication of blood transfusion

   Assess for:
   - Sudden chills and fever
   - Flushing
   - Headache
   - Anxiety
3. Septic Reaction

It is caused by the transfusion of blood or components contaminated with bacteria.

Assess for:
- Rapid onset of chills
- Vomiting
- Marked Hypotension
- High fever

4. Circulatory Overload

It is caused by administration of blood volume at a rate greater than the circulatory system can accommodate.

Assess for:
- Rise in venous pressure
- Dyspnea
- Crackles or rales
- Distended neck vein
- Cough
- Elevated BP

5. Hemolytic reaction

It is caused by infusion of incompatible blood products.

Assess for:
- Low back pain (first sign). This is due to inflammatory response of the kidneys to incompatible blood.
- Chills
- Feeling of fullness
- Tachycardia
- Flushing
- Tachypnea
- Hypotension
- Bleeding
- Vascular collapse
- Acute renal failure

Nursing Care Plan for Blood Transfusion

A: Assessment findings
1. Clinical manifestations of transfusions complications vary depending on the precipitating factor.
2. Signs and symptoms of hemolytic transfusion reaction include:
   1. Fever, Chills.
   2. Low back pain, flank pain.
   3. Headache
   4. Nausea
   5. Flushing
   6. Tachycardia, tachypnea
   7. Hypotension
   8. Hemoglobinuria (cola-colored urine)

B: Possible Nursing Diagnosis
- Ineffective breathing pattern
- Decreased Cardiac Output
- Fluid Volume Deficit
- Fluid Volume Excess
- Impaired Gas Exchange
- Hyperthermia
- Hypothermia
- High Risk for Infection
- High Risk for Injury
- Pain
- Impaired Skin Integrity
- Altered Tissue Perfusion.

**C: Planning and Implementation**

1. Help prevent transfusion reaction by, verifying patient identification beginning with type and cross match sample collection and labeling to double check blood product and patient identification prior to transfusion.

2. Inspecting the blood product for any gas bubbles, clothing, or abnormal color before administration.

3. Beginning transfusion slowly (1 to 2 mL/min) and observing the patient closely, particularly during the first 15 minutes (severe reactions usually manifest within 15 minutes after the start of transfusion).

4. Transfusing blood within 4 hours, and changing blood tubing every 4 hours to minimize the risk of bacterial growth at warm room temperatures.

5. Preventing infectious disease transmission through careful donor screening or performing pretest available to identify selected infectious agents.

6. Preventing hypothermia by warming blood unit to 37 C before transfusion.
7. **On detecting any signs or symptoms of reaction:**

- Stop the transfusion immediately, and notify the physician.
- Disconnect the transfusion set but keep the IV line open with 0.9% saline to provide access for possible IV drug infusion.
- Send the blood bag and tubing to the blood bank for repeat typing and culture.
- Draw another blood sample for plasma hemoglobin, culture, and retyping.
- Collect a urine sample as soon as possible for hemoglobin determination.

**Nursing Interventions for Complications**

*If blood transfusion reaction occurs:*

1. Stop the Transfusion Immediately.
2. Start IV line (0.9% NaCl)
3. Place the client in fowler’s position if with SOB and administer O2 therapy.
4. The nurse remains with the client, observing signs and symptoms and monitoring vital signs as often as every 5 minutes.
5. Notify the physician immediately.
6. The nurse prepares to administer emergency drugs such as antihistamines, vasopressor, fluids, and steroids as per physician’s order or protocol.
7. Obtain a urine specimen and send to the laboratory to determine presence of hemoglobin as a result of RBC hemolysis.
8. Blood container, tubing, attached label, and transfusion record are saved and returned to the laboratory for analysis.
Nursing Procedure of blood transfusion

The following is a step-by-step checklist of things to do and other responsibilities to ensure proper blood transfusion and prevent any unwanted reactions and errors.

1. Verify the physician’s written order and make a treatment card according to hospital policy.
2. Observe the 10 Rs when preparing and administering any blood or blood components.
3. Explain the procedure/rationale for giving blood transfusion to reassure patient and significant others and secure consent.
4. Get patient histories regarding previous transfusion.
5. Explain the importance of the benefits on Voluntary Blood Donation.
6. Request prescribed blood/blood components from blood bank to include blood typing and cross matching and blood result of transmissible Disease.
7. Using a clean lined tray, get compatible blood from hospital blood bank.
8. Wrap blood bag with clean towel and keep it at room temperature.
9. Have a doctor and a nurse assess patient’s condition. Countercheck the compatible blood to be transfused against the crossmatching sheet noting the ABO grouping and RH, serial number of each blood unit, and expiry date with the blood bag label and other laboratory blood exams as required before transfusion.
10. Get the baseline vital signs- BP, RR, and Temperature before transfusion.
11. Give pre-meds 30 minutes before transfusion as prescribed.
12. Do hand hygiene before and after the procedure.
13. Prepare equipment needed for BT (IV injection tray, compatible BT set, IV catheter/ needle G 19/19, plaster, tourniquet, blood, blood components to be transfused, Plain NSS 500cc, IV set, needle gauge 18 (only if needed), IV hook, gloves, sterile 2×2 gauze or transplant dressing, etc.

14. If main IV fluid is with dextrose 5% initiate an IV line with appropriate IV catheter with Plain NSS on another site, anchor catheter properly and regulate IV drops.

15. Open compatible blood set aseptically and close the roller clamp. Spike blood bag carefully; fill the drip chamber at least half full; prime tubing and remove air bubbles (if any). Use needle g.18 or 19 for side drip (for adults) or g.22 for pediatric (if blood is given to the Y-injection port, the gauge of the needle is disregarded).

16. Transfuse the blood via the injection port and regulate at 10-15 drips/min initially for the first 15 minutes of transfusion and refer immediately to the physician for any adverse reaction.

17. Observe/Assess patient on an on-going basis for any untoward signs and symptoms such as flushed skin, chills, elevated temperature, itchiness, urticaria, and dyspnea. If any of these symptoms occur, stop the transfusion, open the IV line , and report to the doctor immediately.

18. Swirl the bag gently from time to time to mix the solid with the plasma.

19. Continue to observe and monitor patient post transfusion, for delayed reaction could still occur.

20. Re-check Hgb and Hct, bleeding time, serial platelet count within specified hours as prescribed and/or per institution’s policy.
21. Discard blood bag and BT set and sharps according to Health Care Waste Management.

22. Fill-out adverse reaction sheet as per institutional policy.

23. Remind the doctor about the administration of Calcium Gluconate if patient has several units of blood transfusion (3-5 more units of blood).