Introduction :-

• Blood Transfusion is the Replacement of Blood or its components.

Or

• Blood Transfusion is a life saving Procedure to place the Blood cell or Blood Products which lost through Haemorrhage, Anemia and Other Disease.

Indication for Blood Transfusion :-

• Hemorrhage
• Anemia
• Trauma
• Burns
• Surgery

Types of Blood Donation :-

1. Autologous
2. Blood Salvage
3. Designated Donor

1. Autologous :-

• “Blood Donate to Yourself" ( अपने आप को Blood Donate करना )

• इस प्रकार के Blood donation किसी भी Schedule Procedure से पहले , स्वयं Patient के ही blood को Donate और Restore किया जाता है ( so इसमें Disease Transmission और Transfusion complication होने के Risk कम हैं )

• Blood को Scheduled Procedure से 5 week से पहले Blood collect और restore करते हैं ।

• Septicemia और Leukemia वाले Patient में इस प्रकार का Blood Transfuse सक्षम नहीं ।

2. Blood Salvage :-

• Blood salvage भी Autologus Blood का type ही है इसमें Blood को Suctioning के द्वारा Body cavities, Joint Spaces और other closed body sites से Collect करते हैं ।
• Blood को Re-Infusion करने से पहले Blood को Special Process से इसमें उपस्थित Tissue Debris (अवशेष) को हटाया जाता है।

3. Designated Donor :-

• Compatible donor selected by Recipient.

Types of Blood Components :-

1. Whole Blood :-

• 1 Unit = 350 ml (300 ml Blood + 50 ml Anticoagulant)
• Maximum Storage time :- 35 Days
• Storage Temperature :- 1°C - 6°C (Ideal Storage temperature 4°C)
• Infusion time :- 2 - 4 hour

Note :- Blood Transfusion हमेशा 4 घंटों के भीतर ही करें, जिससे Septicemia (Blood Bacterial Infection) के चांगले दौर को रोका जा सके।

• Discard Blood remains after 4 hours of Blood Transfusion.

2. Red Blood Cells [RBC] :-

• 1 Unit = 250 ml (1 Unit RBC Increase 1 Gram hemoglobin)
• Maximum storage time = 42 Days
• 2 - 3% Hematocrit Value increase
• Transfusion time :- 2 - 4 hour

3. Platelets :-

• Platelets Transfuse in thrombocytopenia and Platelets dysfunction.
• 1 Unit = 50 - 70 ml
  1 Unit Platelets Increase 5000 - 10,000 cells platelets / mm³
• Maximum Storage time :- 5 - 7 Days (Mainly 5 days)
  Effective use as soon as Transfer.
• Storage Temperature = 20° - 24°C
• Transfusion time = 15 - 30 Minut
4. **White Blood Cells (WBC)**:
- 1 Unit = 400 ml
- Transfusion time = 1 Hour (WBC को स्टोर नहीं करते हैं)
- Use: - immunity Dificient Person and Chronic Infection Person.

5. **Fresh Frozen Plasma (FFP)**:
- Transfuse In: - Deficiency of Blood clotting factor (V, VIII) and Plasma Protein.
- 1 Unit FFP = 200 - 250 ml
- Storage Time - 1 Year
  - Storage Temperature: -30°C for 1 Year Store
    -60°C for 2 Year Store
- Transfusion Time: - Within 15 - 30 minutes.

**Types of Plasma Products**:

1. **Albumin**:
   - Use in Hypovolemia Shock, Liver failure, hypoalbuminemia.
   - Stored for 5 Years.
   - 25 gm/100ml is equal to 500 ml of plasma.

2. **Cryoprecipitate**:
   - Prepared from FFP, used to Replace clotting factors VIII and XIII, Fibronectin and Von Willebrand factor.
   - Used for Bleeding Disorders
   - Store - Can be Stored for 1 Year.
   - 1 Unit Administered over 15 - 30 minutes.
   - Note: - Client के Medical record में Blood Transfusion के बारे में complete information को Document करके रखें।
Compatibility :-

- Client's Identification (Name on Band or Bracelet)
- Recipient ABO type & Rh type Identify
- An antibody screen :- Presence of Antibody
  - Universal Blood Donor :- O\textsuperscript{ve}
  - Universal Blood Recipient :- AB\textsuperscript{ve}

Conditions for Blood Donation :-

- Donor must be free from all Infectious Disease like malaria, HIV, Hepatitis, STD etc.
- Donor should not be donated blood in last 90 days.
- Age will be Between 18 - 65 year.
- Hemoglobin not less than 12gm%.
- Blood Should not be collect in Empty Stomach.
- Give Sweet drink to donor after Donation.

Precautions for Blood Transfusion :- (Blood Transfusion के दौरान निम्न सावधानियां बरते ) :-

- In the first 15 minute the Blood flow rate is limited to 50ml, except when treating massive trauma.
- Use 40 micro meter Size filter for BT.
- Two Health care professionals (One the Administering nurse) verify the Patient's ABO and Rh Blood type and It's compatibility.
- Blood store at 4°C and Administer on room temperature (22 - 23°C).
- Start Transfusion of Blood within 30 minutes after coming out from blood bank.
- Never use any Solution or Drug except normal Saline during Blood Transfusion.
- Change BT set in 4 - 6 hours.
  ★ Rapid Transfuse of cold blood may cause Cardiac Arrhythmias.
  ★ Assess Patient every 15 minute to observe Blood Transfusion reaction.
  ★ Use 18 gauge needles for Blood Transfusion
Blood Bank:-

- A Place in which whole Blood and certain components are Processed and stored until needed for Transfusion.
- Blood is mixed with Citrate Phosphate Dextrose and Stored at 4°C (39°F) for maximum of 40 - 45 days.
- Heparin may be Used as a Preservatives.
- Banked Blood should be used as soon as Possible because the Longer it is stored, the fewer red blood cells survive in Usable form.

Complications of Blood Transfusion :-

1. Transfusion Reaction :-
   - Allergic and Hemolytic reaction

Sign & Symptoms :- Fever

- Chills
- Itching
- Sweating
- Nausea & Vomiting
- Tachycardia
- Hypotension
- Dyspnea
- Hematuria

Nursing Intervention :-

★ Stop Transfusion ★ & Start 0.9% NS Sodium Chloride

- Inform doctor
- Check Vital Signs at every 5 minutes.
- Administer antihistamine or other emergency drugs ( Acetaminophen & Diphenhydramine as Prescribed ).
- Collect first Voided Urine, Blood unit, Tubing and Filter and send to Lab.

2. Circulatory Overload / Fluid Overload :-

- Infusion of Blood at a rate of too rapid for the client to tolerate.

Sign & Symptoms :-

- Cough, Dyspnea, Chest pain and Wheezing
• Hypertension
• Tachycardia and Bounding Pulse
• Distended neck vein

Nursing Interventions :-
• Slow the Flow rate at minimum level
• Place the Client in Upright Position with Feer dependent.

3. Septicemia / Bacteremia :-
• Transfusion of Bacterial contaminat Blood

Sign & Symptoms :-
• Rapid onset of Chills and High fever
• Vomiting
• Diarrhoea
• Hypotension and Shock

Nursing intervention :-
• Stop Transfusion
• Notify to the Physician

Note :- To Prevent Septicemia BT will complete in 4 hours.

अगर Patient में Septicemia develop हो जाये तो Blood Transfusion को stop करेंगे, तथा Blood bag को वापस Blood bank में भेजेंगे।

4. Iron Overload :-
• Delayed Transfusion complications that Occurs in clients who receive Multiple Blood Transfusion such as Client with Anemia and Thrombocytopenia.

Sign & Symptoms :-
• Vomiting, Diarrhoea, Hypotension and Altered Hematological values.

Nursing Intervention :-
• Administer Deferoxamine ( which remove accumulated iron by Kidney ).

5. Hyperkelaemia :-
• Stored Blood, Hemolysis के द्वारा Potassium को मुक्त करता हैं
• The older blood have greater risk of Hyperkalemia.
• Renal failure के Patient को हमेशा Fresh Blood देना चाहिये।

Sign & Symptoms :-
• Paresthesias
• Weakness
• Abdominal Cramps
• Dysrhythmia

Nursing Intervention :-
• Slow the Transfusion
• Notify to the HCP

Medical Management :-
• IV Calcium Gluconate
• Sodium Bicarbonate
• Regular Insuline + Hypertonic Dextrose
• Kayexalate (Sodium Polystyrene Sulfonate)

6. Hypocalcemia :-
• Blood में उपस्थित Excess Citrate यह Calcium के साथ जुड़कर, Body से Excret होने लगता है जिससे Hypocalcemia की Condition Creat हो जाती है

Sign & Symptoms :-
• Muscle Spasm (Tetany Signs - Positive Chvostek’s Sign & Trousseau’s Sign)
• Paresthesias

Intervention :-
• Slow Transfusion
• Notify to HCP

7. Disease Transmission :-
• Massive Blood Transfusion Cause Disease
  Ex :- Hepatitis C & Hepatitis B