BLOOD TRANSFUSION

By

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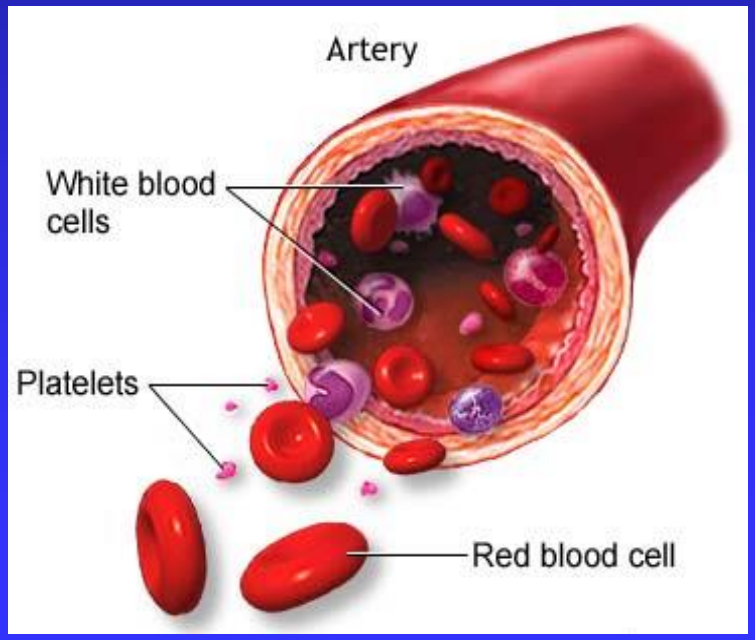
Blood Transfusion



Blood transfusion

Definition

Blood transfusion is the transfusion of the whole blood or its component such as blood cells or plasma from one person to another person.

Blood transfusion involves two procedure that is –

- ***Collection of blood from donor***

And

- ***Administration of blood to the recipient.***

Indications

(1) Decrease blood volume as in hemorrhage & blood loss more than **30%**

(2) In severe anemia (**Hb** is less than 7gm/dl)

(3) Restore blood contents as **platelets**, packed **RBCs** or **clotting factor** as in **purpura** and **hemophilia**

(4) Erythroblastosis fetalis by exchange transfusion.

(5) Restore plasma proteins

(6) Provide antibodies to persons with lowered immunity

(7) To improve leucocytes count

(8) To control infection in case of leucopenia

Common Blood Component Transfusions

- **Packed Red Blood Cells (PRBCs)**
  - The most common transfusion, given **to raise hemoglobin** levels in patients with severe anemia, trauma, or blood loss during surgery.
- **Platelet Transfusion**
  - Replaces platelets **to stop active bleeding** or prevent bleeding in patients with low platelet counts, often due to chemotherapy.
- **Fresh Frozen Plasma (FFP)**
  - The liquid part of blood containing clotting factors and proteins. It is used **for severe infections**, **liver failure**, or **after massive blood loss**.
- **Whole Blood**
  - Contains all blood components. While rare today due to component separation, it is sometimes used **in massive trauma** .

Types of Transfusion Sources

- **Allogeneic Transfusion**
  - Blood donated by someone else (volunteer donor).
- **Autologous Transfusion**
  - The patient receives their own blood, which was donated and stored in advance of a planned surgery.

Precautions

- (1) Blood is obtained from healthy donors

  - Age =18-60 years old with good general condition

  - Weight: more than 55 kg

  - Blood pressure & all vital signs should be within normal range

  - Donor has not donate blood in the previous 90 days
  - Must not have been pregnant within the last 6 months

  - Hb% is not less than 90% (13gm/dl).

  - Hematocrit value at least 40%.

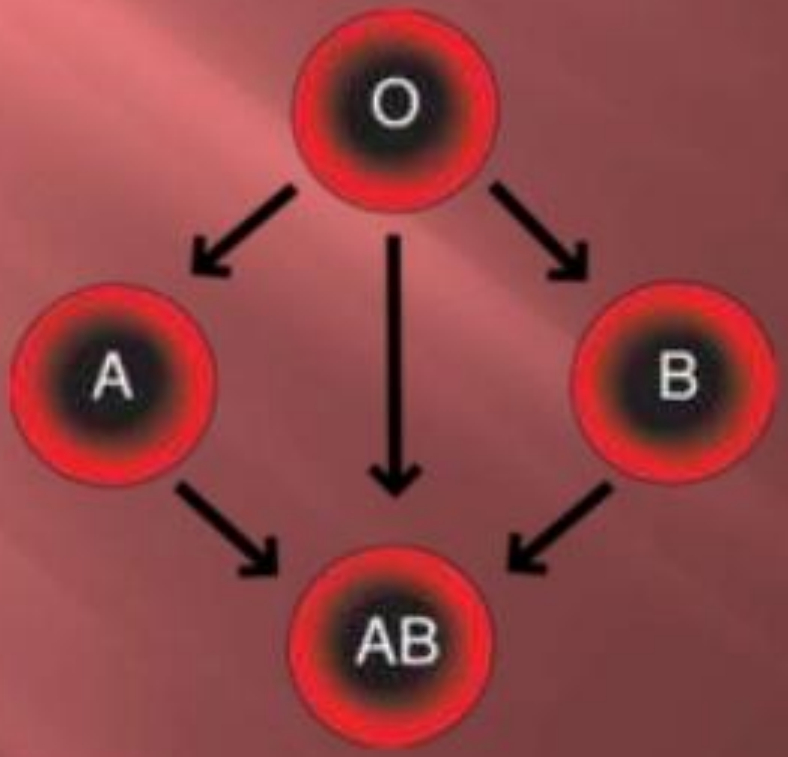
  -Free from infectious diseases as AIDS, viral hepatitis

Precautions

- (2) Blood used is stored at 4°C not more than 21 days
- (3) Blood bag must contain, sodium citrate (anti-coagulant), citric acid (reduce pH) and dextrose (nutrient of RBCs) (all = 120 ml)
- (4) Blood groups are compatible by (Cross matching test or slide technique.
- (5)The blood is warmed before transfusion to restore the Na+ / K+ pump

Blood transfusion

Blood grouping and cross matching



Blood transfusion

Blood grouping and cross matching

- Each person has one of the following blood types: A, B, AB, or O.
- O can be given to anyone but can only receive O.
- AB can receive any type but can only be given to AB.
- Also, every person's blood is either
  - Rh-positive or Rh-negative.

Blood transfusion

Blood grouping and cross matching

- The blood used in a transfusion must be compatible with the patient's blood type.
  - Type O blood is called the universal donor
  - People with type AB blood are called universal recipients
- People with Rh-positive blood can get Rh-positive or Rh-negative blood. But people with Rh-negative blood should get only Rh-negative blood.

- The Main Role In Blood Transfusion
- The recipient's plasma should not contain agglutinins(antibodies) against the donor's red cells agglutinogens (antigens).
- N.B **the donor's serum is diluted in recipient blood.**

Complications of blood transfusion

- ***(A) Incompatibility***

leads to:

1. RBCs are agglutinated in clumps

Block small blood vessels → ischemic pain in chest

If the amount of the blood is less than 350 ml, death not occur.

2. Agglutinated RBCs hemolyse and hemoglobin is liberated in plasma

- Converted to bilirubin → post-transfusion jaundice

- Precipitate as acid hematin in the renal tubules blocking it → acute renal failure and anuria this may cause death from uremia

- ↑ Viscosity of blood ↑→ heart work and may cause heart failure

3. Hemolysed RBCs may produce toxic substances → V.C of renal vessels → renal failure. Or may release histamine with severe vasodilatation and drop in blood pressure

(B) Other complications

1. Transmission of diseases as AIDS & hepatitis B,C.

2. Bacterial contamination and increase body temperature.

3. Over loading by excessive transfusion → heart failure.

4. Hyperkalemia → arrhythmia

5. Hypocalcemia → tetany , this occurs if large volume of citrated blood is transfused (citrate toxicity as it binds with the ionized Ca^{++}

6. Allergic reactions → occurring when the immune system reacts to donor plasma proteins

➢ Changes occur in stored blood

1- Increase K+ ions in plasma (Na+/ K+ pump inhibited by cold)

2- Decrease dextrose and changed to lactic acid.

3- Decrease Platelets number (short life span)

4- **RBCs** swell and become spherical and more hemolysed.

5- Decrease the plasma concentration of factors VII, VIII & IX

6- Decrease **2,3 DPG** → more **Hb** affinity to **O2**
→ less O2 supply to the patient → hypoxia.

DID YOU KNOW?

- When someone donates blood, that blood is separated into red cells, plasma and platelets.
- Each one of these can be given to a different patient who needs only that part of the blood.


THank you