



# Blood Transfusion

Blood components


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Blood transfusion treats decreased Hb and HCT. **Whole blood** transfusion replaces the volume and oxygen carrying capacity of the circulatory system by increasing the mass of circulating red blood cells. Because of the circulatory overload, whole blood transfusions are rarely used, except in cases of severe hemorrhage.



**Packed RBCs**, a blood component from which 80% of the plasma has been removed, are transfused to restore the circulatory system's oxygen carrying capacity. Packed RBCs are used when the patient has normal blood volume to avoid possible fluid and circulatory overload.

Perioperative and emergency blood salvage are the most common indications for transfusion in the critical care setting.

## Platelets: (Platelet sediment from whole blood)

In cases of bleeding due to critically decreased circulating platelet counts or functionally abnormal platelets.


-Thrombocytopenia.

-platelet count  $< 50,000$  /MI before surgery or a major invasive procedure.

## Fresh Frozen Plasma (FFP):

Uncoagulated plasma separated from RBCs and rich in clotting factors.

- Bleeding
- Coagulation factor deficiency
- Warfarin reversal
- Thrombotic thrombocytopenic purpura



**Cryoprecipitate (Insoluble plasma portion of FFP containing fibrinogen, factor VIII, factor XIII, and fibronectin).**

-Used for bleeding associated with hypofibrinogenemia or dysfibrinogenemia.

-Significant factor XIII deficiency (prophylactic or treatment).

Factor VIII concentrate(recombinant, genetically engineered product; derivative obtained from plasma).

Used in:- Hemophilia A

-Von Willebrand's disease.

Albumin 5%( A small plasma protein prepared by fractionating pooled plasma).

Used in:-Volume loss due to burns, trauma, surgery, or infection.

-Hypoprotienemia.

Immune globulin(processed human plasma from multiple donars that contains 95%immunoglobulin IgG,<2.5%IgA, a fraction of IgM) Used for I and 2<sup>nd</sup> immune deficiencies,Kawasaki syn,ITP, Guillin-Barre syn,Myasthenia gravis)

## Compatibility:

**Whole blood** -----ABO Identical; Rh match necessary.

**Packed RBCs** -----ABO compatible; Rh match necessary.

**Platelates** -----ABO Identical when possible ; Rh–ve receive Rh-ve when possible.

**FFP**-----ABO Compatible; Rh match not required.

**Cryoppt** -----ABO Compatibility preferred but not necessary; Rh match not required.

**Factor VIII conc** ----Not required.

**Albumin 5%** -----Not required .

**Immune globulin** -----Not required.



## Transfusion Reactions:

### Endogenous:

I. Bacterial contamination (pseudo and staph)  
(Chills, fever, vomiting, abdominal cramping, diarrhea, shock, signs of renal failure).

### Nursing interventions:

. Broad spectrum antibiotics, corticosteroids, epinephrine.

Prevention: Strict blood storage control, change blood infus set and filter every 4 hr or after every 2 units, infuse each unit of blood over 2 to 4 hr, stop infusion if time > 4hr, maintain sterile technique, inspect blood for air, clots and dark purple colour.



2. Febrile (Bacterial lipopolysaccharides, Antileukocyte recipient Ab directed against donor WBCs.

(Fever 40C, chills, headache, facial flushing, palpitations, cough, chest pain, tachycardia, flank pain).

*Nursing:* Relieve symptoms with antipyretic, antihistamine.

Use FFP, leukocyte removal filter to blood line, premedication with acetaminophen as ordered before starting another transfusion.

### 3. Hemolytic (ABO or Rh incompatibility)

(Chest pain, dyspnea, facial flushing, fever, chills, shaking, hypotension, flank pain, hemoglobinuria, oliguria, bloody oozing at infusion site or surgical incision, burning sensation along vein receiving blood, shock and renal failure).

#### *Nursing intervention:*

- Monitor blood pr.
- Manage shock with I.V.F, O<sub>2</sub>, epinephrine, diuretic and a vassopressor as ordered.
- Obtain posttransfusion-reaction blood samples and urine specimen for analysis.



-Observe for signs of hemorrhage resulting from DIC.

## **Prevention:**

**.Before the transfusion, check donar and recipient blood types to ensure blood compatibility.**

**.Transfuse blood slowly for first 30 minutes of transfusion**

#### 4. Plasma protein incompatibility (IgA )

◦ Abdominal pain, diarrhea, dyspnea, chills, fever, flushing, hypotension.

*Nursing intervention:*

- Administer O<sub>2</sub>, fluids, epinephrine or, possibly a steroid, as ordered.
- Transfuse only IgA-deficient blood or well-washed RBCs

Exogenous:

**Bleeding tendencies** (low platelet count in stored blood, causing thrombocytopenia).


Abnormal bleeding and oozing from a cut, a break in the skin surface or the gums, abnormal bruising and petechiae.

*Nursing Intervention:*

-Administer platelets, FFP, cryoppt.

-Monitor platelet count.

-Use only fresh blood (less than 7 days old) when possible.



**Circulatory overload** (may result from infusing whole blood too rapidly).


Increased plasma volume, back pain, chest tightness, chills, fever, dyspnea, flushed feeling, headache, hypertension, increased CVP and JVP.

*Nursing intervention:*

- Monitor blood pr.
- Administer diuretics, as ordered.

Prevention:

- Transfuse blood slowly.
- Don't exceed two units in 4hr; fewer for elderly patients, infants or patients with cardiac conditions



**Hypocalcemia**(citrate toxicity-citrate binds with calcium causing calcium deficiency or normal citrate metabolism becomes impeded by hepatic disease).


Arrhythmias, hypotension, muscle cramps, nausea and vomiting, seizures, tingling in fingers.

*Nursing intervention:*

-Slow or stop transfusion, depending on patient's reaction. Expect a more severe reaction in hypothermic patients or patients with elevated potassium level.

-Infuse blood slowly.





**Hypothermia** Rapid infusion of large amounts of cold blood, which decreases body temperature. Chills, shaking; hypotension; arrhythmias, especially bradycardia, cardiac arrest, if core temperature falls below 30C.

*Nursing Intervention:*

- Stop transfusion.
- Warm patient with blankets.
- Obtain an ECG.

*Prevention:* Warm blood(35 to 36.7C)especially before massive transfusions.