INDICATIONS FOR BLOOD TRANSFUSION

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ROLL No. 10

- Blood transfusion involves administration of blood or blood components.
- Used to restore the oxygen carrying capacity, hemostasis, blood volume

Components of Blood used in Blood Transfusion

- Common components :
  - Whole blood (rare use)
  - Packed Red Blood Cells (PRBC)
  - Platelet concentrates
  - Fresh Frozen Plasma (FFP)
  - Cryoprecipitate

WHOLE BLOOD

- **Whole blood**: one unit of blood collected contains 450ml+/-10% of blood and citrate anticoagulants.
- Within few hrs to days coagulation factors[V,VIII] and platelets decrease or lose viability
- GENERAL INDICATIONS
  - Acute blood loss due to hemorrhage or during surgery
  - Symptomatic anemia [Hb <7g/dl in stable, Hb<8g/dl in cardiovascular disease]
  - Exchange transfusion (rare)
  - Situations where components unavailable

RED CELL CONCENTRATES

- Most of the plasma is removed and replaced with a solution of glucose and adenine in saline to maintain viability of red cells
- Replace acute blood loss: increase circulating red cell mass to relieve clinical features caused by insufficient oxygen delivery.
- Order 4–6 U initially to allow high red cell to FFP transfusion ratios 2:1
- INDICATIONS
  - Acute blood loss
    - Trauma
    - Surgery
    - Obstetric hemorrhage
    - GI bleeding
  - Symptomatic anemia
    - Dyspnea
    - Tachycardia
    - Hypotension
    - Angina
  - Hb based thresholds (general guidelines)
    - Hb <7 g/dL → stable hospitalized patients
    - Hb <8 g/dL → cardiovascular disease / surgery
    - Hb <10 g/dL → rarely needed except special cases
  - Chronic anemia with symptom
    - CKD
    - Bone marrow failure
    - Hemoglobinopathies

PLATELET CONCENTRATE

- One adult dose is made from four donations of whole blood, or from a single platelet apheresis donation ABO compatibility with recipient preferable
- Prophylactic
  - Platelet count <10,000/µL
- With bleeding risk
  - <20,000/µL (fever, sepsis)
- Before procedures
  - Minor surgery: <50,000/µL
  - Major surgery: <50–100k
- Active bleeding with thrombocytopenia
  - Dengue
  - DIC
  - Bone marrow suppression e.g. in acute leukaemia
  - Surgical or invasive procedures

FRESH FROZEN PLASMA

- 150–300 mL plasma from one donation of whole blood ABO compatibility with recipient recommended.
- Indications
  - Coagulopathy with bleeding
  - DIC
  - Liver failure
  - Massive transfusion
  - Warfarin reversal (if PCC unavailable)
- Lab indication:
  - Prolonged PT/INR or aPTT with bleeding

- Dilutional coagulopathy with a PT prolonged >50% is likely after replacement of 1–1.5 blood volumes with red cell concentrate.

Give initially a ratio of 1 FFP: 2 red cell concentrate

- Order 15–20 mL/kg and allow for thawing time.
- Replacement of coagulation factor deficiency
- Thrombotic thrombocytopenic purpura

CRYOPRECIPITATE

Fibrinogen and coagulation factor concentrated from plasma by controlled thawing .
10–20 mL pack contains:

- Fibrinogen 150–300 mg
- Factor VIII 80–120 U
- von Willebrand factor 80–120 U

Aim to keep Fibrinogen >1.5 g/L. Pooled units (of 10 donations) will raise fibrinogen by 1 g/L

- Indications:
  - Hypofibrinogenemia
  - DIC
  - Massive transfusion
  - Congenital fibrinogen deficiency
  - Von Willebrand disease
  - Haemophilia

MASSIVE TRANSFUSION

- **Massive blood transfusion** is **the replacement of a patient's total blood volume within 24 hours, or transfusion of ≥10 units of packed red blood cells in 24 hours.**
- It may also be defined as **replacement of ≥50% of the blood volume within 3 hours in actively bleeding patients.**
- Examples:
  - Polytrauma
  - Obstetric hemorrhage
  - Major surgery
- Protocol:
- 1:1:1 ratio (PRBC : Plasma : Platelets)

ADVERSE EFFECTS OF BLOOD TRANSFUSION

- IMMUNOLOGICAL
  - **Immediate**
    - Acute hemolytic transfusion reactions
    - Febrile nonhemolytic reaction
    - Allergic reactions
    - Anaphylactic reactions
    - Transfusion related acute lung injury
  - **Late**
    - Alloimmunisation
    - Transfusions associated graft-vs-host disease
    - Post transfusion purpura

- NONIMMUNOLOGICAL
  - **Immediate**
    - Circulatory overload
    - Air embolism
  - **Late**
    - Iron overload
    - Thrombophlebitis
    - Infections

REFERENCE : DAVIDSON PRINCIPLES AND PRACTICE OF MEDICINE ,24TH EDITION