Blood Transfusion

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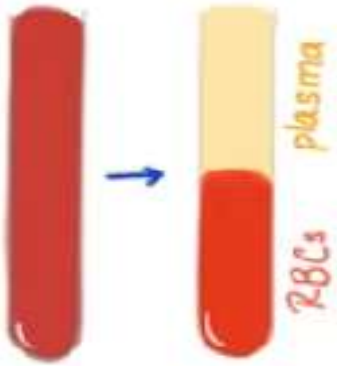
Blood Component separation



Whole blood

Centrifuge

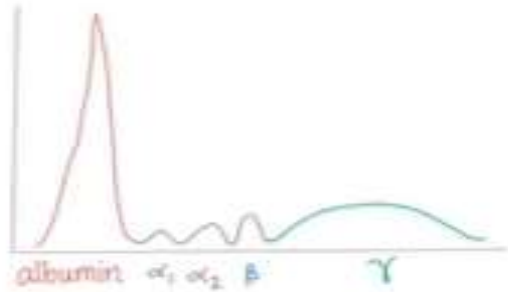
- RBCs
- PLT-rich plasma
  - Centrifuge
    - Plasma
      - Freeze, thaw, centrifuge
        - Cryoprecipitate
          - fibrinogen, VIII, VWF, XIII
        - Cryoprecipitate-reduced plasma (Cryosupernatant)
          - ↓↓ VIII
    - PLT

Cryoprecipitate

Blood Products

- Whole blood
- Blood Components
  - RBCs
  - PLTs
  - Plasma
    - FFP
    - Cryoprecipitate
    - Cryosupernatant
- Plasma Derivatives
  - albumins
  - Coagulation factors
  - immunoglobulins

Globulin



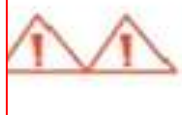
Normal SPEP

FFP

↓ levels of blood proteins { Coagulation factors; others (e.g. immunoglobulins)

- Replacement of coagulation factors in cases of factor def. (e.g. hemophilia
- Antidote to Warfarin toxicity. • ATIII deficiency • Tx of TTP.
- Replacement of immunoglobulins in cases of immunodeficiencies

Allergy, TACO, TRALI



Do NOT use FFP as a volume expander

→ Use Saline instead. "Crystalloids or Colloids"

TTP (THROMBOTIC THROMBOCYTOPENIC PURPURA)

Path: ADAMTS-13 deficiency = vWF

Labs: ↑ Bleeding Time, Thrombocytopenia

Presentation: Anemia, Thrombocytopenia, Fever, Neurologic Sxs, Renal Dysfunction

Cells: Schistiocytes

What is TRALI

- TRALI- Transfusion Related Acute Lung Injury
- It is defined as acute dyspnoea with hypoxia and bilateral pulmonary infiltrates during or within 6hr of transfusion, not due to circulatory overload or other likely causes
- This is an Acute reaction
- TRALI's clinical presentation is:
  - Acute dyspnoea (difficult or laboured breathing)
  - Hypoxia (reduced oxygen levels in blood)
  - Bilateral pulmonary infiltrates

What is TACO

- TACO- Transfusion Associated Circulatory Overload
- This is defined as the presentation of at least 4 of the following symptoms within 6hrs of transfusion:
  - Acute respiratory distress
  - Tachycardia
  - Increased blood pressure
  - Acute or worsening pulmonary oedema
  - Evidence of positive fluid balance
- This is also an acute reaction

FFP vs PF24

- Phlebotomy → Blood → Centrifugation → Separated
  → Frozen Solid @ -18°C within 8 hrs.

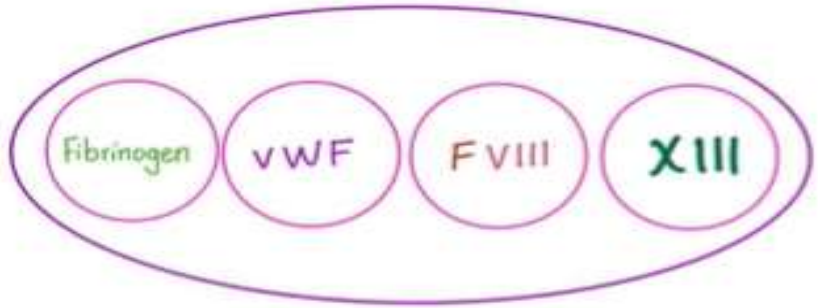
1 unit = 150-300ml

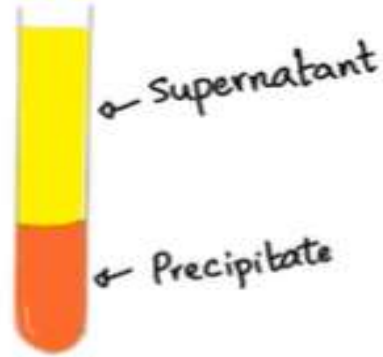
- Higher levels of factors 5 & 8

- Phlebotomy → plasma → Freeze within 24 hours

- lower levels of factors 5 & 8

Cryoprecipitate

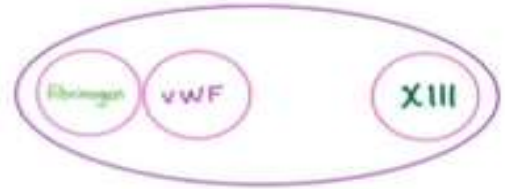




Cryosupernatant

(Cryoprecipitate - reduced plasma)

↓↓↓ VIII



- Hemophilia
- vWD
- Hypofibrinogenemia / Afibrinogenemia
- DIC
- Reversal of excessive anticoagulant administration

- TTP
- HUS

TTP

DIC (DISSEMINATED INTRASVASULCAR COAGULATION)

Path: inappropriate widespread clotting activation

Labs: ↑Bleeding Time, ↑PT/PTT, Thrombocytopenia, ↑D-Dimer, ↓Fibrinogen

Presentation: bleeding, sepsis, trauma

Cells: Schistiocytes

HUS (HEMOLYTIC UREMIC SYNDROME)

Path: toxin-mediated Hemolysis

Labs: ↑ Bleeding Time, Thrombocytopenia, ↑ Creatinine

Presentation: kidney failure, bloody diarrhea

Cells: Schistiocytes

RBC TRASFUSION

Each unit of packed RBCs will raise your { Hgb by 1 g/dl ; HCT by 3 % }

The rule of 3

RBC Count x3 =	Hgb x3 =	HCT

MATCHING (ABO, Rh)

Anemia
Chemotherapy
Hemorrhagic shock

Allergy. Anaphylaxis, Infections, TRALI. ECF volume overload.

HIV, Hep B, Hep C

Goal: Restore O_2 carrying capacity

★Most common given

1 unit ≈ 250-300ml

Sodium Citrate (anticoagulant)
- Binds calcium
- ↑PRBCs → bleeding
- Monitor level/give Ca^{++}

Uses:
- Anemia

Stable - Transfuse <7g/dL
Unstable+ May be higher

1u PRBC = ↑1g/dL (recheck post)

• Use isotonic-fluid & inline filter

Generally start slow for first 15min
- Watch for reaction

★Emergent = quicker!

PLT TRASFUSION

Bleeding due to → Thrombocytopenia, Thrombasthenia → Chemotherapy-related.

MATCHING "ABO, Rh"

1 unit ≈ 50ml (6 pack) ↑ platelets by 50,000

⚠ Allergy. Anaphylaxis, Infections, TRALI

- Now how do estimate the total blood volume ?
- the blood volume = 8% of our body weight expressed in kg.
- were we did get this number 8%?
- The blood cells 3% of body weight + blood plasma makes 5% of our body weight. So 3 plus 5 would be 8.
- 8% × 70kg equals to 5.6L which equals to 5.6 kg.

- one pint is called blood unit. Or 500ml half a litre
- 1 litre = half a court .
- And one quart = 2 pints.

- In this example you got 10pints in your blood . So when you donate 1 pint you giving less than 1/10 of your blood body.

- So the person who less than 100 bound doesn’t give blood. In other word when you donate blood you given 10% or less ,
- if you gave twice that you will lose a litre of blood, half a court of blood then you need a medical attention.