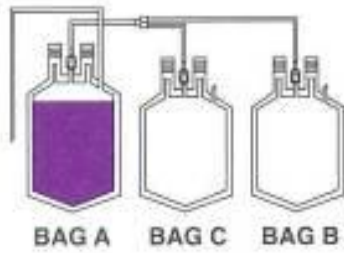
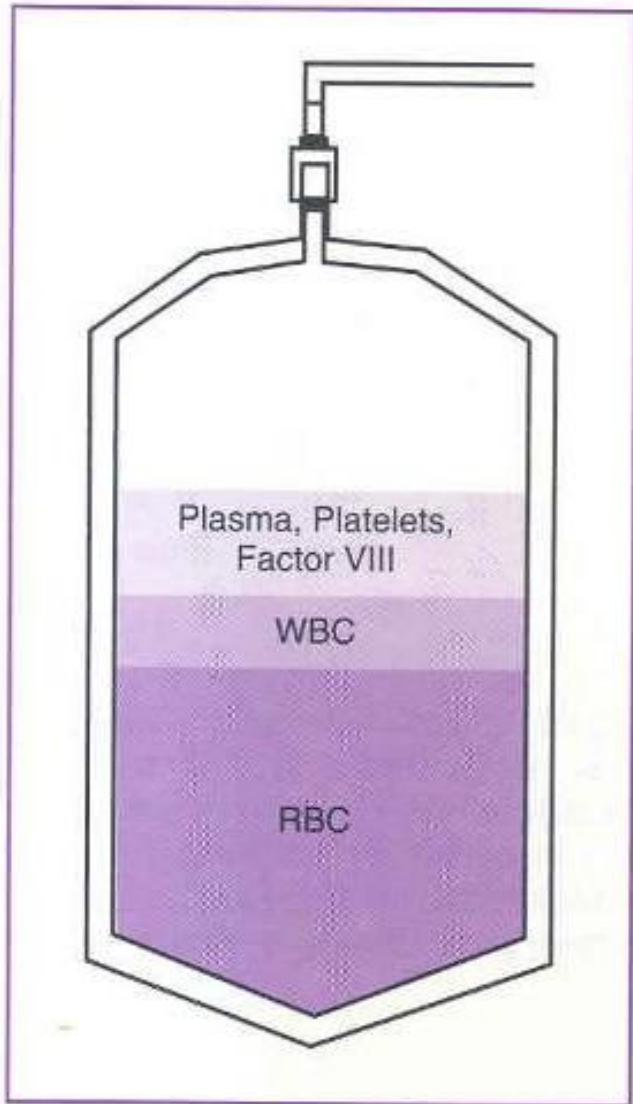


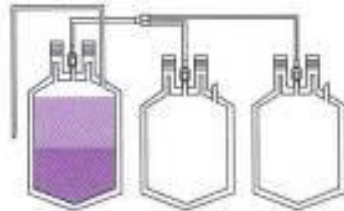
BLOOD TRANSFUSION

OBJECTIVES

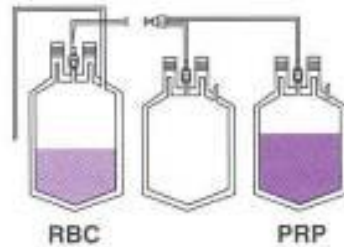
- Know the components of the blood
- Indication of each component
- Blood transfusion reactions



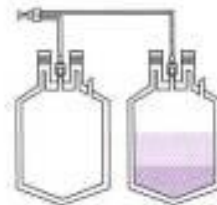
Step 1
Whole blood is in Bag A (primary bag). Bag B (platelet bag) and Bag C (plasma bag) are termed "satellite bags."



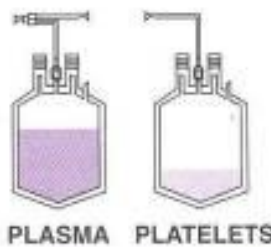
Step 2
Bags are spun in centrifuge, separating components within primary bag. Platelet-rich plasma rises to the top; red blood cells sink to the bottom.



Step 3
Platelet-rich plasma (PRP) is forced into Bag B; red blood cells (RBC) remain in the bottom of Bag A. Bag A is separated from Bags B and C. Red blood cells are stored at 4 to 6°C.

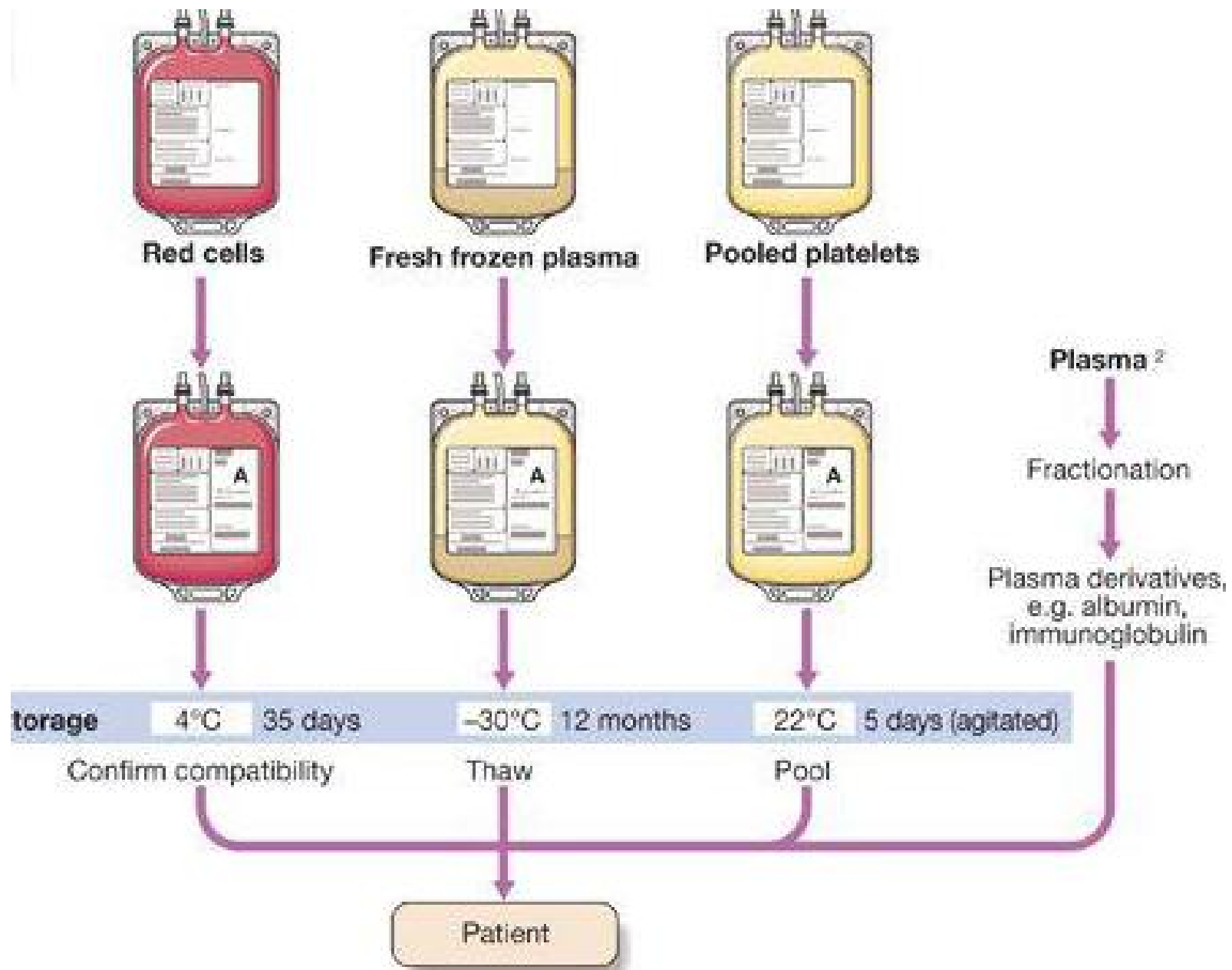


Step 4
Bags are spun again, longer and harder than initial spin. Plasma and platelets are separated in Bag B. Plasma rises to the top; platelets sink to the bottom.



Step 5
Plasma is forced into Bag C. Bags B and C are separated. Bag B contains a platelet concentrate in 40 to 70mL of plasma. Plasma in Bag C can be made into fresh frozen plasma or other products.





PACKED RBC TRANSFUSION

- Transfusion of one unit raise the hemoglobin by

1g/dL.

- Packed RBC transfusion is not indicated if Hb >

10gm/dl

1. Packed RBC transfusion is indicated if Hb < 7gm/dl
2. Hgb 7-10 g/dl in cases of:
 - ü Symptom
 - ü Increased risk of ischemia - pulmonary disease, coronary artery disease, cerebral vascular disease.
3. Acute blood loss > 15% of total blood volume or
Hypotension
4. Transfusion for a regular predetermined therapeutic program such as for hemoglobinopathies.

- Packed RBC transfusion is indicated in which of the following:
 1. 15 years old male with hemoglobin = 10.5 gm/dl
 2. 45 years old male with recurrent ischemic chest pain and hemoglobin = 8 gm/dl
 3. 40 years old female with hematemesis her blood pressure 80/40 mmHg
 4. 55 years old male with recurrent ischemic chest pain and hemoglobin = 11 gm/dl
 5. 70 years old male with hemoglobin = 6 gm/dl

PLATELETS TRANSFUSION

1. Platelet count $<10 \times 10^9/L$
2. Platelet count $10-50 \times 10^9/L$ involving: with hemorrhage or patient planned for invasive or surgical procedure.
3. Neurosurgical patient with platelet count $< 100 \times 10^9/L$
4. Documented platelet dysfunction with petechiae, purpura, bleeding, invasive or surgical procedure

FRESH FROZEN PLASMA

- Indication:

- Ø Replacement of isolated coagulation factor deficiency where concentrate are not available.
- Ø Liver disease
- Ø Warfarin side effects
- Ø Vitamin K deficiency
- Ø TTP/ DIC

- Not indicated: for albumin replacement, or as a volume expander.

CRYOPRECIPITATE

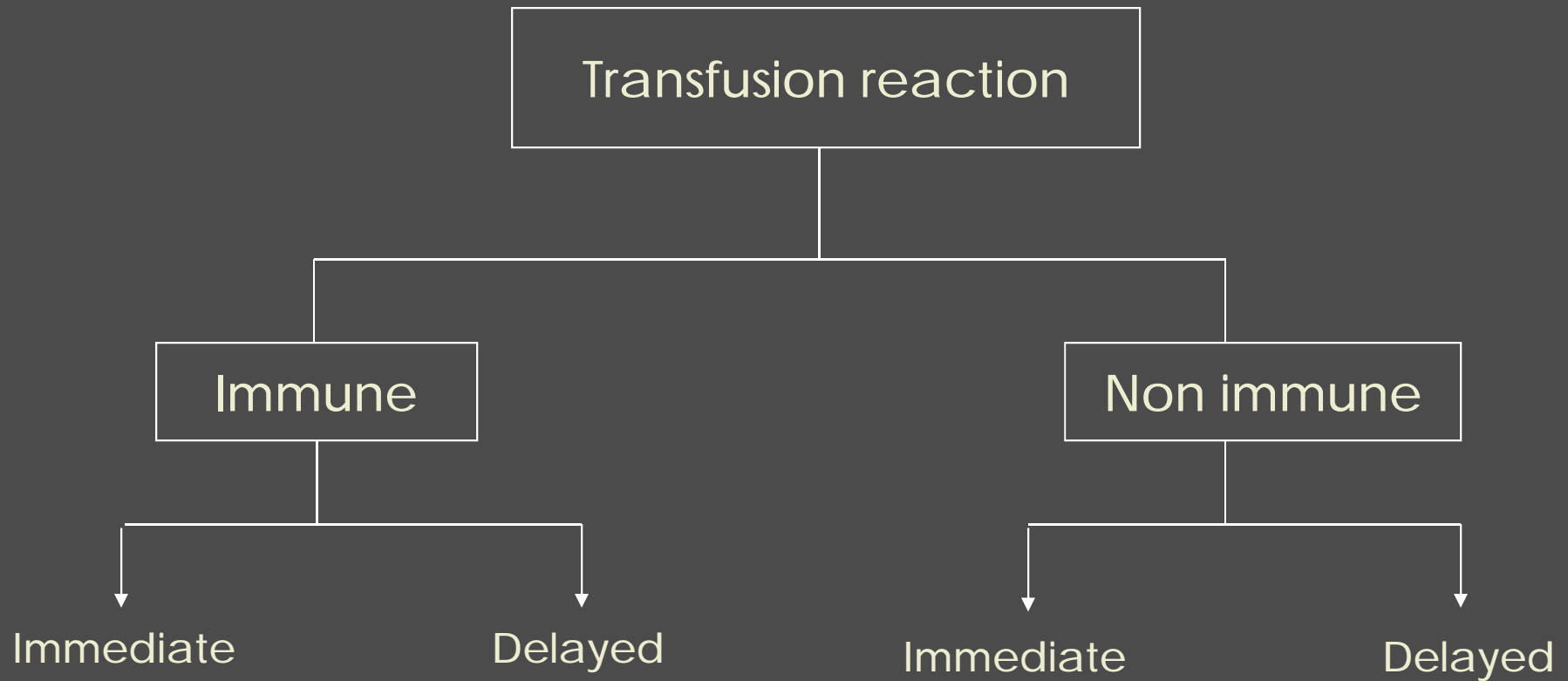
- It is an extract of FFP that is enriched in high-molecular-weight plasma protein.
- It is a source of:
 - ü Fibrinogen,
 - ü Factor VIII,
 - ü Factor XIII
 - ü Von Willebrands factors.

For the treatment or prevention of bleeding associated with:

- ü Von Willebrands disease
- ü Factor XIII deficiency
- ü Factor VIII deficiency
- ü Fibrinogen deficiency (such as DIC)
- ü Dysfibrinogenemia

COMPLICATIONS OF BLOOD TRANSFUSION

COMPLICATIONS OF BLOOD TRANSFUSION



NON - IMMUNE COMPLICATIONS

Immediate (hours)	Delayed (days to years)
<ol style="list-style-type: none">1. Bacterial infection2. Hypothermia3. Electrolyte toxicity (Hypocalcaemia, hyperkalemia)4. Hypotension5. Transfusion associated circulatory overload	<ol style="list-style-type: none">1. HIV, HIV, HBV, CMV2. Others: parvovirus B19, HAV, HEV, WNV, dengue, malaria, Chagas disease, brucellosis, syphilis, vCJD3. Iron overload

IMMUNE COMPLICATIONS

Immediate (hours)	Delayed (days to years)
<ol style="list-style-type: none">1. Febrile non- hemolytic transfusion reactions2. Allergic reactions (urticarial)3. Acute hemolytic transfusion reactions4. Anaphylactic reactions5. Transfusion- related acute lung injury	<ol style="list-style-type: none">1. Delayed hemolytic transfusion reactions2. Post- transfusion purpura3. Transfusion associated graft-versus- host disease

FEBRILE NON-HEMOLYTIC REACTION

- It is the most frequent reaction.
- These reactions are characterized by chills and rigors and a 1°C rise in temperature within 1-6 hour after transfusion.
- Management: stopping the transfusion and antipyretics and moderate doses of pethedine.

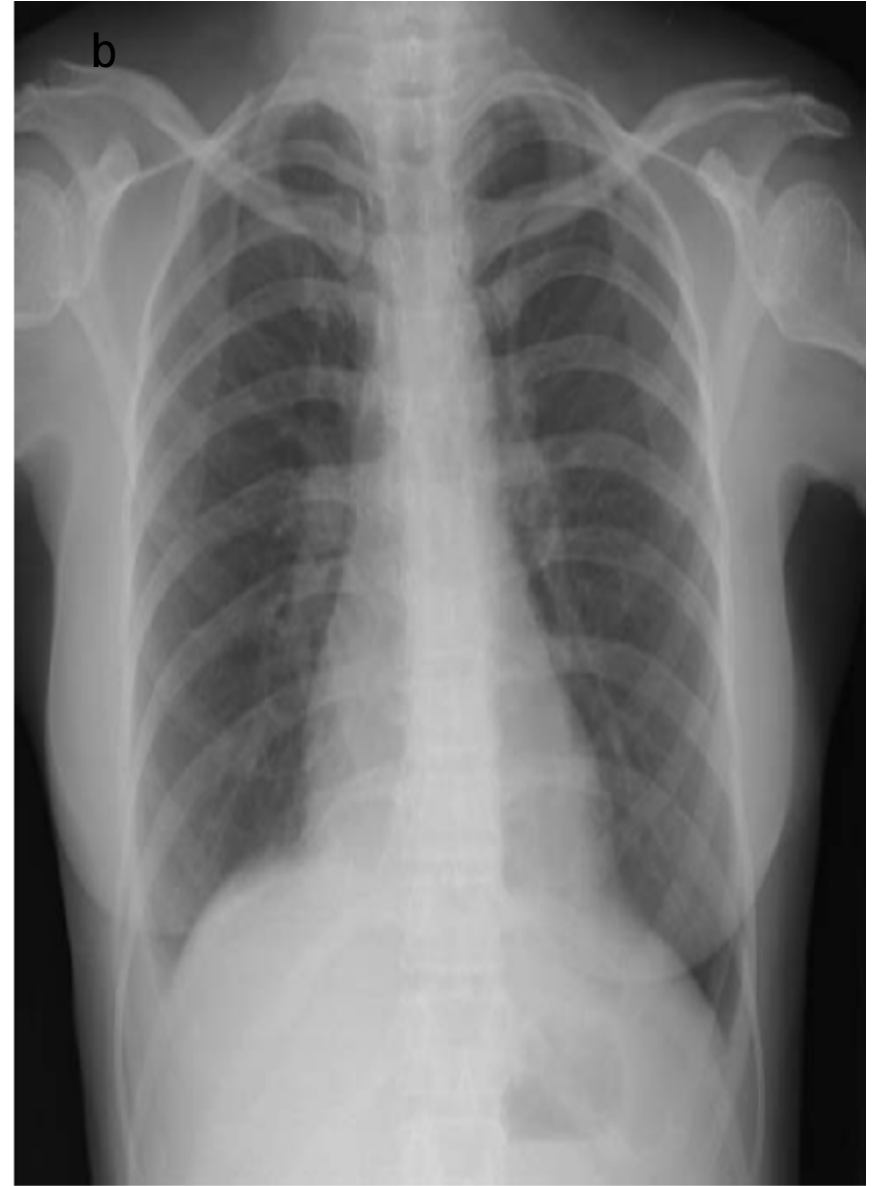
ALLERGIC REACTIONS

- The appearance of wheals to diffuse urticaria with or without bronchospasm.
- Mild reactions may be treated by temporarily stopping the transfusion and administering antihistamines. The transfusion may be completed after the signs and/or symptoms resolve.



TRANSFUSION RELATED ACUTE LUNG INJURY

- It presents as acute respiratory distress, either during or within 6 h of transfusing the patient.
- It is characterized by dyspnea and hypoxia secondary to non cardiogenic pulmonary edema.
- Treatment is supportive, and patients usually recover without sequelae.



ANAPHYLACTIC REACTION

- This severe reaction presents after transfusion of only a few milliliters of the blood component.
- Symptoms and signs include difficulty breathing, coughing, nausea and vomiting, hypotension, bronchospasm, loss of consciousness, respiratory arrest, and shock.

TREATMENT

- Stopping the transfusion, vascular access,
- Administering epinephrine (0.5–1 mL of 1:1000 dilution subcutaneously).
- Glucocorticoids may be required in severe cases.

ACUTE HEMOLYTIC TRANSFUSION REACTIONS

- It results from the rapid destruction of donor erythrocytes by preformed recipient antibodies.
- The ABO antibodies are responsible (majority).
- Patient present with hypotension, tachypnea, tachycardia, fever, chills, hemoglobinemia, hemoglobinuria, chest and/or flank pain, and discomfort at the infusion site.

When acute hemolysis is suspected:

- The transfusion must be stopped immediately,
- Intravenous access maintained.
- A labeled post transfusion blood sample and any untransfused blood should be sent to the blood bank for analysis.
- Laboratory evaluation for hemolysis (PT, PTT, PC, fibrenogen)

- Generous fluid replacement with saline to support a urine output to prevent the development of acute oliguric renal failure.
- A vasopressor such as low-dose dopamine may be required.

- If massive intravascular hemolysis has occurred, hyperkalemia is likely and cardiac monitoring and acute hemodialysis may be required.
- If there has been clinical or laboratory signs of DIC, cautious and early treatment is important.

- A 35-year-old woman was hospitalized for anemia. After her 1st unit of blood she developed a temp of 38.3 °C.
- On exam she appears anxious but her vital signs are stable with Bp 120/70 mmHg, HR 90 bpm 18cpm Pox 98%
- She has no skin rash

- A 35-year-old woman was hospitalized for anemia. 5 minutes after her blood transfusion, She complains of new flank pain and fever.
- On exam she is febrile to 38.8C with Bp 100/60mmHg, HR 101 bpm, Pox 98%.
- Her urine color is now reddish brown.
- Labs: elevated Bun/creatinin, increased PTT, PT and decreased HCT.

What is the diagnosis and how would you manage this patient?

Thank you