



# ICU

## L12

**Anesthesia Technologist**

BCS. Anesthesia. and IC  
diploma. Community health

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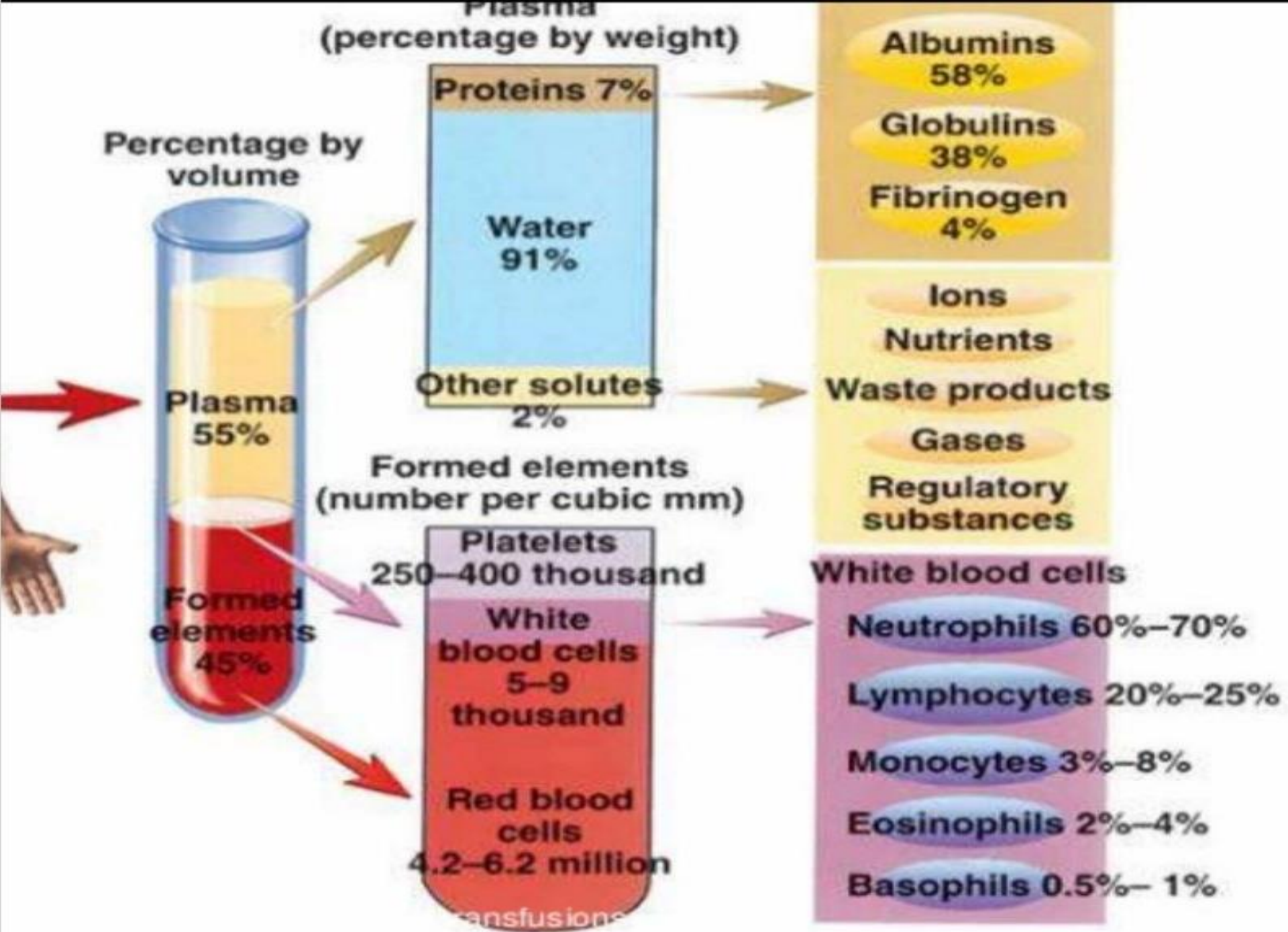
**Anesthesia Technologist**

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**Muneer Salman Hasan**



# *BLOOD & BLOOD PRODUCTS*



## Blood Products



- Components of the blood which are collected from a donor for use in blood transfusion.

# Blood Products



**Blood**

Whole Blood  
Fresh Whole Blood

Cellular Components

Red Cell Concentrates  
Platelet Concentrates  
Granulocyte Concentrate

Plasma Components

Fresh Frozen plasma  
Cryoprecipitate  
Cryo poor plasma  
Stored plasma

Plasma Derivatives

Albumin  
Immunoglobulin  
Coagulation Factors

# Whole Blood



- Whole blood = Donor blood + Anticoagulant
- 1 Unit - 450ml
- Anticoagulant (CPDS)
- Rich - coagulation factors
- Hct - 45%
- Stored at 2 - 6 °c
- Shelf life - 35 days

# Whole Blood

## Indications

- Acute blood loss with hypovolaemia
- Exchange transfusion
  - severe anaemia at birth
  - severe hyperbilirubinaemia
- Massive transfusion
- Cardiovascular bypass surgery



# Red Cell Concentrate



- Also called Packed Red Cells
- Platelets and plasma are removed
- 1 Unit - 330ml
- Hct – 65 - 75%
- Shelf life - 35 days
- Stored at 2 - 4 °c



# Red Cell Concentrate

## Indications

- Anaemia
- Thalassemia
- Sickle cell disease



# Fresh Frozen Plasma



- Removed – Fresh blood & Rapidly Frozen
- 1 Unit – 200 - 250ml
- Contains all coagulant factors
- Stored at - 40 to - 50°c
- Shelf life – 2 years

# Fresh Frozen Plasma

## Indications



- Single clotting factor deficiency
- Multiple clotting factors deficiencies- DIC
- Massive transfusions
- Warfarin overdose
- Haemorrhagic disease of neonates
- TTP

## Cryoprecipitate



- Fresh frozen plasma thawed at 4° C
- Rich in – F – VIII & Fibrinogen
- 1 unit = 15 - 20ml
- Stored at -30° C
- Shelf life – 2 years

# Cryoprecipitate

## Indications

- Hemophilia A
- Von Willebrand's disease
- FXIII or fibrinogen deficiency



# Platelets Concentrate

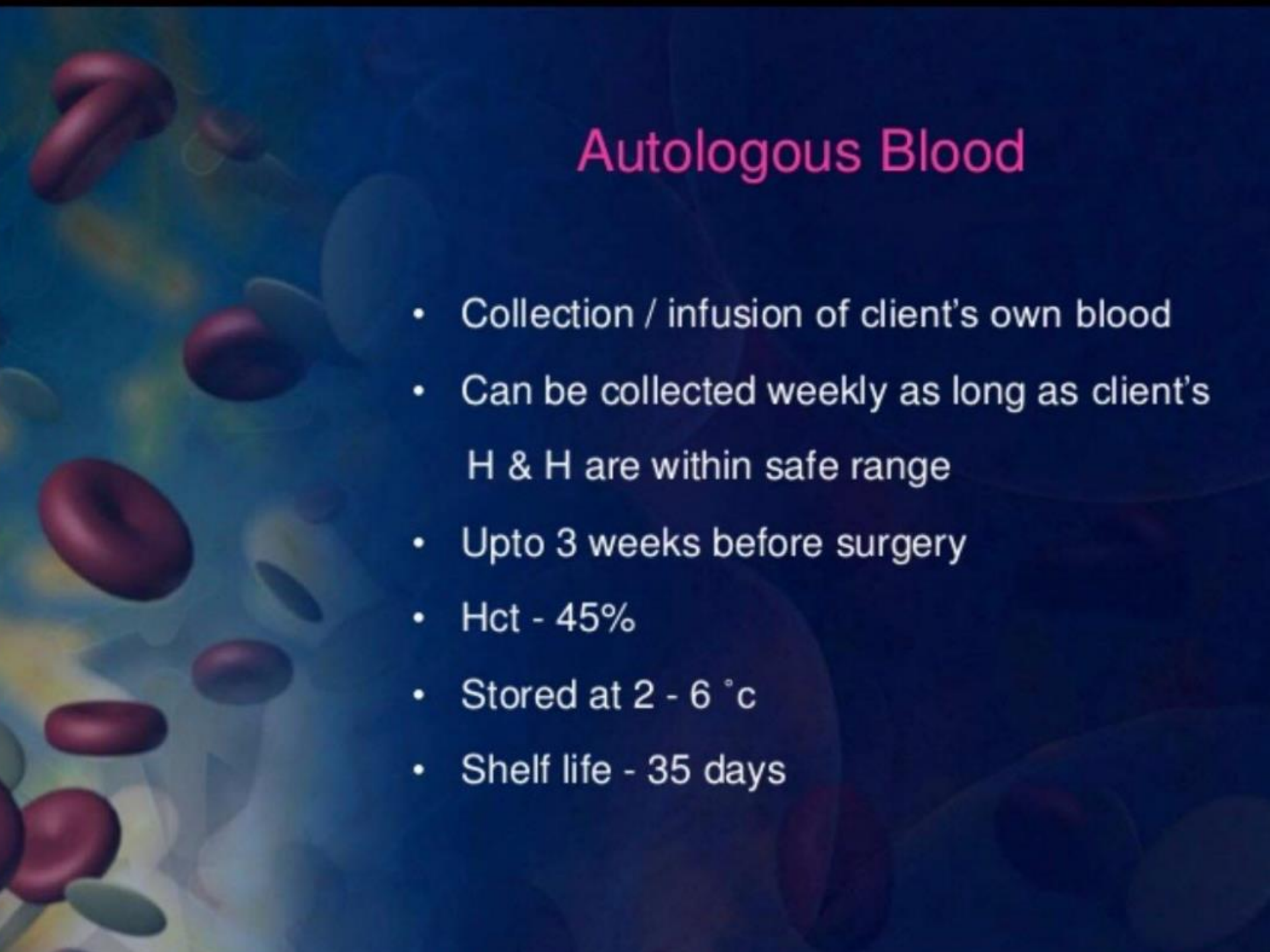


- Platelet rich plasma – Cent.
- Stored at – 20 to 24 °c
- Shelf life – 5 days
- 1 unit = 15 - 20ml
- Uses =  
Thrombocytopenia  
Drug induced Hge

A microscopic view of blood cells, including red blood cells and white blood cells, set against a dark blue background. The red blood cells are prominent, appearing as biconcave discs in various shades of red and brown. The white blood cells are smaller and more irregular in shape, appearing in lighter shades of blue and green. The overall scene is illuminated from the left, creating a sense of depth and highlighting the texture of the cells.

## Prothrombin Complex Concentrate (PCC)

- Derived from pooled plasma
- Contains – F – II / IX / & X
- Emergency reversal of warfarin therapy

A microscopic view of blood cells, including red blood cells (erythrocytes) and white blood cells (leukocytes), set against a dark blue background. The red blood cells are prominent, showing their characteristic biconcave disc shape. The white blood cells are smaller and more varied in shape, some appearing as small, round cells and others as larger, more irregular cells. The overall scene is illuminated from the left, creating a sense of depth and highlighting the texture of the cells.

## Autologous Blood

- Collection / infusion of client's own blood
- Can be collected weekly as long as client's H & H are within safe range
- Upto 3 weeks before surgery
- Hct - 45%
- Stored at 2 - 6 °c
- Shelf life - 35 days



# Concept map

## Complications of transfusion

### Immunological

Febrile

Allergic

Hemolytic

Post-transfusion  
Purpura (PTP)

anaphylactic  
reactions

urticarial  
reactions

Acute

Delayed

### Non-immunological

Infections

Bacterial

Viral

Others

Thrombophlebitis


Hemosiderosis

Air embolism

Circulatory  
overload

massive  
transfusion

# ABO system

Blood group	Red cell A or B antigens	Antibodies in plasma
O	None 	Anti-A and anti-B
A	A	Anti-B
B	B	Anti-A
AB	A and B	None

Reaction	Clinical Features	Management	Notes
<b>Non-haemolytic febrile transfusion reaction</b> <small>(alloimmunised recipient produces cytokines due to donor leukocytes/HLA antigens)</small>	-Shivering, <u>fever</u> , ± headache, nausea, flushing, tachycardia -Usually 30-60mins after	-Continue slowly/stop -Monitor frequently -Paracetamol	-Most common reaction (1 in 8 patients)! -The patient is <b>HOT</b> , but really <u>WELL</u> (unlike other causes)
<b>Acute haemolytic reaction / ABO incompatibility</b> <small>(IgM mediated)</small>	-Fever, hypotension - <u>Agitation</u> , <u>flushing</u> , abdo/chest pain, bleeding/DIC/RF -Occurs in minutes of starting	-Supportive management -ABCDE	-The patient is <u>SICK</u> -Both have fever + hypotension -Differentiate by agitation/flushing vs rigors
<b>Bacterial contamination</b>	-Fever, hypotension - <u>Rigors</u> (→ septic shock)	- <b>Treat as sepsis</b> ↳ Broad spectrum Abx	
<b>Delayed haemolytic reaction</b>	-Anaemia, fever, jaundice, haemoglobinuria -1-4 weeks after	-Investigations -Monitor renal function -Specific treatment rarely required	
<b>Transfusion-Related Acute Lung Injury (TRALI)</b>	-Acute respiratory distress syndrome (ARDS) -Dyspnoea, cough, CXR white-out -Occurs <6hours (usually ~2)	-Supportive care -ABCDE -Oxygen -ICU	-Symptoms similar -TRALI if no history of LVF, overload more likely if LVF history present
<b>Fluid overload</b>	-Dyspnoea, hypoxia, tachycardia, increased JVP, basal crepitations	- <b>Treat as acute LVF</b> ↳ Furosemide ↳ Oxygen	
<b>Anaphylaxis</b> <small>(IgA mediated)</small>	-Bronchospasm, cyanosis, hypotension, soft tissue swelling	- <b>Treat as anaphylaxis</b> ↳ Maintain airway ↳ Call anaesthetist	
<b>Allergic reactions</b> <small>(plasma protein incompatibility)</small>	-Urticaria and itch	-Chlorphenamine	- <u>Rarely severe</u>

Thank  
you

