



# Lecture 10

## Subject Parenteral Fluid Therapy

### Theoretical

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- ❖ Intravenous therapy is administration of liquid substances directly into a vein and the general circulation through venipuncture.
- ❖ is an effective and efficient method of supplying fluid directly into intravenous fluid compartment producing rapid effect, with availability of injecting large volume of fluid more than other method of administration.



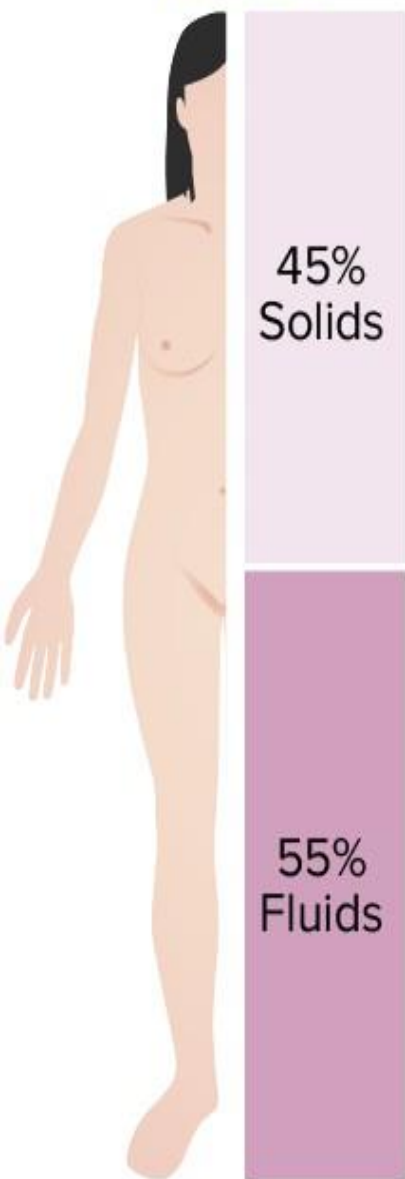
# Distribution of Body Fluids

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graph TD; A[Distribution of Body Fluids] --> B[Intracellular fluid (ICF)]; A --> C[Extracellular fluid (ECF)];
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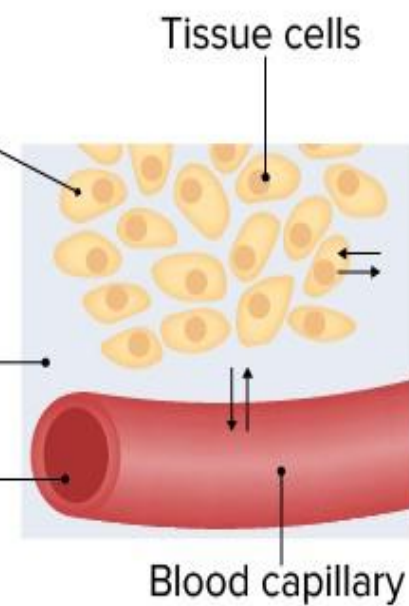
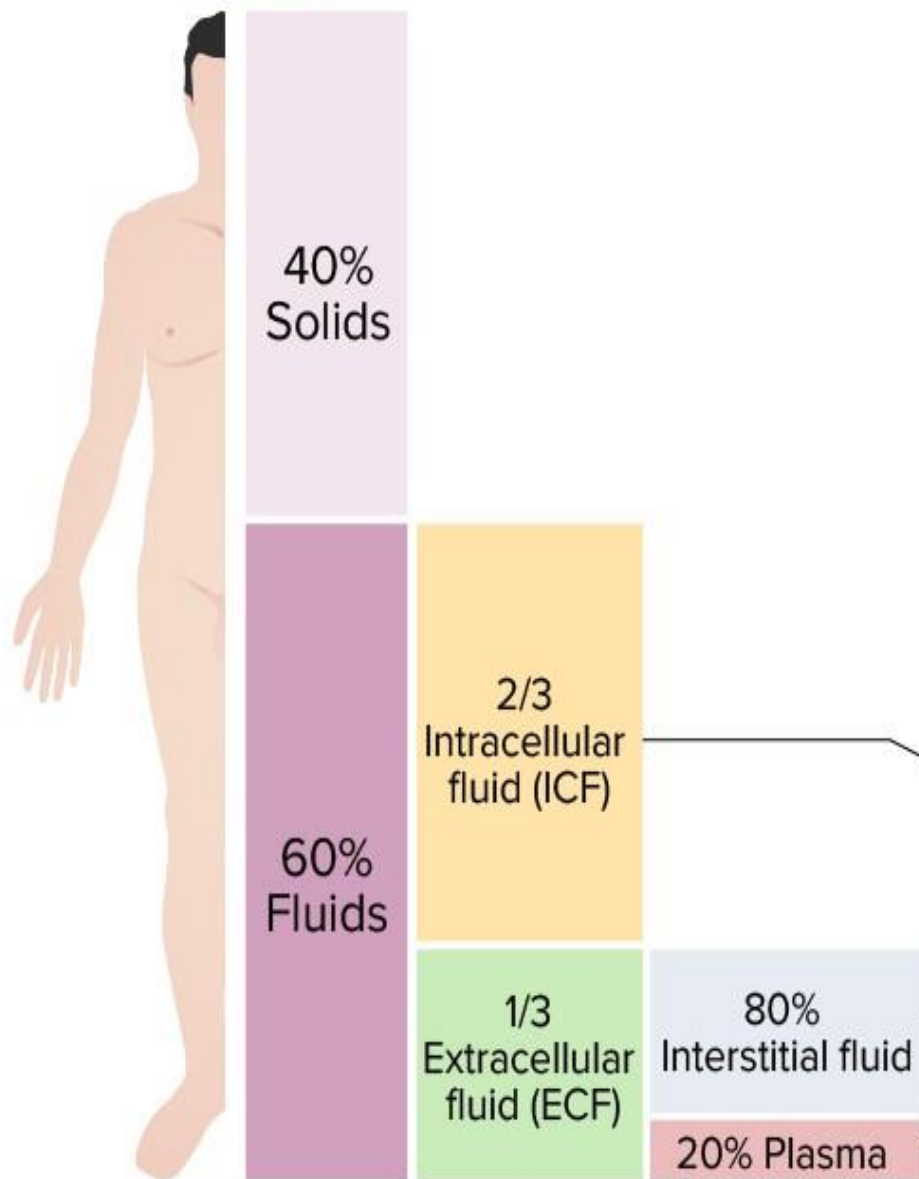
Intracellular fluid  
(ICF)

Extracellular fluid  
(ECF)

Total body mass  
(female)



Total body mass  
(male)



# Types of Fluids



# TYPES OF I.V. FLUIDS

## 1. Crystalloids vs. Colloids

CRYSTALLOIDS	COLLOIDS
Normal (0.9%) saline	Human Albumin
Ringer's lactate solution (Hartmann's' solution)	Gelatin solutions (Haemaccel <sup>®</sup> , Gelafundin <sup>®</sup> )
5% Dextrose	Dextran
	Hydroxyethyl starches (Hetastarch <sup>®</sup> )



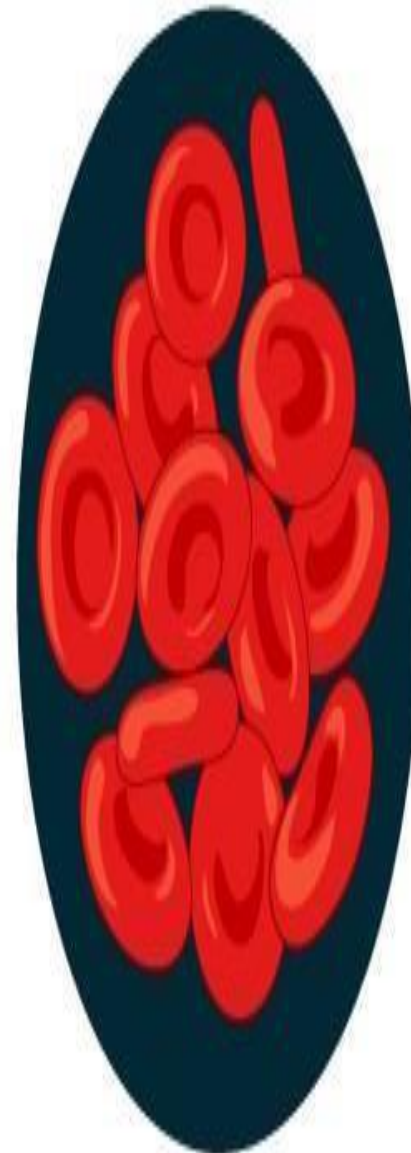
# Isotonic

A solution that has the same salt concentration as the normal cells of the body and the blood.

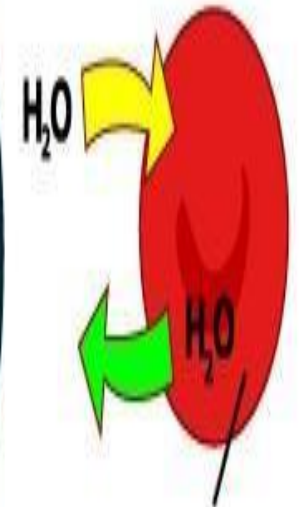
Ex:

- 1 **0.9% NaCl** (Metabolic alkalosis, Hyponatremia, Shock, Resuscitation)
- 2 **Ringer Lactate** (Dehydration, Burns, GI tract fluid loss, Acute blood loss, Hypovolemia)
- 3 **D5W** (Fluid loss, dehydration, Hypernatremia)

## Isotonic



Amount of water transported into the cell equal to the amount of water transported out from the cell



Solute concentration inside the cell is Equal to the solution outside the cell



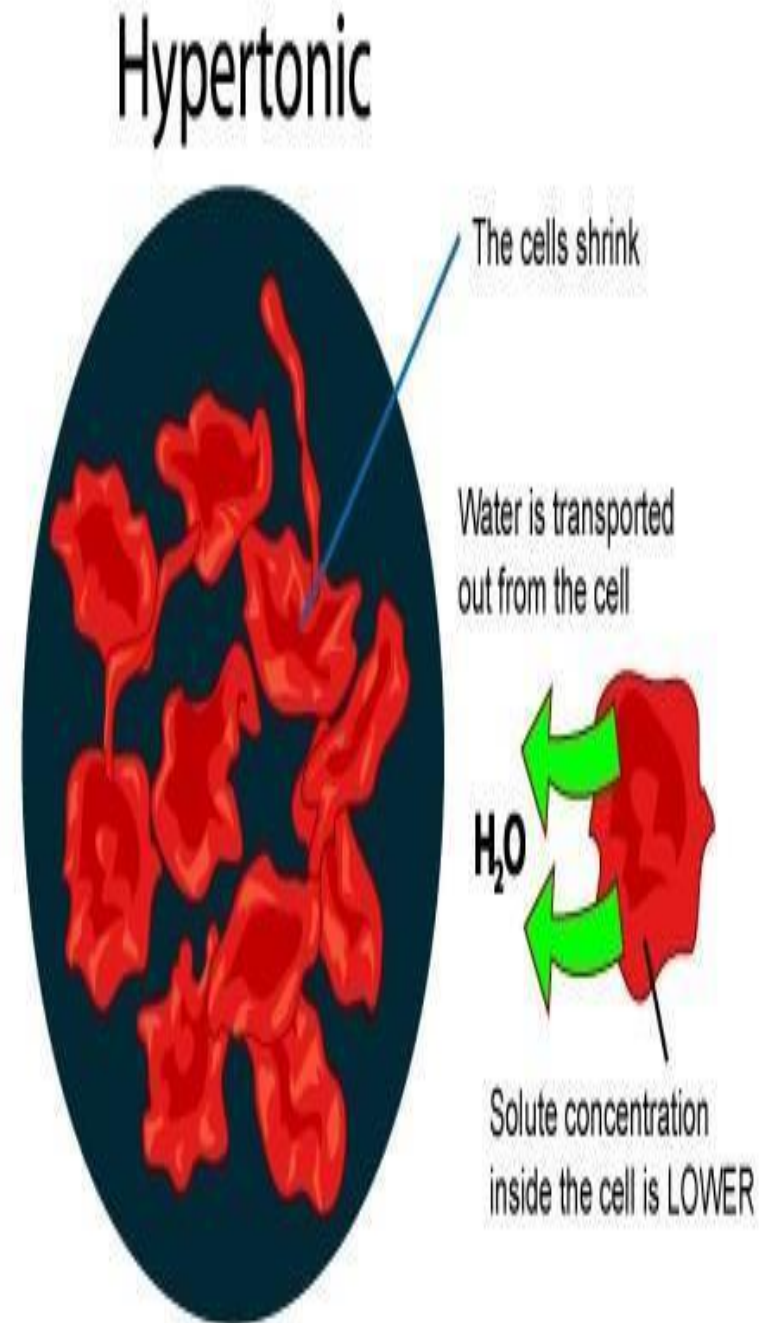


# Hypertonic

A solution with a higher salts concentration than in normal cells of the body and the blood

EX:

- 1 5%Dextrose in 0.9% Nacl**  
(D5NS): (Heat related disorders, Peritonitis)
- 2 5%Dextrose in Lactated Ringers'**  
(D5LR): (Hypovolemic shock, Hemorrhagic shock)





# Hypotonic

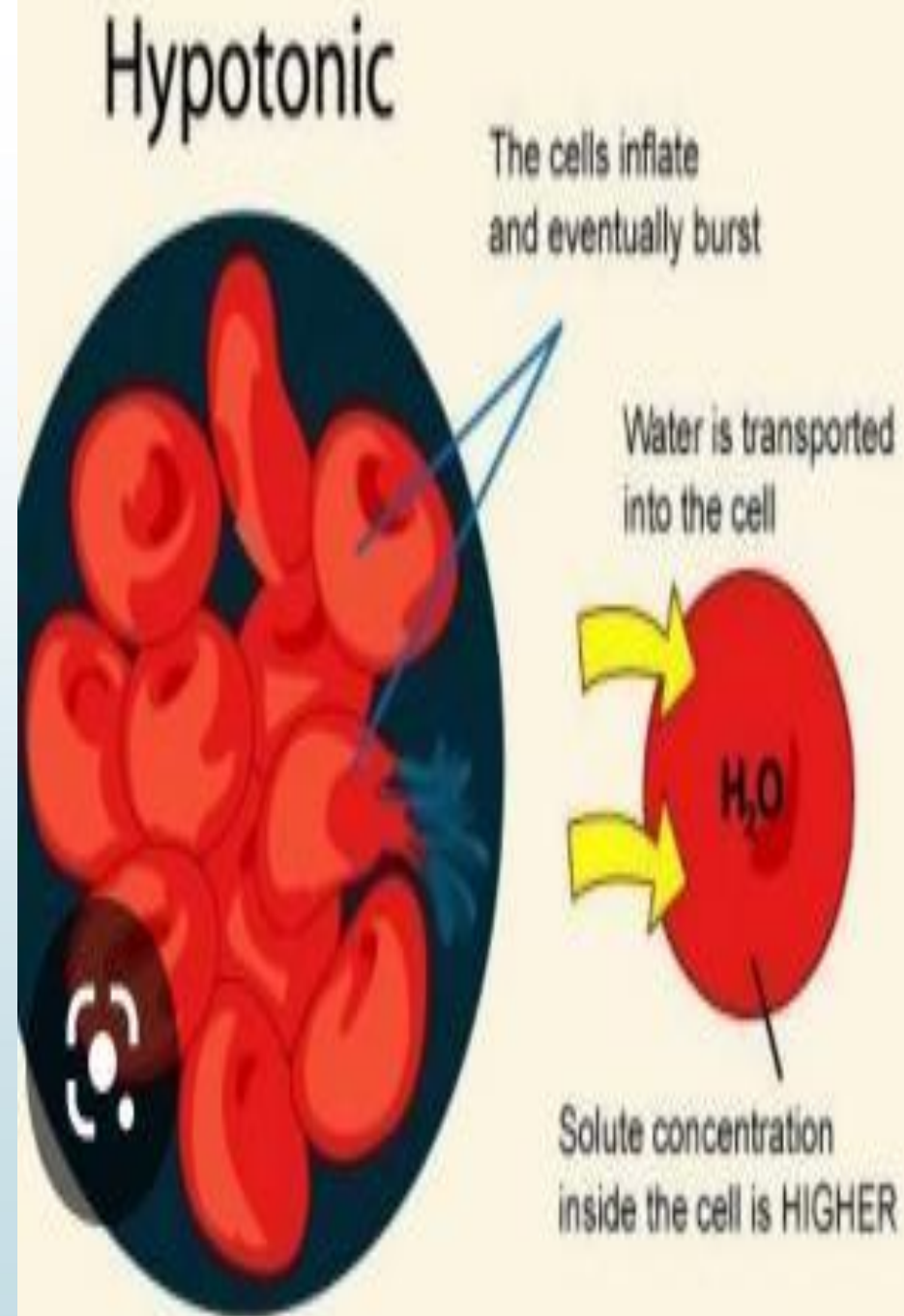
A solution with a lower salts concentration than in normal cells of the body and the blood.

Ex:

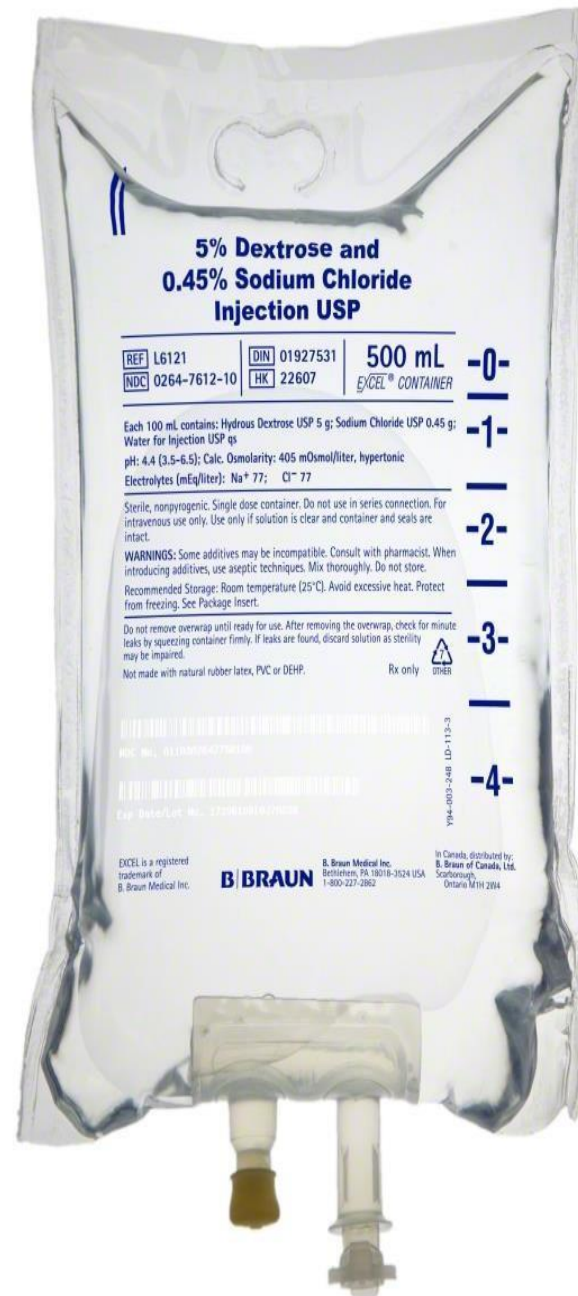
- 1 D5W in half normal Saline .
- 2- D10W.

**uses**

- 1 Treatment of hypertonic dehydration.
- 2 Gastric fluid loss
- 3 Cellular dehydration from excessive diuresis
- 4 Slow rehydration







# Types of infusion set



1- Macro drip

2- Micro drip

3- Blood set



**Figure 35–47** ■ Syringe pump or mini-infuser for administration of IV medications.



# How to calculate IV flow rates !

## What is a drop factor?

Drop factor is the number of drops in one milliliter used in IV fluid administration (also called drip factor). A number of different drop factors are available but the Commonest are:

- 1- Blood set: 10 drops/ml
- 2- Macrodrip: 15 drops / ml
- 3- Microdrip: 60 drops / ml

Drops per minute are calculated by the following formula:

$$\text{Drops per minute} = \frac{\text{Total infusion volume} \times \text{drop factor}}{\text{Total time of infusion in minutes}}$$

# Nursing management

- 1- Verify prescription for IV therapy, check solution label and identify patient. Check for allergies
2. Explain procedure to patient.
3. Perform hand hygiene and put on disposable nonlatex gloves
4. Apply a tourniquet 4 to 6 inches above the site and identify a suitable vein.
5. Choose site, Choose IV cannula.

6. Prepare equipment by connecting infusion bag and tubing, run solution through tubing to displace air and cover end of tubing.
7. Position patient's arm below heart level to encourage capillary filling.
8. Palpate for a pulse distal to the tourniquet. Ask patient to open and close fist several times.
9. Prepare site by scrubbing with povidone–iodine swabs for 2 to 3 minutes in circular motion, moving outward from injection site.

10. Holding needle bevel up and at 5- to 25-degree angle,
11. If backflow of blood is visible, straighten angle and advance needle.
12. Release tourniquet and attach infusion tubing; open clamp enough to allow drip.
13. Cover the insertion site with a transparent dressing bandage, or sterile gauze.

# Complications

## **A- Infiltration:**

1 Needle / cannula displacement.

2 Blood leak from IV site.

S\S (pain/redness/swelling/diminished flow rate)

## **B- Air Embolism:**

1- Air in IV tubing (IV bag has emptied)

S\S (decreased or weak BP, rapid pulse and cyanosis).

## **C- Infection:**

Note any signs of redness , pain , swelling hot to touch and yellow discharge



## **D- Circulatory (fluid) overload:**

- 1- The cardiovascular system is unable to cope with the IV rate & volume.
- 2- The patient becomes pale , sweaty and short of breath.  
S\S headache, dyspnea, raised BP, flushed skin, fluid imbalance(volume infused vs volume excreted).

## **E- Allergic reaction:**

- 1 Note any known allergies & document
- 2 Observe for any reaction to IV additives e.g: IV antibiotics / blood products.