



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.



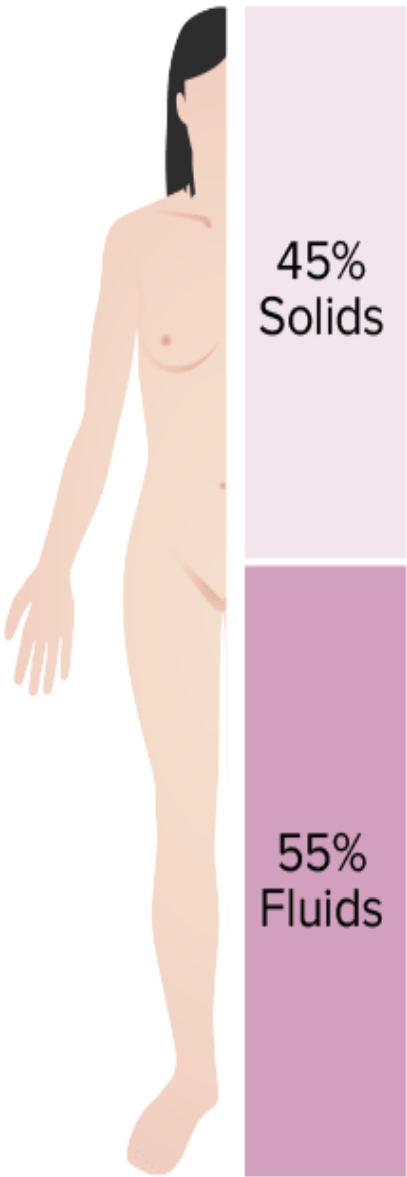
Distribution of Body Fluids

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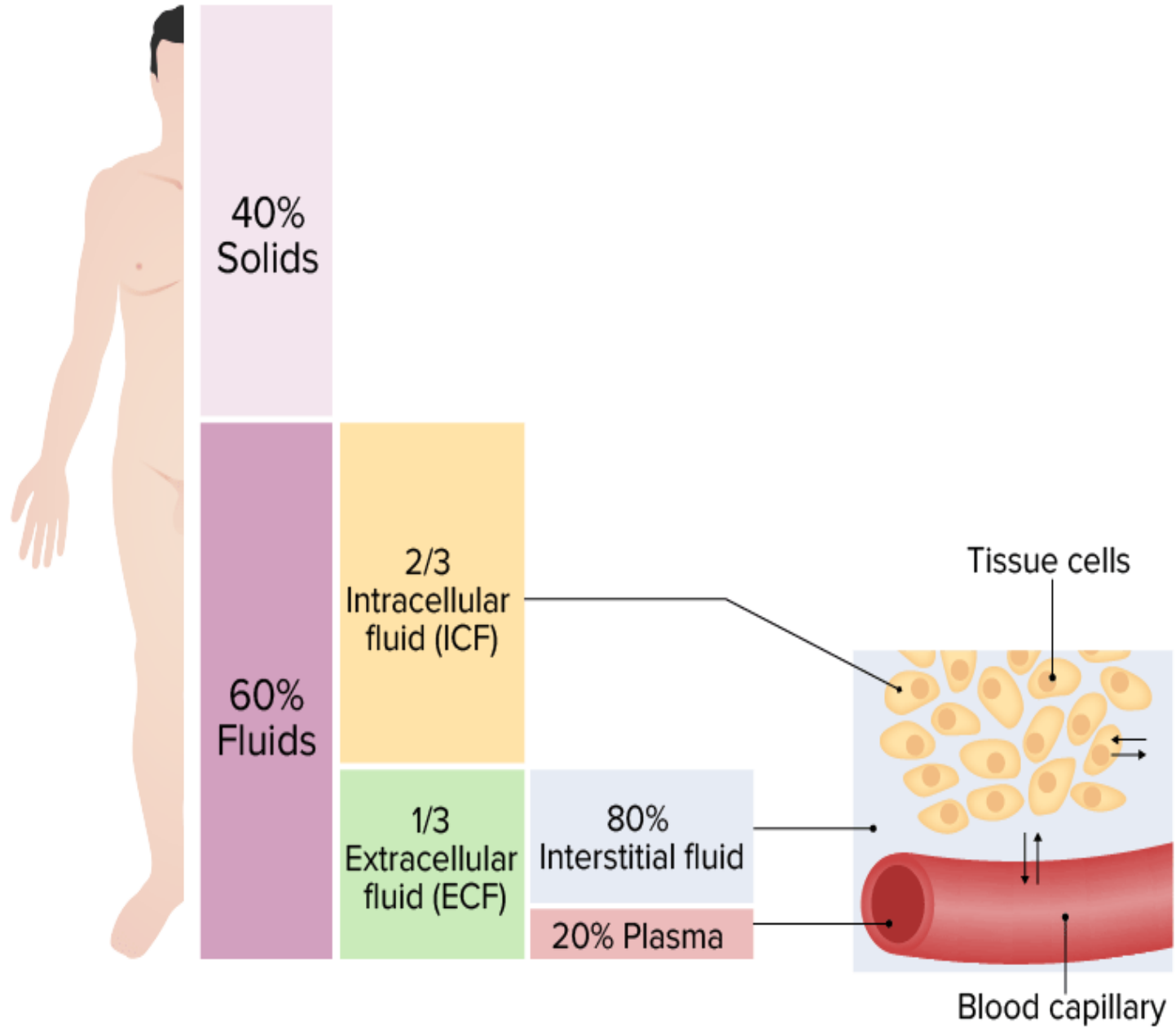
Intracellular fluid
(ICF)

Extracellular fluid
(ECF)

Total body mass (female)



Total body mass (male)



Types of Fluids



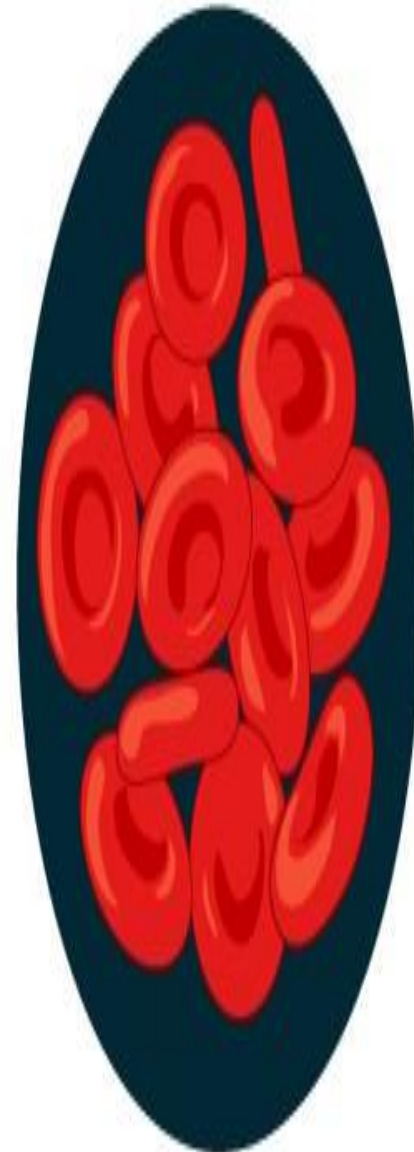
Isotonic

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

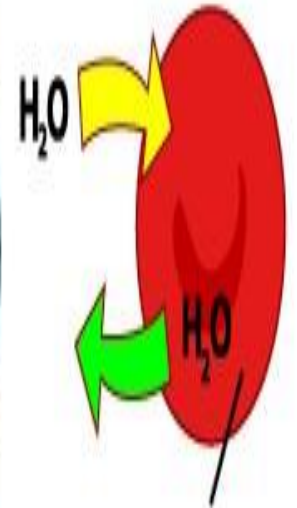
Ex:

- 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

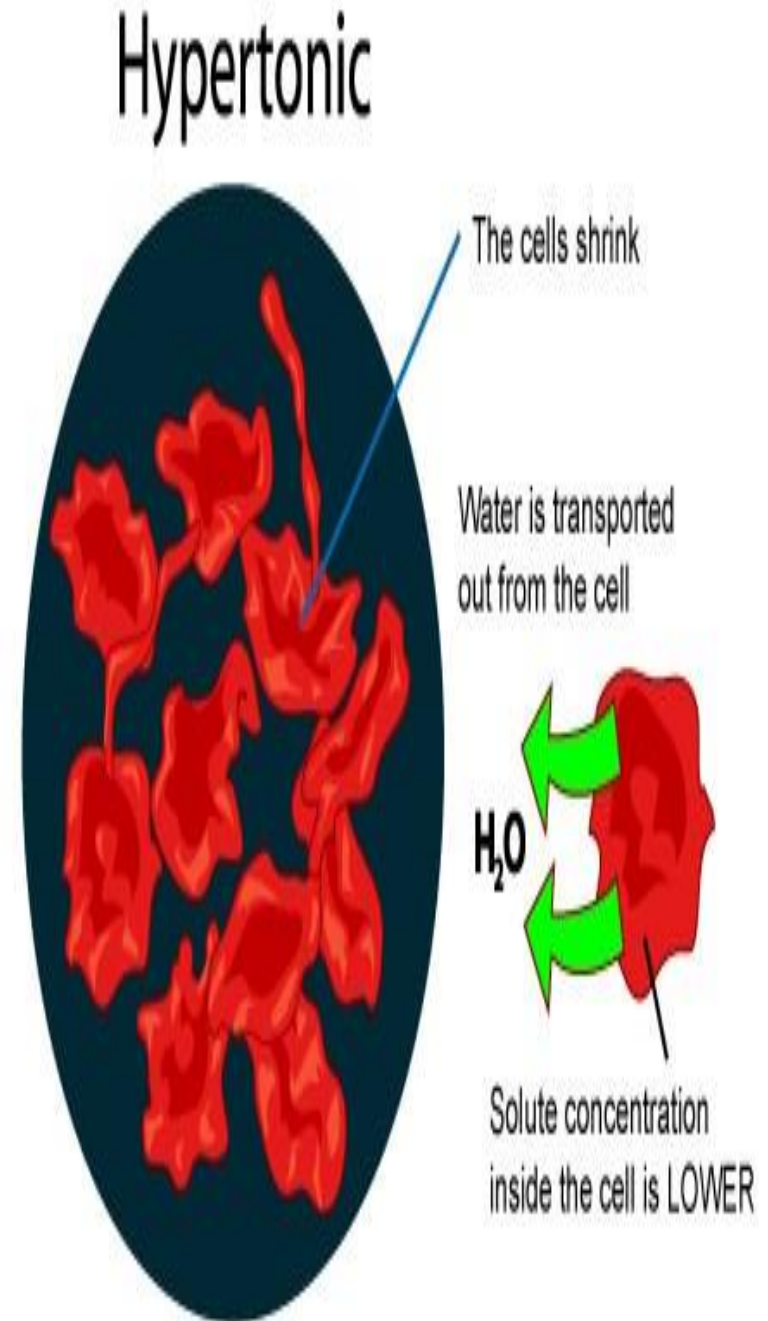
EX:

1- 5%Dextrose in 0.9% Nacl

(D5NS): (Heat related disorders, Peritonitis)

2- 5%Dextrose in Lactated Ringers'

(D5LR): (Hypovolemic shock, Hemorrhagic shock)





0.9% Sodium Chloride Intravenous And 5% Glucose Infusion B.P.

NaCl 0.9% **G-5%**

Each 100 ml contains:
 Sodium Chloride 0.90 g
 Glucose Monohydrate for Parenteral Use 5.50 g
 Water for Injections to 100 ml 100 ml Δ 85 kJ Δ 20 kcal
Osmolarity: 585 mOsm/l
Electrolytes: mmol/l
 Na⁺ 154
 Cl⁻ 154

Single dose container
 Discard unused portion
 Sterile, non-pyrogenic
Caution:
 Not to be used if container is found leaking or solution is not clear.
 Keep medicine out of reach of children.
 Do not store above 30 °C.

Dosage:
 Average dose: 1000 ml/day

Flow rate:
 120-180 drops/min
 Δ 360-540 ml/h

500 ml
 Manuf. date: LOT: EXP:

B BRAUN Manufactured by:
 B. Braun Medical Industries S/B
 11900 Bayan Lepas, Penang, Malaysia

NaCl 0.9% **G-5%**

009
008
007
006
005
004
003
002
001



Sterile, Non-pyrogenic

5% DEXTROSE IN LACTATED RINGER'S
 SOLUTION FOR INTRAVENOUS INFUSION

Useful. Do not use if directed by the physician.
Caution:
 Avoids, Glycerol, Dextrose, and Chemically Active groups appearing without prescription. Open only when ready to use. Use only if solution is clear and colorless & not leaking. Use plastic infusion set.

Formulation:
 Each 100 ml contains:
 Sodium Chloride 8.00 g
 Sodium Lactate Anhydrous 2.00 g
 Potassium Chloride 0.30 g
 Calcium Chloride Dihydrate 0.20 g
 Electrolytes in 100 ml:
 Sodium 130 mmol
 Potassium 4 mmol
 Calcium 1.4 mmol
 Lactate 24 mmol

Chemistry: 525 mOsm/L
 pH: 2.8 to 8.5
 Appearance: **Indication:**
 For fluid and electrolyte replacement therapy.
 Single Use Only.
 Store at temperatures not exceeding 25°C.
 Not for use in the treatment of lactic acidosis.

Imported and Distributed by:
CHONG MEDICAL INC.
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5% DEXTROSE IN LACTATED RINGER'S
 SOLUTION FOR INTRAVENOUS INFUSION



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.

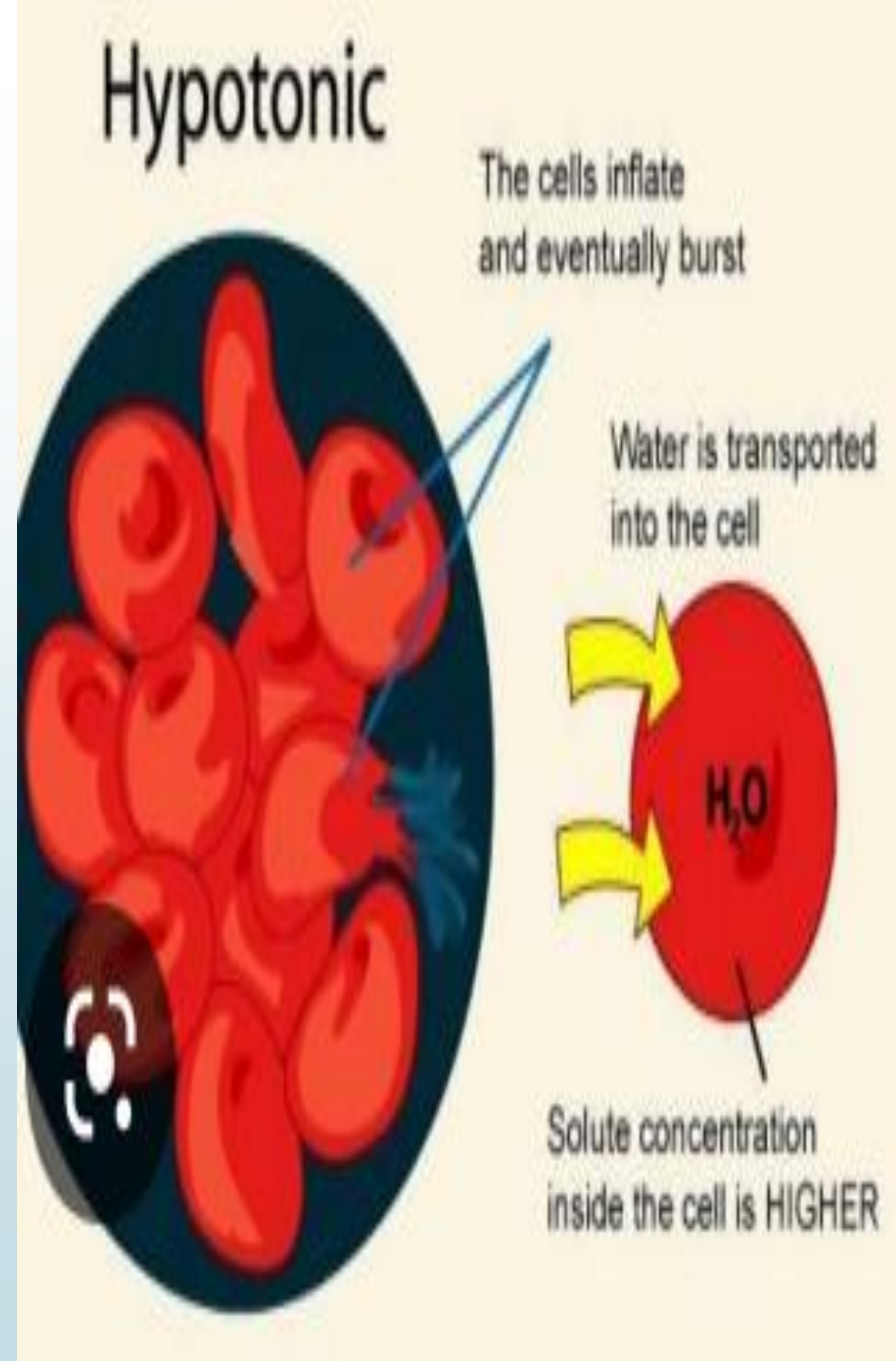
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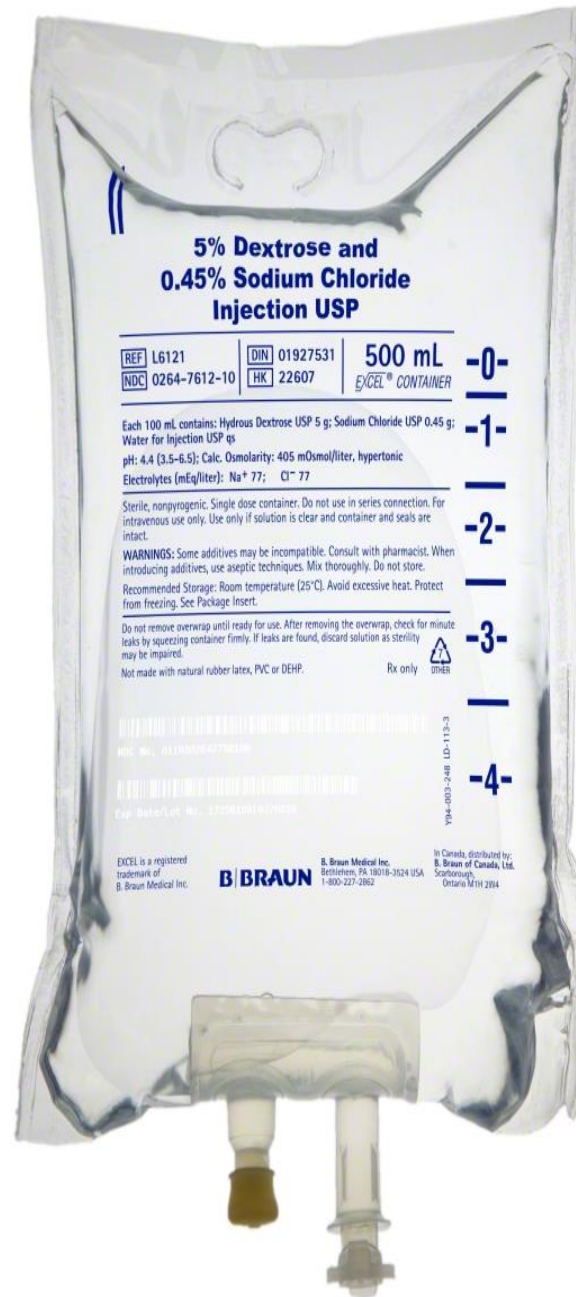
1- Treatment of hypertonic dehydration.

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.