

SNS COLLEGE OF ALLIED HEALTH SCIENCE
Affiliated to The Tamil Nadu Dr. M.G.R Medical University, Chennai



DEPARTMENT OF PHYSICIAN ASSISTANT

COURSE NAME : PHARMACOLOGY

UNIT : BASIC DRUG EFFECT

TOPIC : INTRAVENOUS FLUIDS

FACULTY NAME : Ms. SINEKA M

INTRODUCTION (Define)

- IV fluids (intravenous fluids) are sterile solutions administered directly into the venous circulation to restore fluid volume, correct electrolytes, administer medications, or provide nutrition in clinical settings.

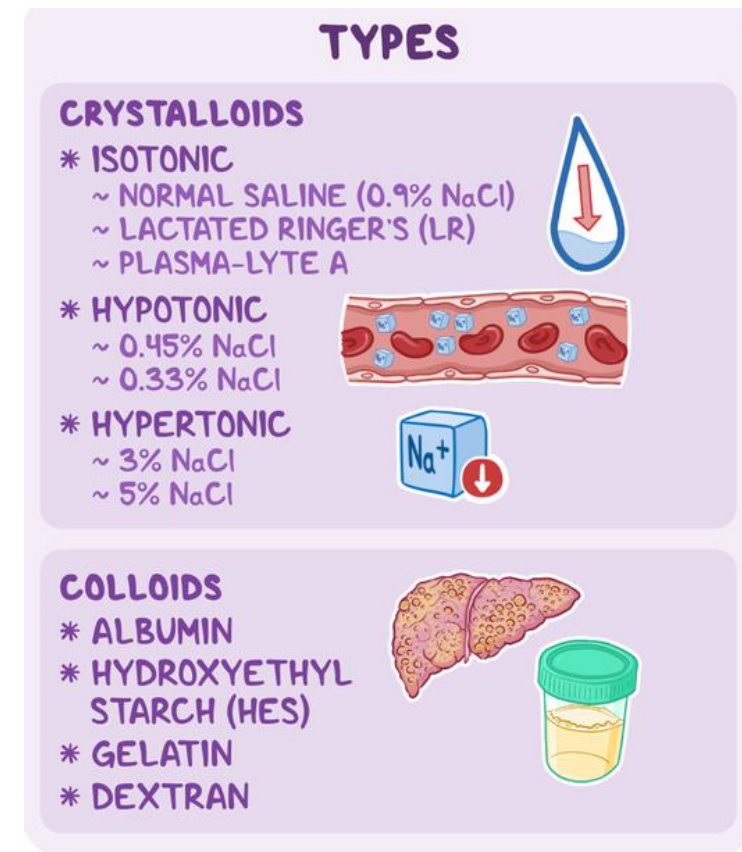


TYPES OF IV FLUIDS (Ideate)

- **Crystalloids:** Contain small molecules that move freely across semipermeable membranes.

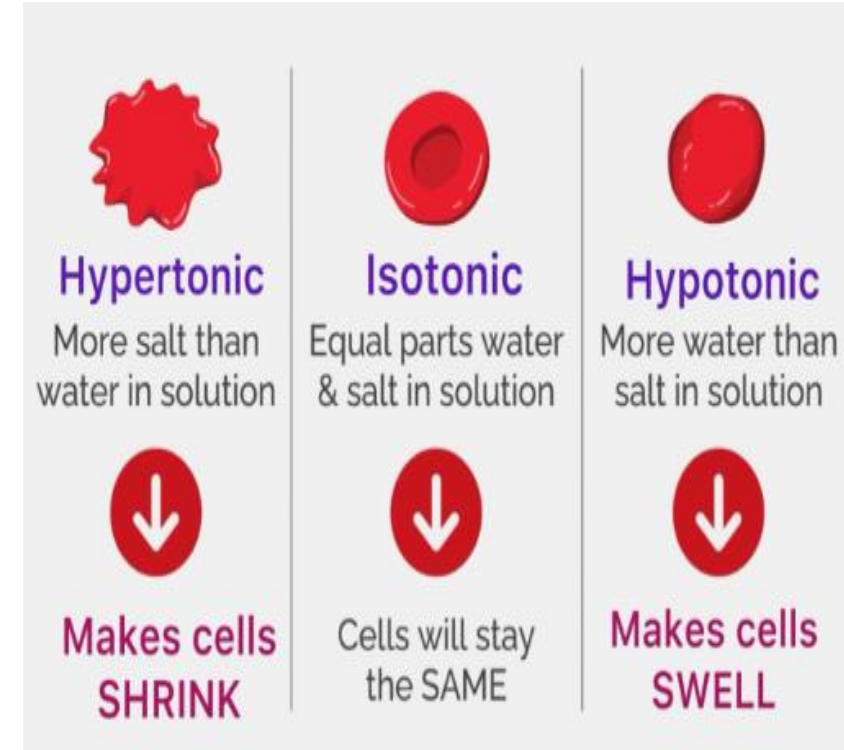
Examples:

- **Isotonic solutions:** e.g., 0.9% saline (normal saline), Lactated Ringer's.
- Remain within the intravascular compartment; used for volume resuscitation and maintenance.



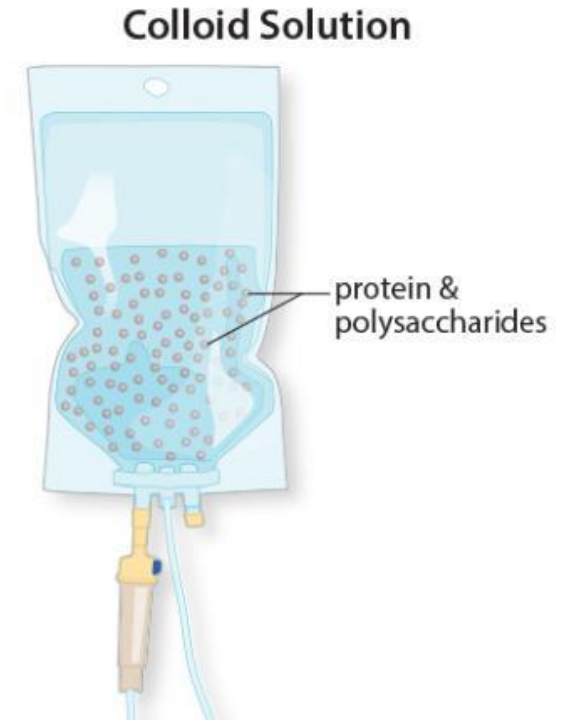
➤ **Hypotonic solutions:** e.g., 0.45% saline, D5W (initially isotonic, becomes hypotonic). Water shifts into cells; used for cellular dehydration and hypernatremia.

➤ **Hypertonic solutions:** e.g., 3% saline, D5 0.45% NaCl. Draw water from cells into vasculature; used in severe hyponatremia and cerebral edema.



Colloids:

- Contain larger molecules (e.g., albumin, hetastarch) that remain in the vascular compartment longer, expanding plasma volume.
- Used in cases like significant hypovolemia where rapid and sustained volume expansion is needed.



COMPONENTS

- **Water:** Base solvent (sterile, pyrogen-free).
- **Electrolytes:** Sodium (Na^+), potassium (K^+), chloride (Cl^-), calcium (Ca^{2+}), magnesium (Mg^{2+}), bicarbonate precursors (e.g., lactate).
- **Dextrose/Sugars:** For caloric support (e.g., 5–10% glucose).
- **Buffers:** Maintain pH (e.g., acetate, lactate) to prevent acidosis.
- **Additives:** May include vitamins, trace minerals, or medications.

INDICATIONS (Empathy)

- **Fluid Resuscitation:** Hypovolemia from hemorrhage, shock, or burns.
- **Electrolyte Correction:** Hyponatremia, hypokalemia, or metabolic acidosis.
- **Nutritional Support:** Total parenteral nutrition (TPN) for malnourished patients.

* **FLUID RESUSCITATION**
 ~ ACUTE BLOOD LOSS
 ~ SEVERE DEHYDRATION
 ~ SHOCK



* **MAINTENANCE FLUID THERAPY**
 ~ BURNS
 ~ GI TRACT LOSSES from VOMITING or DIARRHEA
 ~ FISTULAS



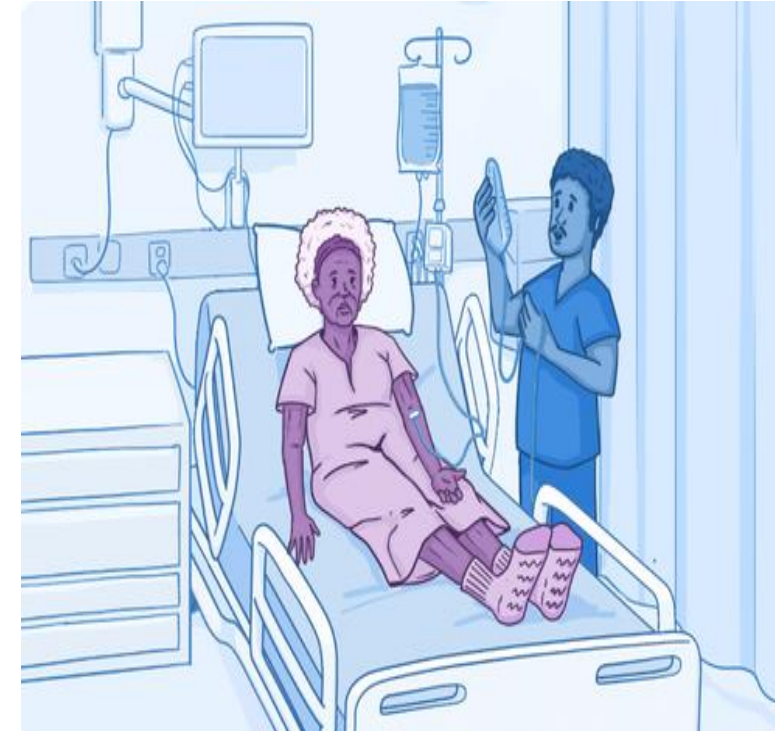
* **CORRECTION of ELECTROLYTE IMBALANCES**
 ~ HYPER- or HYPONATREMIA
 ~ HYPOKALEMIA
 ~ HYPOCALCEMIA



* **DELIVERY of IV MEDICATIONS**
 ~ NORMAL SALINE
 ~ DEXTROSE SOLUTIONS

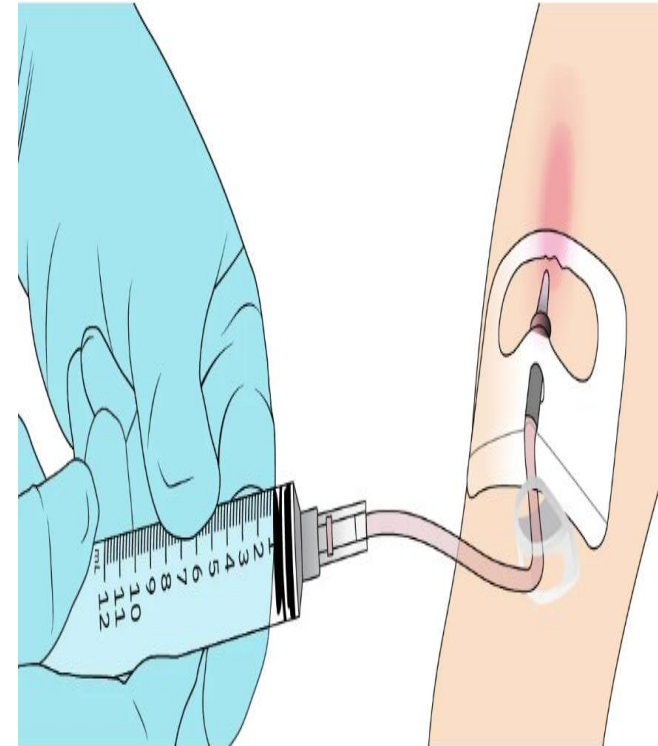
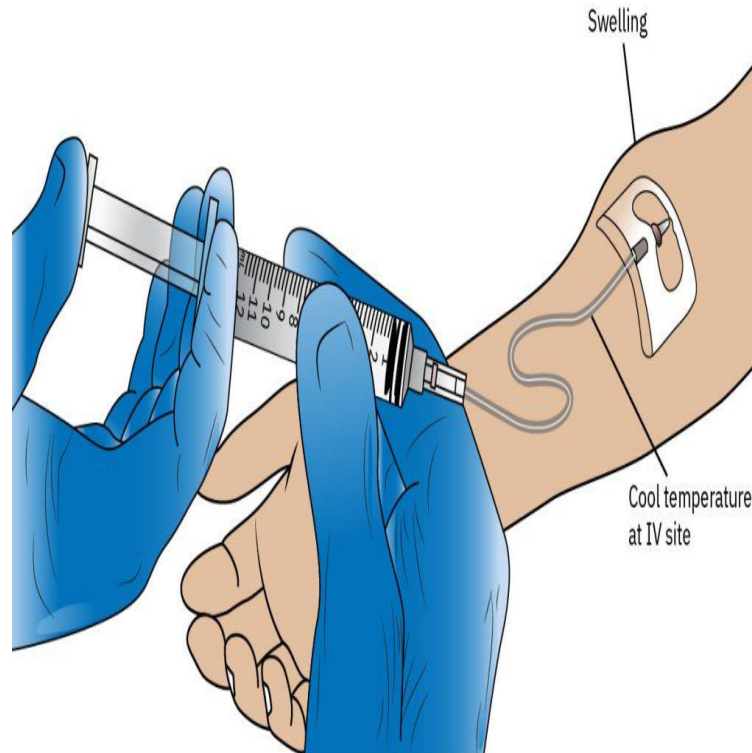


- **Medication Delivery:** Antibiotics, chemotherapy, or analgesics via IV piggyback.
- **Maintenance Therapy:** Post-operative care or chronic conditions like renal failure.



COMPLICATIONS

- Hypervolemia (fluid overload)
- Electrolyte disturbances
- Infusion reactions
- Infection or thrombosis
- Allergic Reactions



ADMINISTRATION GUIDELINES (Prototype)

- **Rate:** Calculated via formulas like **4-2-1 rule** (e.g., 4 mL/kg/hr for first 10 kg, 2 mL/kg/hr for next 10 kg, 1 mL/kg/hr thereafter)
- **Access:** Peripheral IV (short-term) or central line (e.g., PICC for long-term).

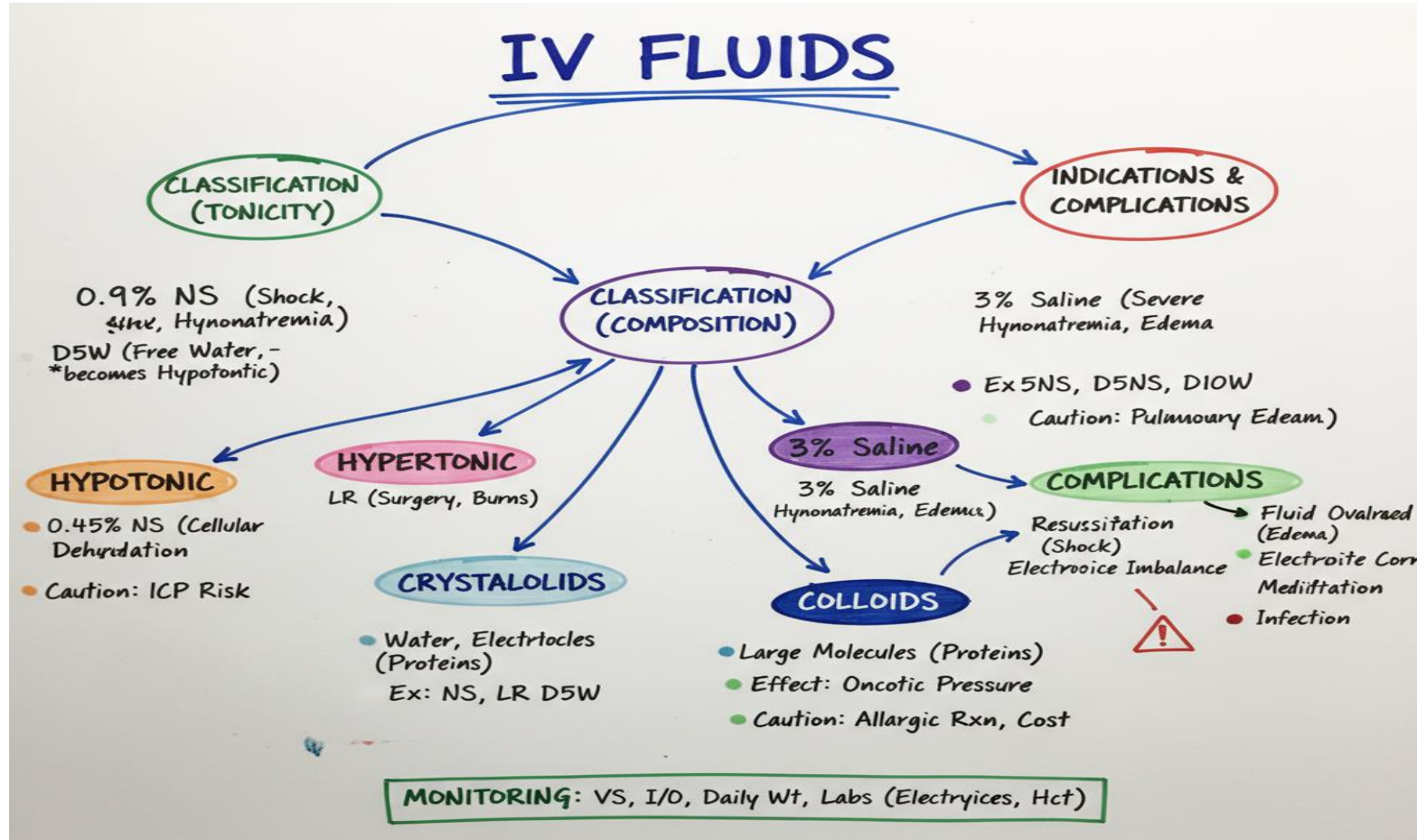


PHYSICIAN ASSISTANT ROLE (Test)

- Monitor for fluid overload
- Monitor for electrolyte shifts
- Monitor for Site complications
- Monitor for urine output (>0.5 mL/kg/hr)
- Choose the fluid type based on patient diagnosis
- Closely monitor patient response to therapy



SUMMARY



References

- Medical Pharmacology – Padmaja Udayakumar
- <https://my.clevelandclinic.org/health/treatments/21635-iv-fluids>
- <https://www.osmosis.org/answers/IV-fluids>
- <https://wtcs.pressbooks.pub/nursingfundamentals/chapter/15-3-intravenous-solutions/>