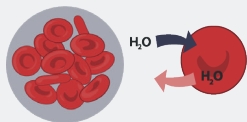


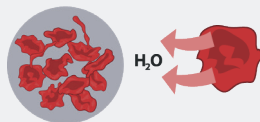
IV SOLUTIONS



Hypotonic
Causes fluid to shift into cells and interstitial compartments



Isotonic (equal)
Causes no fluid shift



Hypertonic
Causes fluid to shift out of cells

Normal osmolality			
270		300 mOsm/L	
Hypotonic	Isotonic		Hypertonic
103 mOsm/L 0.33% sodium chloride	260 mOsm/L 5% dextrose in water (D5W)	308 mOsm/L 0.9% normal saline (sodium chloride)	406 mOsm/L 5% dextrose in 0.45% sodium chloride
126 mOsm/L 2.5% dextrose in water	275 mOsm/L Lactated Ringer's	310 mOsm/L Hetastarch	560 mOsm/L 5% dextrose in 0.9% sodium chloride
154 mOsm/L 0.45% sodium chloride	295 mOsm/L Normosol		

HYPOTONIC SOLUTIONS

0.45% sodium chloride	154 mOsm/L
0.33% sodium chloride	103 mOsm/L
2.5% dextrose in water	126 mOsm/L

Do NOT use 0.45% saline for burns, liver disease, or trauma

0.45% Saline

Treat:

DKA – after saline and before dextrose infusions
Gastric fluid loss from long-term NG suctioning/vomiting
Hypertonic dehydration (water loss > salt loss)

Hypotonic Solutions

Patients at risk:

Elevated ICP, head trauma, cerebrovascular accident (CVA), neurosurgery
Third spacers – burns, trauma, low serum protein

ISOTONIC SOLUTIONS

0.9% normal saline (sodium chloride)	308 mOsm/L
Lacted Ringer's	275 mOsm/L
5% dextrose in water (D5W)	260 mOsm/L
Hetastrach	310 mOsm/L
Normosol	295 mOsm/L

D5W is Isotonic only in the bag. Dextrose is rapidly metabolized and becomes hypotonic water.

0.9% Normal Saline

This is used to increase circulating volume (does not carry oxygen):

Watch for fluid overload and hypokalemia/hyponatremia.

Contains Na - be careful with renal disease, glucocorticoids!

Lacted Ringer's

Liver converts lactate to bicarbonate Patients with liver disease cannot metabolize lactate well.

Not good for alkalosis - buffers pH (liver converts lactate to bicarbonate).

Given as a fluid and electrolyte replenisher

5% Dextrose in Water

Not good for patients with elevated ICP, CHF, or early in the post-op period (surgical stress may cause increase in antidiuretic hormone [ADH])

Can be used for fluid loss and dehydration or hyponatremia (dilutes the extra sodium in the extracellular fluid)

HYPERTONIC SOLUTIONS

(D5 ½ NS) 5% dextrose in 0.45% sodium chloride	406 mOsm/L
(D5 NS) 5% dextrose in 0.9% sodium chloride	560 mOsm/L

Do NOT use D5NS with patients who have renal issues or CHF - there is an increased risk of fluid overload, heart failure, and pulmonary edema

Hypertonic Solutions

Shift fluid from cells and the interstitial spaces into the extracellular fluid

Used to replace electrolytes

Post-op: reduce the risk of edema, stabilize the blood pressure, and regulate urine output

5% Dextrose in 0.45% Saline

One of the fluids used in DKA (after NS and ½ NS as needed) and glucose is lower (< 250)

Helps to minimize effects of fast and drastic decrease in serum osmolality (cerebral edema and hypoglycemia)

5% Dextrose in 0.9% Saline

Treat:

Hypotonic dehydration (salt loss > water loss)

Possible causes: diuretics, impaired kidneys, decreased fluid intake

Syndrome of inappropriate antidiuretic hormone secretion (SIADH)

Addisonian crisis

