IV Solutions

The goal of IV fluid administration is to correct and/or prevent fluid and electrolyte disturbances. It is important to have correct knowledge of the correct ordered solution, the reason for its use, and how to identify and correct problems related to the infusion. Many preparations are available for use including hypotonic, isotonic, and hypertonic solutions.



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Hypotonic (< 280 mOsm/L)
Hippo-tonic
A hypotonic solution is more diluted than blood with osmolarity typically less than 280 milliosmoles/L. This causes fluid to move into the cells. Hypotonic solutions are given to patients that are cellularly dehydrated and not hypovolemic or hypotensive patients.

1/4 Normal Saline (0.225% NaCl)
Quarter Saline-sail
0.225% NaCl is commonly called ¼ normal saline and has a low osmolarity of 77 mOsm/L.

1/2 Normal Saline (0.45% NaCl)
Half Saline-sail with Colt-45
This is also known as ½ normal saline, and has a low osmolarity of 140 mOsm/L.

Isotonic (280-300 mOsm)
Ice-tonic
Isotonic solutions have the same effective osmolarity as body fluid, which is 280-300 mOsm/L. Those containing sodium, such as normal saline are often used to replace extracellular volume in those patients with fluid volume deficit.

Normal Saline (0.9% NaCl)
Normal Saline-sail
Normal Saline is an isotonic solution used to increase vascular fluid. Primary fluid of choice in emergencies when a patient is bleeding, has hypotension, or is dehydrated.

Lactated Ringer's (LR)
Lactating Rings
Lactated Ringer’s are the most physiologically adaptable fluid because its electrolyte content is most closely related to the composition of the body’s blood serum and plasma. It is an isotonic solution containing Na, K, Ca, Cl, and lactate, which the liver metabolizes to HCO3. This makes it a first choice for fluid resuscitation for certain patients such as burn victims, surgical patients, or those experiencing acute blood loss or hypovolemia due to third-space fluid shifts.

Dextrose 5% in Water (D5W)
Sugar-rose with (5) Hand in Water
D5W is unique in that it may be classified as both an isotonic and hypotonic solution. The dextrose in the solution makes its initial tonicity similar to intravascular fluid making it isotonic. However, once in the body, the dextrose is rapidly metabolized, leaving no osmotically active particles in the plasma and thus, it can be classified as hypotonic.

Hypertonic (> 300 mOsm)
Hiker-tonic
Hypertonic solutions have an effective osmolarity greater than body fluids, generally above 300 mOsm. Higher osmolarity means more particles than normal such as sodium, are present in the fluid and this causes water to be drawn out of cells.

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3% or 5% NaCl

(3) Tree and (5) Hand with Salt-shaker and Chloride-dispenser

Hypertonic sodium chloride solutions contain a higher concentration of NaCl than that normally contained in plasma. They should only be used in critical situations to treat hyponatremia. These solutions should be administered slowly to avoid intravascular fluid volume overload and pulmonary edema.

Dextrose 5% in 0.45% NaCl

Sugar-rose with (5) Hand with Colt-45

When dextrose is added to 0.45% NaCl or 0.9% NaCl, it becomes a slightly hypertonic solution. The dextrose is absorbed into the cells which leaves the sodium chloride in the extracellular space. This supplies the body with calories and electrolytes. It can also be used to manage blood sugars in NPO patients.

Dextrose 10% in Water (D10W)

Sugar-rose in (10) Tin with Water

Plain glucose solutions with a concentration higher than 5% are considered hypertonic. D10W is given to provide free water and calories, but not electrolytes.

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