Intravenous Solutions

The most commonly prescribed intravenous solutions are listed in Table 10.1.

Table 10.1

Intravenous Solutions

Name of Solution	Common Abbreviation
0.45% sodium chloride injection USP	0.45% NS
0.9% sodium chloride injection USP	0.9% NS
5% dextrose in 0.22% sodium chloride injection USP	5% D/0.22% NS
5% dextrose injection USP	5% D/W, D/5/W
5% dextrose in 0.45% sodium chloride injection USP	5% D/0.45% NS or D/5/0.45% NS
5% dextrose in 0.9% sodium chloride injection USP	5% D/0.9% NS or D/5/0.9% NS
Lactated Ringer's injection USP	LR, RL, or RLS
Lactated Ringer's and 5% dextrose injection USP	5% D/RL, or D/5/RL

Intravenous fluids generally contain dextrose, sodium chloride, and/or electrolytes:

- D/5/W (or 5% D/W) is a 5% dextrose solution, which means that 5 milliliters or 5 grams of dextrose are dissolved in water to make each 100 milliliters of this solution. See Figure 10.2a and b.
- 0.9% NS stands for a solution in which each 100 milliliters contains 0.9 gram of sodium chloride. See Figure 10.2c and d.
- 5% D/0.45% NS stands for a solution containing 5 milliliters or 5 grams of dextrose in each 100 milliliters of 0.45% normal saline solution. See Figure 10.3b
- Ringer's lactate (RL), also called lactated Ringer's solution (LRS), is a solution containing electrolytes. See Figure 10.3c.

Additional information on IV fluids can be found in nursing and pharmacology textbooks.

41 The order is for
500 mL .9% NS in 2 hr IV
The tubing is calibrated at
10 drops per mL. How many
drops per minute do you
administer?

$$\frac{mL}{hr} \longrightarrow \frac{drops}{min}$$

$$\frac{500\ mL}{2\ hr} \quad \frac{10\ drops}{1\ mL} \quad \frac{60\ min}{1\ hr}$$

$$\frac{500\ mL}{2\ \cancel{hr}} \times \frac{1\ \cancel{hr}}{60\ min} = \frac{4.1\bar{6}\ mL}{1\ min}$$

$$\frac{4.1\bar{6}\ mL}{1\ min} \times \frac{10\ drops}{1\ mL} = 41.\bar{6}\ \frac{drops}{min}$$

Short cut.

$$\frac{500\ \cancel{mL}}{2\ \cancel{hr}} \times \frac{1\ \cancel{hr}}{60\ min} \times \frac{10\ drops}{1\ \cancel{mL}} = 41.\bar{6}\ \frac{drops}{min}$$

#2 The order is 400 mL of 5% D/W in 4 hrs, the flow rate was set at 16 drops per minute. You come back 2 hrs later and the patient has received 192 mL with 208 mL remaining. Recalculate the flow rate with a drop factor of 10 drops per mL.

$$\frac{208\ mL}{2\ hr} \longrightarrow \frac{drops}{min}$$

$$\frac{208\ mL}{2\ hr} \quad \frac{10\ drops}{1\ mL} \quad \frac{60\ min}{1\ hr}$$

$$\frac{208\ mL}{2\ \cancel{hr}} \times \frac{1\ \cancel{hr}}{60\ min} = 1.7\bar{3}\ \frac{mL}{min}$$

$$1.7\bar{3}\ \frac{\cancel{mL}}{min} \times \frac{10\ drops}{1\ \cancel{mL}} = 17.\bar{3}\ \frac{drops}{min}$$

#3 A patient needs 200 mL of Ensure in 2 hrs. The tubing is set to 20 drops per mL. Calculate the flow rate in drops per minute.

want $\frac{\text{drops}}{\text{min}}$

$$\frac{200\text{ mL}}{2\text{ hr}} \quad \frac{20\text{ drops}}{1\text{ mL}} \quad \frac{60\text{ min}}{1\text{ hr}}$$

$$\frac{200\text{ mL}}{2\text{ hr}} \times \frac{1\text{ hr}}{60\text{ min}} = 3.\overline{3}\ \text{mL/min}$$

$$3.\overline{3}\ \text{mL/min} \times \frac{20\text{ drops}}{1\text{ mL}} = 66.\overline{6}\ \frac{\text{drops}}{\text{min}}$$

Shortcut

$$\frac{200\text{ mL}}{2\text{ hr}} \times \frac{1\text{ hr}}{60\text{ min}} \times \frac{20\text{ drops}}{1\text{ mL}} = 66.\overline{6}\ \frac{\text{gtt}}{\text{min}}$$