



## How to Set Up a Drip Without a Pump

### Necessary Supplies

1. Medication (how much you want to add to bag)
2. IV bag solution (100 mL, 250 mL, 500 mL, or 1000 mL). Make sure medication is compatible with solution.
3. 10-mL syringe with needle
4. Alcohol swab or another antiseptic wipe
5. Medication label (always label with drug, dose, and concentration)
6. Gloves

Practical rule of thumb: If the volume of the medication you are adding is less than 10% of the IV bag, then you **do not** need to remove any fluid. If the medication volume is greater than 10%, then you need to remove that volume from the IV bag.

### Calculating Drip Rate

1. If weight-based dosing, calculate how much medication you want to administer per hour.

**Example:**

70-kg patient on ventilator. Ketamine to be administered at 0.2mg/kg/h.

$$70 \text{ kg} \times 0.2 = 14 \text{ mg/h}$$

2. Calculate flow rate per hour.

**Example 1:**

Calculate flow rate for dose of 0.2mg/kg/h for ketamine vial of 100 mg in 100 mL.

$$\frac{\text{Medication dose amount}}{\text{Medication quantity}} = \text{Flow rate per hour}$$

*Medication on hand*

$$(14 \text{ mg}/100 \text{ mg}) \times 100 \text{ mL} = 14 \text{ mL/h}$$

Therefore, flow rate is 14 mL/h. The math is simple if your concentration is 1mg-to-1mL.

**Example 2:**

Calculate flow rate for dose of 0.3mg/kg/h for ketamine vial of 100 mg in 500 mL.

80-kg patient who is a double amputee. Ketamine to be administered at 0.3mg/kg/h.

$$80 \text{ kg} \times 0.3 = 24 \text{ mg/h}$$

$$(24 \text{ mg}/100 \text{ mg}) \times 500 \text{ mL} = 120 \text{ mL/h}$$

Therefore, flow rate is 120 mL/h.

*As you see, concentration determines flow rate, so you should decide what will be a practical flow rate given your situation. How much fluid do you have on hand? If you have little, then concentrate your medication. If it is too concentrated and you are administering only about 1 mL/h, it will be impractical to set up; you would be better off with intermittent dosing.*

3. Calculate drip rate. This will be flow rate (step 2)  $\times$  drop factor  $\times$  conversion to minutes. Drop factor is different for IV tubing. It is usually labeled on outside of packaging. We will use 20 gtt/1mL.

**Example 1:**

Calculate drip rate for flow rate on a dose of 0.2mg/kg/h for ketamine vial of 100 mg in 100 mL. Previous flow rate = 14 mL/hr. From here, we will use the following formula to calculate drip rate:

$$\frac{\text{Flow rate (mL)}}{1 \text{ Hour}} \times \frac{\text{Drop factor (specific to IV tubing)}}{1 \text{ mL}} \times \text{Time conversion (hour/60 min)} = \text{Drip rate}$$

$$(14 \text{ mL/1 hour}) \times (20 \text{ gtt/1 mL}) \times 1 \text{ hour/60 minutes} = 4.67 \text{ gtt/minute}$$

As you cross-multiply, the “mL” will cancel out and the “hour” will cancel out, leaving you with gtt/minute. This is done so you can measure how many drops are in the minute. You cannot measure 0.67 of a drop, so round to the nearest whole drop. In this case you would measure 5 drops in 1 minute.

**Example 2:**

Calculate flow rate for dose of 0.3mg/kg/h for ketamine vial of 100 mg in 500 mL (flow rate 120 mL). (120 mL/1 hour) x (20 gtt/1 mL) x (1 hour/60 minutes) = 40 gtt/minute

4. Spike premixed IV admixture bag with specific IV tubing (20 gtt drop factor) and prime the tubing so all air bubbles are gone from the tubing. After priming is complete, close the roller clamp on the tubing. After final calculations are complete on the drip rate, open the roller clamp accordingly for the calculated drip/minute rate.

**Recommendations:**

- Know your medications and supplies before you begin your calculation. This will create less math for you on the fly.
- Make a chart with varying dosages ahead of time since 1 dosage will not work for all patients, but will depend on their pain and your goal.

**Example:**

Drip rate table for ketamine IV admixture of 100 mg/100 mL concentration (1:1 concentration, drip factor 20 gtt/mL)

	Weight			
Dose (mg/h)		0.1 mg/kg/h	0.2 mg/kg/h	0.3mg/kg/h
Drops/minute based on weight and dose	65 kg	2.2	4.3	6.5
	70 kg	2.3	4.7	7
	75 kg	2.5	5	7.5
	80 kg	2.7	5.3	8



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Useful formulas:

### 1. Calculate the dose.

$$\frac{\text{Medication dose amount}}{\text{Medication quantity}} \times \text{Medication quantity} = \text{Flow rate per hour}$$

*Medication on Hand*

### 2. Calculate the drip rate (drops/minute).

$$\frac{\text{Flow rate (mL)}}{1 \text{ Hour}} \times \frac{\text{Drop factor (specific to IV tubing)}}{1 \text{ mL}} \times \text{Time conversion (hour/60 min)} = \text{Drip rate}$$

**Ketamine drip (for sedation):** Sedation loading dose first (1mg/kg IV/IO over 60 seconds).

**MIX:** 750mg (1.5 vials of 500mg/5mL) in 250mL of normal saline (3mg/mL solution).

**Initial drip dose:**

- **Best:** Using an IV pump, set to  $\mu\text{g/kg/min}$  dose desired. Increase or decrease dose by 5–10 $\mu\text{g/kg/min}$  increments.
- **Better:** Using a dial flow adaptor, initial drip rate in mL/h equals the casualty's weight in kg divided by 2 (see mL/h table).
- **Minimum:** Count drip rate. Increase or decrease rate by 1–2 drips/min (very slowly) to achieve goal.

**Drip adjustments:** Increase or decrease drip by 0.25mg/kg/h (1 row).

Ketamine Drip Dosing Tables					
Ketamine drip rate for dial flow or IV pump (starting dose highlighted)					
Dose		Patient's Weight, kg			
		40	60	80	100
mg/kg/h	$\mu\text{g/kg/min}$	Infusion Rate, mL/h			
0.5	8	7*	10	13	17
0.75	13	10	15	20	25
1.0	17	13	20	27	33
1.25	21	17	25	34	42
1.5	25	20	30	40	50
1.75	29	24	35	47	59
2.0	33	27	40	53	67
Ketamine drip count for 15 drips/mL tubing (starting dose highlighted)					
		Infusion Rate, 1 drip/X seconds			
0.5	8	1/35	1/24	1/18	1/9
0.75	13	1/27	1/18	1/14	1/8
1.0	17	1/18	1/12	1/9	1/7
1.25	21	1/15	1/10	1/8	1/6
1.5	25	1/12	1/8	1/6	1/5
1.75	29	1/11	1/7	1/6	1/5
2.0	33	1/9	1/6	1/5	1/4
Ketamine drip count for 10 drips/mL tubing (starting dose highlighted)					
		Infusion Rate, 1 drip/X seconds			
0.5	8	1/53	1/36	1/27	1/14
0.75	13	1/41	1/27	1/21	1/12
1.0	17	1/27	1/18	1/14	1/11
1.25	21	1/23	1/15	1/12	1/9
1.5	25	1/18	1/12	1/9	1/8
1.75	29	1/17	1/11	1/9	1/8
2.0	33	1/14	1/9	1/8	1/6