



Chapter 15

Pediatric Drip Calculations in Emergency

15.1 Routine Drug Preparation

Table 15.1 Method of preparation of cardiac inotropes with a standard drug concentration.

DRUG	Dose	Constitution	Concentration
Dobutamine	5-20 mcg/kg/min	(6 × BW (kg) in mg) added to make 100 mL	1 mL/hr = 1 mcg/kg/min
Dopamine	2-20 mcg/kg/min	(6 × BW (kg) in mg) added to make 100 mL	1 mL/hr = 1 mcg/kg/min
Epinephrine	0.1 to 1 mcg/kg/min	(0.6 × BW (kg) in mg) added to make 100 mL	1 mL/hr = 0.1 mcg/kg/min
Isoproterenol	0.1 to 1 mcg/kg/min	0.6 × BW (kg) in mg added to make 100 mL	1 mL/hr = 0.1 mcg/kg/min
Lidocaine	20-50 mcg/kg/min	120 mg in 100 mL	1 mL/kg/hr = 20 mcg/kg/min

BW= body weight

Illustration 1: 12 kg child requires dobutamine infusion at the rate of 9 mcg/kg/minute:

Constitute dobutamine (6 × 12) = 72 mg added to make 100 mL solution. This solution is run at the rate of 9 mL/hour to deliver 9 mcg/kg/minute (1 mL/hr = 1 mcg/kg/min).

Illustration 2: 12 kg child requires isoproterenol infusion at the rate of 0.3 mcg/kg/minute:

Constitute isoproterenol (0.6 × 12) = 7.2 mg added to make 100 mL solution. This solution is run at the rate of 3 mL/hour to deliver 0.3 mcg/kg/minute (1 mL/hr = 0.1 mcg/kg/min).

15.2 Concentrated Drug Preparation at Standardized Concentration

15.2.1 Calculation of a Drug Preparation

Patients > 40 kg and patients requiring fluid restriction need more concentrated solutions of drugs. Calculation under these circumstances is done by the following formula and using any standardized concentrations given below.

$$\text{Rate (mL/hr)} = \frac{\text{Dose in mcg per kg per minute} \times \text{weight in kg} \times 60 \text{ min.hr}}{\text{Concentration of drug (mcg per mL)}}$$

Illustration: 12 kg child requires dobutamine infusion at the rate of 9 mcg/kg/minute. Due to fluid restriction calculate the rate (mL/hr) as: Rate (mL/hr) = 9 × 12 × 60 / standardized concentration of drug (i.e., 1600 mcg/mL).

$= 9 \times 12 \times 60 / 1600 = 4.05$ mL/hr deliver 9 mcg/kg/minute of the drug at a drug concentration of 1600 mcg/mL or 160 mg of drug diluted in 100 mL.

15.2.2 Standardized Drug Concentrations (mcg/mL)

Table 15.2 Standardized concentrations (mcg/mL) for commonly used cardiac inotropes.

Dobutamine	800	1600	3200
Dopamine	800	1600	3200
Epinephrine	8	16	60
Norepinephrine	8	16	60
Isoproterenol	8	16	60

15.2.3 Standardized Drug Concentrations (By Patient Weight)

Table 15.3 Standardized concentrations by patient weight for commonly used cardiac inotropes.

	Patient Weight (Kg)	Concentration (mcg/mL)
Dopamine / or	2-3	200
Dobutamine	4-8	400
	9-15	800
	>15	1600
Epinephrine / or	2-3	5
Isoproterenol / or	4-8	10
Nor-epinephrine	>9	20

15.3 Alternate Drip Calculations

To calculate the amount of drug to be added per 50 mL infusion solution:

At a desired infusion rate of (mL/hour) and at a desired dose in mcg/kg/minute use the following formulae a) and b).

$$\text{a) Mg of the drug (D*)} = \frac{3 \times (\text{mcg per kg per minute}) \times \text{weight in kg}}{\text{Desired fluid rate (mL per hour)}}$$

b) To calculate the VOLUME of the drug needed per 50 mL of solution

$$\text{Volume (mL) of the drug} = \frac{\text{mg of drug (D*)}}{\text{Concentration of drug (mg per mL)}}$$

Example:

2 kg infant to receive dobutamine (D*) 5 mcg/kg/minute at an infusion rate of 0.5 mL/hour. If the concentration of dobutamine (D*) solution is 12.5 mg/mL.

a) Mg of the drug D* in 50 mL infusion solution = $3 \times 5 \text{ mcg/kg/minute} \times 2 \text{ (kg)} / 0.5 = 60 \text{ mg}$ of the drug (D*)

b) Volume of the drug needed per 50 mL of infusion solution is = $60 \text{ mg} / 12.5 \text{ mg} = 4.8 \text{ mL}$ of dobutamine in 50 mL solution.

Add 4.8 mL of dobutamine (12.5 mg/mL) to 45.2 (50 - 4.8) mL of compatible solution such as D5W to yield 50 mL of dobutamine infusion with a concentration of 1200 mcg/mL.