

ADRENALINE

ACTIONS AND USES

Adrenaline is the main neurotransmitter released by sympathetic neurones. Its effect on alpha and beta receptors varies with the dose used. It has a positive inotropic and chronotropic effect on the heart and causes peripheral vasoconstriction and bronchodilation. It is used in resuscitation to correct asystole or profound bradycardia. Occasionally it can be used instead of dopamine for acute hypotension secondary to cardiac dysfunction.

DOSAGE

Resuscitation (1 in 10,000)

First dose (IV or intraosseous) :	0.2ml/kg
Subsequent IV or intraosseous:	0.2ml/kg/dose. Repeat after 3-5 mins
ETT dose (no longer recommended)	1ml/kg/dose

Hypotension

- 0.1-1.5 microgram/kg/min as an infusion titrate dosage to desired effect.
- Doses greater than 2 microgram/kg/min may cause renal ischaemia.
- Wean down dose by 100 nanogram (0.1microgram)/kg/min before stopping.

ADMINISTRATION

- By slow IV bolus over 3 minutes. Flush the line before and after administration with 0.5ml sodium chloride 0.9%.
- By intraosseous injection
- By endotracheal tube during resuscitation.
- Continuous infusion through a central venous line.

RECONSTITUTION

Adrenaline is available as a 1 in 10,000 solution(0.1mg/ml) in a 3ml pre-filled minijet syringe. Reconstitution is not needed. It is also available as 1 in 1000 (1mg/ml) solution which must be diluted for continuous use.

(Note 1 in 1000 is equivalent to 1mg/ml of adrenaline).

For continuous infusion:

Adrenaline 30 microgram/kg/ml (equivalent to 100 nanogram/kg/min in 0.2ml/hr)

Add 1.5ml/**kg** (1.5mg/**kg**) of adrenaline 1mg/ml (1 in 1000) to a 50ml syringe and make up to a final volume of 50ml with glucose 10%. At this concentration, the rate of infusion is calculated by the following formula.

Rate (ml/hr) = 2 x prescribed dose (microgram/kg/min). (See [explanation](#) of formula and [example](#)).

Other compatible diluent

Sodium chloride 0.9%, glucose 5% (or 10%).

Incompatibilities

Do not mix or inject with sodium bicarbonate and phenobarbital.

STORAGE

Store in the IV drug cupboard and on resuscitation trays at room temperature.

MONITORING

Monitor heart rate and BP as tachycardia, hypertension, increased myocardial oxygen consumption and cardiac arrhythmias are reported. Observe U&Es, urine output and creatinine. Therapeutic doses can cause hypokalaemia and reduce in renal blood flow. Monitor IV site for extravasation and blanching, infiltration can cause tissue ischaemia and necrosis. Hyperglycaemia has been reported, monitor BM's.

Explanation of formula to calculate rate of administration of adrenaline

Final dilution is based on the premise that a dose of 500 nanogram/kg/min can be provided by infusion rate of 1ml/hr irrespective of baby's body weight providing adrenaline is diluted to 30 microgram/kg/ml (1.5mg/kg/50ml).

Note 1000 nanogram = 1 microgram

Dose = 500 nanogram/kg/min

= 0.5 microgram/kg/min

= 30 microgram/kg/hr

Concentrated solution = 1mg/ml (1 in 1000)

Final diluted solution = 1.5ml/kg to 50ml

= 1.5mg/kg/50ml

= 1500 microgram/kg/50ml

= 30 microgram/kg/ml

Rate of infusion to provide dose of 500 nanogram/kg/ml using 30 microgram/kg/ml final dilution.

= Dose / Concentration

= 30 microgram/kg/hr / 30 microgram/kg/ml

Therefore :

- 400 nanogram/kg/min = 0.8ml/hr
- 600 nanogram/kg/min = 1.2ml/hr
- 100 nanogram/kg/min = 0.2ml/hr

Example

For a 1.8kg infant requiring 800 nanogram/kg/min

Final dilution = 1.5ml/kg/50ml
= (1.5 x 1.8) per 50ml
= 2.7ml of adrenaline 1mg/ml to 50ml

Add 2.7ml to 47.3ml of glucose 10% (i.e. 50ml)

800 nanogram/kg/min = 1.6ml/hr or
= 2 x prescribed dose (microgram/kg/ml)
= 2 x 0.8 (microgram/kg/min)
= 1.6ml/hr