Adrenaline (epinephrine) Intravenous for Adults

Who can administer

Administration RESTRICTED - see Appendix 1

Important information

- **Central line administration:** administration by infusion **in specialist units only** - (critical care only)
- **Peripheral line administration (restricted use - Critical Care, Outreach ONLY)**
- Resuscitation use: any area
- Infusion route is an unlicensed method of administration
- For Y-site compatibility see below

Available preparations

Adrenaline 1mg in 1mL ampoule (1:1000) (Mercury)

Adrenaline 1mg in 10mL pre-filled syringe (1:10,000) (Aurum)

Adrenaline 100 microgram in 1mL ampoule (Martindale)- for use in neonates

Reconstitution

Pre-filled syringe

- Already in solution

Ampoule

- Already in solution
- **Dilute further prior to administration**
- Draw up using a 5 micron filter needle

Infusion fluids

Glucose 5% (preferred [ref 3]) or Sodium chloride 0.9%

Methods of intravenous administration

Bolus intravenous injection

- Resuscitation: as per GUH guidelines
- Pre-filled syringes are used as supplied
- Ampoules are to be diluted before use

Continuous intravenous infusion (using an electronically controlled infusion device)

- **Central line administration**
    - Prepare a solution containing either 3mg in 50mL, or 6mg in 50mL
    - A 3mg per 50mL solution contains 60 micrograms per mL
    - A 6mg per 50mL solution contains 120 micrograms per mL
    - Administer at a suitable rate, titrated to response - see 'dose' below

- **Peripheral line administration**[ref 1] **(restricted use - Critical Care, Outreach ONLY)**
    - Adrenaline 1mg in 1mL ampoule
    - Prepare a solution containing 4mg in 250ml (16 micrograms per mL)
    - Administer at a suitable rate, titrated to response - see 'dose' below

Dose in adults

Bolus intravenous injection: as per resuscitation guidelines

- Pre-filled syringes are used as supplied
- Ampoules are to be diluted before use

Continuous intravenous infusion - CENTRAL LINE (Critical Care only) [ref 2]

- **Initial rate:** 1 microgram per minute, titrated to effect

Continuous intravenous infusion - PERIPHERAL LINE (Restricted use - Critical Care, Outreach ONLY)

- **Anaphylaxis (refractory to IM adrenaline)** [ref 2,4]
    - **Initial rate** advised at 0.1microgram **per kilogram** per minute
    - Increase rate every two to three minutes by 0.05 mcg/**kg**/minute until BP and perfusion improve. (see table below for mL/hour volume rate for microgram/**kg**/minute dosing)
    - See Table 1 below and also Guideline for the use of vasopressor agents by peripheral infusion, UHG

Table 1: Peripheral line (restricted use - Critical Care, Outreach ONLY)
Indication: Anaphylaxis (refractory to IM adrenaline) [ref 2,4]
Rate (mL/hour) for microgram/kg/min doses using 4mg/250mL infusion

Dosage (microgram/kg/minute)	50kg patient	75kg patient	100kg patient
0.1microgram/**kg**/minute	19 mL/hr	28 mL/hr	38 mL/hr
0.2microgram/**kg**/minute	38 mL/hr	56 mL/hr	75 mL/hr

0.3microgram/**kg**/minute	56 mL/hr	84 mL/hr	113 mL/hr
0.4microgram/**kg**/minute	75 mL/hr	113 mL/hr	150 mL/hr
0.5microgram/**kg**/minute	94 mL/hr	141 mL/hr	188 mL/hr

Doses rounded for convenience

- **Peripheral venous access** [ref 1]:
  - should ideally be of size 20G or more
  - be sited proximal to the wrist in the arm
  - avoid sites of flexion in awake patients
  - avoid sites requiring more than one venepuncture
  - there should be a return of blood following insertion and flush easily with 5-10mL of 0.9% sodium chloride

Monitoring

- Monitor infusion site frequently - extravasation may cause local tissue necrosis
- Monitor blood pressure continuously
- Monitor blood glucose whilst on continuous infusion [ref 3]
- **Peripheral administration:** a staff member competent in the administration of peripheral vasopressor MUST supervise the patient

Further information

- If PERIPHERAL line extravasation occurs, see Guideline for the use of vasopressor agents by peripheral intravenous infusion, UHG
- If CENTRAL line extravasation occurs, give phentolamine subcutaneously (into site of extravasation) 5 to 10mg in 10 to 20mL Sodium chloride 0.9%Â [ref 2]

Storage

Store below 25^{0}C

References

Adrenaline 1: 1,000 (Mercury) SPC August 2018

Adrenaline 1:10,000 (Martindale)

1: Adult Critical Care Patients. Version 1.1 November 2022 (interim update)
Available from: Intensive Care Society | Vasopressor Agents in Adult ICU (ics.ac.uk) Accessed: 11th July 2023

2: UpToDate (Adrenaline)- accessed online 28th December 2023

3: Injectable medicines guide, Accessed via Medusa 28th December 2023

4: Guideline for the use of vasopressor agents by peripheral infusion, UHG, January 2024

Therapeutic classification

Adrenergic agent/inotrope

BNF
Hypotension and shock