Noradrenaline (Norepinephrine) Intravenous Infusion for Adults

Who can administer

Administration RESTRICTED - see Appendix 1

Important information

- **Central line administration:** administration by infusion **in specialist units only- (Critical Care, CCU, ED resus)**
- **Peripheral line administration (restricted use - Critical care, Outreach ONLY)**
- Doses given are in terms of noradrenaline **BASE**
- For Y-site compatibility see below

Available preparations

Noradrenaline **base 4mg in 50mL** (80 micrograms per mL) solution for infusion (1st line for Central line administration)

Noradrenaline base 2mg per 2mL concentrate for solution for infusion (1:1000) (1st line for Peripheral line administration)

Other strengths also may be available - see Further Information

Reconstitution

Central line administration

- **Noradrenaline base 4mg in 50mL (80 micrograms per mL) solution for infusion:** Already in solution
- **Ampoules (only) to be diluted further prior to administration** (generally only used when the pre-made solution is unavailable, or when higher concentrations are required) (see Further Information re ampoules)
- Use a 5 micron filter needle when drawing up contents of ampoule

Peripheral line administration (restricted use - see under *Dose* below)

- Noradrenaline base 2mg per 2mL concentrate for solution for infusion
- **Dilute further prior to administration**
- Draw up using a 5 micron filter needle

Infusion fluids

Glucose 5% (preferred [ref 1]) or Sodium chloride 0.9%

Methods of intravenous administration

Continuous intravenous infusion (administer using an electronically controlled infusion device)

Central line administration

- Using 4mg base in 50mL
- Administer at a suitable rate, titrated to pressor effect observed- see under 'dose'
- Higher concentrations may occasionally be used- see under Further Information

Peripheral line administration (restricted use - see under *Dose* below)

- Noradrenaline base 2mg/2mL **concentrate** for solution for infusion (ampoules)
- 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

Continuous intravenous infusion - CENTRAL LINE: (Critical Care, CCU, ED resus)

- Note: 4mg **base** in 50mL = 80 micrograms per mL [ref 1]

There are two different ways of dosing noradrenaline for Central line use

Important note [ref 3]

- If patient is of normal to high body weight, consider using Method 1 (**STANDARD APPROACH**)- to avoid inadvertent overdose
- If patient is less than 50kg- consider using Method 2 (**WEIGHT BASED APPROACH**)

1: Method 1 (STANDARD APPROACH) [ref 2] - see Table 1 below

- Rate expressed in **micrograms/minute**
- **Initial rate:** 5 to 15 micrograms/minute, titrated to target blood pressure
- **Usual dose range:** 2 to 80 micrograms/minute. Higher doses may be required.
- **Do not stop infusion suddenly** as abrupt withdrawal can result in acute hypotension

Table 1 (STANDARD APPROACH) (Central line)
Rate (mL/hr) of a 4mg in 50mL infusion using doses in micrograms/minute

Dosage (microgram/minute)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**15**	**20**	**25**	**30**	**40**	**60**	**80mcg/min**
4mg/50ml **(rate in mL/hour)**	0.75	1.5	2.3	3	3.8	4.5	5.3	6	6.8	7.5	11.3	15	18.8	22.5	30	45	60

2: Method 2 (WEIGHT-BASED APPROACH) [ref 2]- see Table 2 below

- Rate expressed in micrograms/**kg**/minute

- **Initial rate:** 0.05 to 0.15 micrograms/**kg**/minute, titrated to target blood pressure
- **Usual dose range**: 0.025 to 1 microgram/**kg**/minute
- **Do not stop infusion suddenly** as abrupt withdrawal can result in acute hypotension

Table 2: (WEIGHT-BASED APPROACH) (Central line)
Rate (ml/hr) of a 4mg in 50ml infusion using doses in micrograms/KG/minute

Â	Weight of patient in 10kg increments below (rate is given in mL/hour in this table)					
Dose(microgram/kg/min)-below	**30kg**	**40kg**	**50kg**	**60kg**	**70kg**	**80kg**
0.025	0.6	0.8	0.9	1.1	1.3	1.5
0.05	1.1	1.5	1.9	2.3	2.6	3
0.1	2.3	3	3.8	4.5	5.3	6
0.15	3.4	4.5	5.6	6.8	7.9	9
0.2	4.5	6	7.5	9	10.5	12
0.25	5.6	7.5	9.4	11.3	13.1	15
0.3	6.8	9	11.3	13.5	15.8	18
0.35	7.9	10.5	13.1	15.8	18.4	21
0.4	9	12	15	18	21	24
0.45	10.1	13.5	16.9	20.3	23.6	27
0.5	11.3	15	18.8	22.5	26.3	30
0.55	12.4	16.5	20.6	24.8	28.9	33
0.6	13.5	18	22.5	27	31.5	36
0.65	14.6	19.5	24.4	29.3	34.1	39

Continuous intravenous infusion [ref 4,5] **PERIPHERAL LINE (Critical Care, Outreach ONLY)**

- **Initial rate: Septic shock**
  - 0.05 micrograms/**kg**/minute, titrated to target blood pressure
  - See Table 3 below and also Guideline for the use of vasopressor agents by peripheral intravenous infusion, UHG
  - **Do not stop infusion suddenly** as abrupt withdrawal can result in acute hypotension

Table 3: Peripheral line (restricted use - Critical care/Outreach ONLY)
Indication: Septic shock
Rate (mL/hour) for microgram/kg/min doses using 4mg/250mL infusion

Dose (microgram/kg/minute)	**50kg patient**	**75kg patient**	**100kg patient**
0.05microgram/**kg**/minute	9 mL/hr	14 mL/hr	19 mL/hr
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 4]:
• 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
- Peripheral administration: a staff member competent in the administration of peripheral vasopressor MUST supervise the patient

Further information

- **Alternative concentrations**
    - For patients requiring high doses you may prepare a solution containing 8mg **BASE** (= 8mL of 1:1000 solution) in 50mL **- unlicensed concentration** [ref 1]
    - Note: 8mg **base** in 50mL = 160 micrograms per mL
- If CENTRAL line extravasation occurs, give phentolamine subcutaneously (into site of extravasation) 5 to 10mg in 10 to 20mL Sodium chloride 0.9% [ref 2]
- If PERIPHERAL line extravasation occurs, see Guideline for the use of vasopressor agents by peripheral intravenous infusion, UHG
- The product license for the solution for infusion stipulates "adults weighing over 50kg" .However, this monograph does not limit its use in patients below this weight [ref 3]

Storage

- Store below 25^{0}C
- Do not use if solution is brown, pink or dark yellow, or it contains precipitates

References

SPC Noradrenaline vials (Pfizer) June 2021

SPC: Noradrenaline pre-filled solution for infusion (Aguettant) March 2020

1: Injectable medicines guide- Medusa, downloaded 01/03/2022

2: UptoDate. downloaded 11/01/2024

3: Kidd, PS. "Noradrenaline 0.08mg/ml solution for infusion: patient's weighing less than 50kg". Personal opinion. September 2022

4. Intensive Care Society. Guidance for: The use of vasopressor agents by peripheral intravenous infusion in 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: 11/01/2024

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

Therapeutic classification

Vasoconstrictor sympathomimetic