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**Peripheral Noradrenaline Infusion in Critical Care**

This guideline is for use in the following areas only:

* WGH: Intensive care unit Ward 20
* SJH: Intensive care unit

Peripheral noradrenaline infusions may be commenced in other areas under direction of the ICU team *in a patient awaiting transfer to any of the above areas.*

The decision to commence noradrenaline by peripheral infusion must be made by or discussed with the ICU consultant on call.

**Patient group**  
Patients with mild/moderate hypotension requiring vasopressors.

**Indications:**

* Bridging measure whilst awaiting CVC insertion e.g. stabilisation of critically unwell patients awaiting transfer to ICU
* In patients where CVC insertion carries additional risk (coagulopathy, thrombocytopenia)
* Short term use in patients who are likely to require brief vasopressor support e.g. urosepsis, post-operative mild/moderate hypotension

**Concentration**

The standard concentration for administration via peripheral venous cannula is 16 micrograms/ml. Dilute 4mg noradrenaline (1mg/ml) with 246ml of 5% glucose to provide a final concentration of 16 micrograms/ml in a final volume of 250ml.

**Infusion rate**

The initial rate of infusion is weight based, starting at 0.05mcg/kg/min.

Titrate to desired effect. Maximum rate 25 ml/hr.

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| Concentration and Diluent: 4mg of Noradrenaline in 246 ml of 5% Glucose | | | | | | |
| Estimated weight | Starting dose of 0.05mcg/kg/min | Peripheral infusion rate |  | Estimated weight | Starting dose of 0.05mcg/kg/min | Peripheral infusion rate |
| 40kg | 120 mcg/hr | 7.5 ml/hr |  | 80kg | 240 mcg/hr | 15 ml/hr |
| 50kg | 150 mcg/hr | 9.4 ml/hr |  | 90kg | 270 mcg/hr | 16.9 ml/hr |
| 60kg | 180 mcg/hr | 11.2 ml/hr |  | 100kg | 300 mcg/hr | 18.8 ml/hr |
| 70kg | 210 mcg/hr | 13.1 ml/hr |  | 110kg | 330 mcg/hr | 20.6 ml/hr |

Duration of infusion should be decided on a case by case basis at the discretion of the responsible senior decision maker.

The concentration of peripheral noradrenaline is significantly weaker than that of centrally-administered noradrenaline infusions. As such, it can be weaned off in 2ml increments.

After discontinuation, flush the peripheral cannula with sodium chloride 0.9% at the same rate the medicine was infused to avoid adverse haemodynamic effects.

Concomitant administration of noradrenaline and other medicines via a Y-site should be avoided to prevent inadvertent bolus administration of noradrenaline

**Access**

* Peripheral noradrenaline infusion should be administered through at least a 20G peripheral venous cannula.
* Locate in a site in the arm, proximal to the wrist in a clearly visible location.
* Avoid sites of flexion in awake patients due to risk of occlusion
* Avoid sites that have had more than 1 venepuncture
* Ensure there is return of blood following insertion of PVC and that PVC flushes easily with 5-10ml of 0.9% sodium chloride. A clear dressing allowing inspection of point of insertion should be applied.
* Site second PVC in case of failure of primary site
* Infusion should be a dedicated line with no other infusions running, clearly labelled ‘peripheral noradrenaline’

**Monitoring**  
Invasive blood pressure monitoring via arterial line is recommended.  
If non invasive BP monitoring used this should cycle at 5 minute intervals and cuff should be placed on different limb to infusion site. Inspect cannula site every 30 minutes (blanching, erythema, swelling, extravasation).

**Management of extravasation of peripheral noradrenaline infusion**  
1. Stop the infusion immediately and disconnect the line from PVC  
2. Attempt to aspirate 3-5ml from the PVC   
3. Remove the cannula and apply a dressing to the removal site  
4. Mark the extravasation area if possible, in order to allow monitoring of any developing injury  
5. Elevate the affected limb if able to do so to reduce any swelling  
6. Consider the application of a topical vasoactive agent to encourage local blood flow (e.g. GTN patch)  
7. Administer analgesia if required  
8. Seek advice from surgical team or local tissue viability service if concerned  
9. Document the incident and report via DATIX

**Treatment of ischemia due to extravasation:**

Phentolamine can be used as an antidote for extravasation ischaemia. To prevent sloughing and necrosis, the injection zone must be irrigated as quickly as possible with 10 to 15ml of saline solution containing 5 to 10 mg of phentolamine. For this purpose, it is necessary to use a syringe provided with a fine needle and to inject locally. Sympathetic blockade with phentolamine causes immediate and conspicuous local hyperaemic changes if the area is infiltrated within 12 hours.

**** NORADRENALINE (NOREPINEPHRINE) via **PERIPHERAL** ADMINISTRATION

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| **PRESENTATION:**  **Update April 2020: New Pfizer product** | 1mg/ml injection: 4ml or 8ml ampoules of noradrenaline base.  **Norepinephrine bitartrate** 1mg/ml: 4ml vial equivalent to 4ml noradrenaline base. |
| **INDICATION:** | Naturally occurring catecholamine primarily used for vasoconstriction. It has some inotropic effects in many cases. It’s effect on blood pressure ceases 1-2 minutes after discontinuing the infusion. |
| **DOSE AND ADMINISTRATION:** | ICU STANDARD INTRAVENOUS INFUSION **For peripheral administration: Add 4ml of noradrenaline (1mg/ml) to 246ml bag of 5% glucose**  Start at 0.05mcg/kg/min. For example, in a 70kg patient administer via an infusion pump at a starting dose of 210 microgram/hour (13.1 mL/hour).\*  Titrate to desired effect. MAXIMUM RATE of 25ml/hr.  Peripheral noradrenaline infusion should be administered through at least a 20G peripheral venous cannula |
| **CONCENTRATION:** | **Peripheral strength** 16 micrograms/ml |
| **STABILITY:** | Physically & chemically stable for 24 hours at room temp. Protect from light. |
| **ADDITIONAL NOTES:** | After discontinuation, flush the peripheral cannula with sodium chloride 0.9% at the same rate the medicine was infused to avoid adverse haemodynamic effects.  The concomitant administration of noradrenaline and other medicines via a Y-site should be avoided to prevent inadvertent bolus administration of noradrenaline.  Also stable for 24 hours in 0.9% sodium chloride but more stable in glucose 5%. **Norepinephrine Pfizer brand is ONLY stable in glucose 5%.**  Do not use any infusion if discoloured or has a precipitate. |
| **Allergy Status** | **Norepinephrine Pfizer brand contains sodium metabisulphite as a preservative. Sulphite sensitivity seen more frequently in asthmatic population.** |

## References

1. Electronic Medicines Compendium available at <http://www.medicines.org.uk>
2. Medusa Injectable Medicines Guide available at <http://medusa.wales.nhs.uk>
3. Medicines Complete available at <http://www.medicinescomplete.com>
4. NHS Gloucestershire Hospitals NHS Foundation Trust Department of Critical Care: Peripheral Noradrenaline Infusion Clinical Guidance. Effective from 06/4/23, Review date: 01/04/25.

\*Starting dose based on CENSER study

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