

<b>Alert</b>	<b>Prescribe as noradrenaline base.</b> Noradrenaline acid tartrate 2 mg/mL is equivalent to noradrenaline base 1 mg/mL (1:1,000)												
<b>Indication</b>	Treatment of hyperdynamic shock secondary to sepsis. [1] Second line inotrope for treatment of fluid-refractory hypotensive shock in the setting of low systemic vascular resistance (SVR).[1] Circulatory failure in the setting of pulmonary hypertension refractory to nitric oxide.[2]												
<b>Action</b>	Catecholamine with strong vascular alpha and cardiac beta-adrenergic action, moderate cardiac alpha-adrenergic actions.[3] Noradrenaline increases blood pressure, urine output and reduces lactate in newborns with septic shock refractory to volume expansion and other inotropes.[4] Noradrenaline increases systemic and pulmonary pressures, increases pulmonary blood flow and improves systemic oxygen saturation in newborn infants with pulmonary hypertension and circulatory failure. [2]												
<b>Drug Type</b>	Inotrope and vasopressor.												
<b>Trade Name</b>	Hospira Levophed Noradrenaline 1:1,000, Noradrenaline BNM 1:1000, Noradrenaline MYX 1:1000. <b>All contain Noradrenaline acid tartrate.</b>												
<b>Presentation</b>	Noradrenaline acid tartrate 8 mg/4 mL is equivalent to <b>noradrenaline base 4 mg/4 mL (1:1000)</b>												
<b>Dosage / Interval</b>	0.05-1.0 microgram/kg/minute of <b>noradrenaline Base.</b>  (a) Suggested starting dose of 0.1 microgram/kg/minute and titrate up to achieve not only normotensive range of blood pressure but also improved tissue perfusion manifested by good urine output, improved FiO <sub>2</sub> , and reduced lactate. (b) Consider starting at higher dose particularly in term infants with respiratory failure and hypotension refractory to other treatments.												
<b>Route</b>	Continuous IV infusion.												
<b>Preparation/Dilution</b>	<p><b>LOW CONCENTRATION IV infusion (for =&gt;1kg)</b></p> <table border="1"> <thead> <tr> <th>Infusion dose</th> <th>Prescribed amount</th> </tr> </thead> <tbody> <tr> <td>1 mL/hour = 0.05 microgram/kg/minute</td> <td>150 microgram/kg noradrenaline <b>base</b> and make up to 50 mL</td> </tr> </tbody> </table> <p>Draw up 150 micrograms/kg (0.15 mL/kg) with 5% glucose or sodium chloride 0.9%<sup>6</sup> to make a 50 mL solution [i.e., 3 micrograms/kg/mL]. Infusing at a rate of <b>1 mL / hour = 0.05 microgram/kg/minute.</b></p> <p><b>HIGH CONCENTRATION IV infusion</b></p> <table border="1"> <thead> <tr> <th>Infusion dose</th> <th>Prescribed amount</th> </tr> </thead> <tbody> <tr> <td>1 mL/hour = 0.2 microgram/kg/minute</td> <td>600 microgram/kg noradrenaline <b>base</b> and make up to 50 mL</td> </tr> </tbody> </table> <p>Draw up 600 micrograms/kg (0.6 mL/kg) with 5% glucose or sodium chloride 0.9%<sup>6</sup> to make a 50 mL solution [i.e., 12 micrograms/kg/mL]. Infusing at a rate of <b>1 mL / hour =0.2 microgram/kg/minute.</b></p> <p><b>For infants requiring fluid restriction consider:</b></p> <p><b>VERY HIGH CONCENTRATION continuous IV infusion</b></p> <table border="1"> <thead> <tr> <th>Infusion dose</th> <th>Prescribed amount</th> </tr> </thead> <tbody> <tr> <td>1 mL/hour = 0.4 microgram/kg/minute</td> <td>1,200 microgram/kg noradrenaline <b>base</b> and make up to 50 mL</td> </tr> </tbody> </table> <p>Draw up 1,200 microgram/kg (1.2 mL/kg) with 5% glucose or sodium chloride 0.9%<sup>6</sup> to make a 50 mL solution [i.e., 24 micrograms/kg/mL]. Infusing at a rate of <b>1 mL / hour = 0.4 microgram/kg/minute.</b></p>	Infusion dose	Prescribed amount	1 mL/hour = 0.05 microgram/kg/minute	150 microgram/kg noradrenaline <b>base</b> and make up to 50 mL	Infusion dose	Prescribed amount	1 mL/hour = 0.2 microgram/kg/minute	600 microgram/kg noradrenaline <b>base</b> and make up to 50 mL	Infusion dose	Prescribed amount	1 mL/hour = 0.4 microgram/kg/minute	1,200 microgram/kg noradrenaline <b>base</b> and make up to 50 mL
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<b>Administration</b>	Noradrenaline should be given via a central venous catheter (UVC or PICC) using a continuous infusion. Infuse through a dedicated line where possible.												
<b>Monitoring</b>	Continuous heart rate, ECG and blood pressure. Assess urine output and peripheral perfusion frequently. Observe IV site closely for blanching and extravasation.												

# Noradrenaline (Norepinephrine)

## Newborn use only

2019

<b>Contraindications</b>	<p>Infants with hypovolaemia until blood volume replaced - may cause severe peripheral and visceral vasoconstriction.</p> <p>Infants with mesenteric or peripheral thrombosis.</p> <p>Known hypersensitivity to sodium metabisulfite.</p>
<b>Precautions</b>	<p>Use with caution in preterm infants and infants with poor myocardial contractility as a sole inotrope/vasopressor.</p> <p>Thyrotoxicosis – may cause severe hypertension.</p> <p>Ensure adequate circulating blood volume prior to commencement.</p> <p>Avoid in hypertension.</p> <p>Overdosage may result in severe hypertension, reflex bradycardia, marked increase in peripheral resistance and decreased cardiac output.</p> <p>The infusion site should be checked frequently for free flow. Care should be taken to avoid extravasation into the tissues which may cause local necrosis.</p> <p>Do not cease infusion abruptly.</p>
<b>Drug Interactions</b>	<p>Should be given with close monitoring to patients exposed to monoamine oxidase inhibitors because severe, prolonged hypertension may result.</p>
<b>Adverse Reactions</b>	<p>Systemic hypertension especially at higher doses.</p> <p>Reflex bradycardia and arrhythmia.</p> <p>Tissue necrosis at infusion site with extravasation. [see special comments]</p> <p>Renal and digital ischaemia may occur.</p> <p>Prolonged administration of any potent vasopressor may result in plasma volume depletion which should be continuously corrected by appropriate fluid and electrolyte replacement therapy.</p>
<b>Compatibility</b>	<p>Fluids: Glucose 5%, sodium chloride 0.9% with glucose 5%, sodium chloride 0.9%, lactated Ringer's solution.</p> <p>Y-site: Amiodarone, anidulafungin, bivalirudin, caspofungin, ceftaroline fosamil, cisatracurium, dexmedetomidine, dobutamine, dopamine, doripenem, esmolol, ethanol, haloperidol lactate, heparin sodium, hydrocortisone sodium succinate, labetalol, midazolam, milrinone, morphine sulfate, mycophenolate mofetil, potassium chloride, remifentanyl, sodium nitroprusside, tigecycline.</p>
<b>Incompatibility</b>	<p>Fluids: No information. 10% Dextrose not tested.</p> <p>Y-site: aminophylline, azathioprine, benzylpenicillin, folic acid, foscarnet, ganciclovir, indomethacin, insulin (short-acting), iron salts, phenobarbitone, sodium bicarbonate, thiopentone. Incompatible with alkalis and oxidising agents.</p> <p>No information: Adrenaline HCL is compatible with noradrenaline bitartrate but no stability data is available for Adrenaline acid tartrate and noradrenaline acid tartrate.</p>
<b>Stability</b>	<p>Diluted solution stable for 24 hours.</p>
<b>Storage</b>	<p>Ampoule: Store below 25°C. Protect from light. Discard unused portion. Do not freeze.</p>
<b>Special Comments</b>	<p>Do not administer with blood products.</p> <p>Glucose solutions (10%, 5%) are protective against the oxidation of noradrenaline.</p> <p>Discard if exhibiting colour change (oxidation).</p> <p>The antidote for extravasation ischaemia is phentolamine. Phentolamine is only available via the Special Access Scheme.</p>
<b>Evidence summary</b>	<p>Refer to full version.</p>
<b>References</b>	<p>Refer to full version.</p>

<b>Original version Date: 31/03/2016</b>	<b>Author: ANMF Consensus Group</b>
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