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Title: **Noradrenaline for neonates**			Effective date: **30 March 2022**
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BRIEF ADMINISTRATION GUIDE

For detailed information refer to The Australasian Neonatal Medicines Formulary **noradrenaline** guideline

Critical Note: there are minor variations between the ANMF and Waikato DHB best practice within this drug guideline – see yellow shaded text

Indications: Refractory hypotension in the setting of septic shock or persistent pulmonary hypertension

Route: Intravenous (**CVAD preferred**)

- Supplied as noradrenaline 4 mg/4 ml (1:1000) ampoule
  Note: the product contains noradrenaline as the acid tartrate, but doses always refer to the noradrenaline component alone
- pH is 3 to 4.5

Dose: Initially 0.05 - 0.1 microgram/kg/min (however may start higher for a short time to accelerate medication through dead space of the line)
Titrate dose in small increments every 30 minutes until desired response is achieved
Usual dose 0.05-1 microgram/kg/min. Maximum dose 2 microgram/kg/min
Avoid abrupt withdrawal, reduce the infusion rate gradually

Preparation and administration

Compatible fluids: glucose 5%, glucose in sodium chloride, sodium chloride 0.9%
Note: glucose containing solutions are preferred as the glucose protects against loss of potency

Continuous IV Infusion

- Select the concentration of noradrenaline required based on the weight of the infant and in the context of any fluid restrictions (refer to appendix for assistance) and dilute the appropriate volume of noradrenaline injection using compatible fluid in accordance with the table below:

Final Noradrenaline Concentration	**15** microgram/mL	**80** microgram/mL	**160*** microgram/mL
Volume of noradrenaline (1 mg/mL)	0.75 mL	4 mL	4.8 mL
Volume of compatible fluid	49.25 mL	46 mL	25.2 mL
Total volume for infusion	50 mL	50 mL	30 mL

*prefilled syringe (from Biomed) of 8mg/50mL (160microgram/mL) is available as an alternative to preparing

- Administer by continuous infusion (using Guardrails profile) preferably via a central venous catheter but may be used peripherally (into a large vein e.g. antecubital or femoral) in an emergency when central access is not available.
- Do NOT flush line or suddenly stop infusion

$$\text{Rate (mL/hr)} = \frac{60 \times \text{Dose (microgram/kg/min)} \times \text{Weight (kg)}}{\text{Concentration (microgram/mL)}}$$

Monitoring

- Continuous cardio-respiratory monitoring required
- Monitor peripheral perfusion frequently (colour and temperature of limbs)
- Observe IV site regularly for signs of extravasation
- Monitor urine output hourly
- Document vital signs hourly and when required

Storage and Stability

- Change infusion solution and tubing every 24 hours
- Protect from light
- Discard any unused ampoule contents
- Discoloured solutions or those containing a precipitate should not be used

Competency for Administration

This procedure is carried out by, or under, the direct supervision of a registered nurse/registered midwife who holds current Waikato DHB Generic Medicine Management and IV certification as well as Neonatal specific competency NCV/NAC and NIC2.

Guardrails Information

Noradrenaline is Guardrail profiled on the CC pump for NICU. Following are the guardrail limits:

Guardrails Drug Name	Noradrenaline
Concentration (microgram/mL)	
Minimum	12
Maximum	160
Dose rate (microgram/kg/min)	
Default	0.05
Soft minimum	0.04
Soft maximum	1.05
Hard max	2.1

Associated documents

- Waikato DHB guideline 1559; Infiltration and Extravasation Injury in NICU

References

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Appendix
Infusion tables to assist concentration selection

Table 1: Infusion rates when using noradrenaline concentration **15 microgram/mL**
(most useful for neonates ≤ 1 kg)

Rate (mL/hr)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Weight (kg)	**Approximate micrograms/kg/minute**									
0.5	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5
1	0.03	0.05	0.08	0.1	0.13	0.15	0.18	0.2	0.23	0.25
1.5	0.02	0.03	0.05	0.07	0.08	0.1	0.12	0.13	0.15	0.17
2	0.01	0.03	0.04	0.05	0.06	0.08	0.09	0.1	0.11	0.13
2.5	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.1
3	0.01	0.02	0.03	0.03	0.04	0.05	0.06	0.07	0.08	0.08
3.5	0.01	0.01	0.02	0.03	0.04	0.04	0.05	0.06	0.06	0.07

Table 2: Infusion rates when using noradrenaline concentration **80 microgram/mL**
(likely useful for neonates 1 – 3 kg)

Rate (mL/hr)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Weight (kg)	**Approximate micrograms/kg/minute**									
0.5	0.27	0.53	0.80	1.07	1.33	1.60	1.87	2.13	2.40	2.67
1	0.13	0.27	0.40	0.53	0.67	0.80	0.93	1.07	1.20	1.33
1.5	0.09	0.18	0.27	0.36	0.44	0.53	0.62	0.71	0.80	0.89
2	0.07	0.13	0.20	0.27	0.33	0.40	0.47	0.53	0.60	0.67
2.5	0.05	0.11	0.16	0.21	0.27	0.32	0.37	0.43	0.48	0.53
3	0.04	0.09	0.13	0.18	0.22	0.27	0.31	0.36	0.40	0.44
3.5	0.04	0.08	0.11	0.15	0.19	0.23	0.27	0.30	0.34	0.38
4	0.03	0.07	0.10	0.13	0.17	0.20	0.23	0.27	0.30	0.33
4.5	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	0.30
5	0.03	0.05	0.08	0.11	0.13	0.16	0.19	0.21	0.24	0.27

Table 3: Infusion rates when using noradrenaline concentration **160 microgram/mL**
(most useful for neonates > 2 kg)

Rate (mL/hr)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Weight (kg)	**Approximate micrograms/kg/minute**									
0.5	0.53	1.07	1.60	2.13	2.67	3.20	3.73	4.27	4.80	5.33
1	0.27	0.53	0.80	1.07	1.33	1.60	1.87	2.13	2.40	2.67
1.5	0.18	0.36	0.53	0.71	0.89	1.07	1.24	1.42	1.60	1.78
2	0.13	0.27	0.40	0.53	0.67	0.80	0.93	1.07	1.20	1.33
2.5	0.11	0.21	0.32	0.43	0.53	0.64	0.75	0.85	0.96	1.07
3	0.09	0.18	0.27	0.36	0.44	0.53	0.62	0.71	0.80	0.89
3.5	0.08	0.15	0.23	0.30	0.38	0.46	0.53	0.61	0.69	0.76
4	0.07	0.13	0.20	0.27	0.33	0.40	0.47	0.53	0.60	0.67
4.5	0.06	0.12	0.18	0.24	0.30	0.36	0.41	0.47	0.53	0.59
5	0.05	0.11	0.16	0.21	0.27	0.32	0.37	0.43	0.48	0.53