South Australian Neonatal Medication Guidelines

Milrinone

10 mg/10 mL injection

Note

This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

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Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary,
- Advising consumers of their choice and ensuring informed consent is obtained,
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements

Dose and Indications

Treatment of low cardiac output states and as an adjunct to inhaled nitric oxide in neonates with PPHN

Treatment of post PDA ligation syndrome

Treatment of myocardial dysfunction in neonates with shock

Intravenous

Corrected Age (weeks) [Gestational Age PLUS Postnatal Age]	Continuous IV infusion (adjusted according to haemodynamic and clinical response)	Loading dose* (OPTIONAL)
< 30 weeks	0.2 microgram/kg/min	0.75 microgram/kg/min for 3 hrs
30 – 37 weeks	0.2 – 0.5 microgram/kg/min	0.75 microgram/kg/min for 1 hr
≥ 37 weeks	0.33 – 0.75 microgram/kg/min Increase by 0.33 micrograms/kg/min as required	0.83 microgram/kg/min for 1 hr

Loading dose is considered optional and may be omitted if patient has hypotension/borderline low blood pressure

Always commence at the lowest dose and titrate based on side-effects and response

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Consider dose adjustment in renal dysfunction:

Corrected Age (weeks) [Gestational Age PLUS Postnatal Age]	Continuous IV infusion (adjusted according to haemodynamic and clinical response)
All	0.2 - 0.33 microgram/kg/min

Preparation and Administration

Loading Dose

The loading dose can be given undiluted if patient is fluid restricted.

Intravenous Infusion

Select the strength required based on the weight of the infant in the context of any fluid restrictions. Milrinone Concentration Selection Tables can be found on the following pages of this guideline to assist prescribers to gauge which strength is best for the patient.

The three standard strengths used are:

- Milrinone 50 microgram/mL
- Milrinone 100 microgram/mL
- Milrinone 200 microgram/mL

Dilute before use and administer by 24 hour infusion.

Formulae

To calculate infusion rate (mL/hr):

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

To calculate the dose (micrograms/kg/min):

$$\text{Dose (micrograms/kg/min)} = \frac{\text{Rate (mL/hr)} \times \text{Strength (micrograms/mL)}}{60 \text{ (minutes)} \times \text{Weight (kg)}}$$

Milrinone Concentration Selection Tables

Milrinone 50 micrograms/mL

To make 50 mL syringe:

Dilute 2.5 mL of milrinone 1 mg/mL with 47.5 mL compatible fluid (to a total volume of 50 mL). This makes a 50 micrograms/mL solution.

Rate (mL/hr)	0.2	0.4	0.6	0.8	1	Rate (mL/hr)
Weight (kg)	Approximate micrograms/kg/minute					Weight (kg)
0.5	0.33	0.67	1.00	1.33	1.67	0.5
1	0.17	0.33	0.50	0.67	0.83	1
1.5	0.11	0.22	0.33	0.44	0.56	1.5
2	0.08	0.17	0.25	0.33	0.42	2
2.5	0.07	0.13	0.20	0.27	0.33	2.5
3	0.06	0.11	0.17	0.22	0.28	3
3.5	0.05	0.10	0.14	0.19	0.24	3.5

Milrinone 100 micrograms/mL

To make 50 mL syringe:

Dilute 5 mL of milrinone 1 mg/mL with 45 mL compatible fluid (to a total volume of 50 mL). This makes a 100 micrograms/mL solution.

Rate (mL/hr)	0.2	0.4	0.6	0.8	1	Rate (mL/hr)
Weight (kg)	Approximate micrograms/kg/minute					Weight (kg)
0.5	0.67	1.33	2.00	2.67	3.33	0.5
1	0.33	0.67	1.00	1.33	1.67	1
1.5	0.22	0.44	0.67	0.89	1.11	1.5
2	0.17	0.33	0.50	0.67	0.83	2
2.5	0.13	0.27	0.40	0.53	0.67	2.5
3	0.11	0.22	0.33	0.44	0.56	3
3.5	0.10	0.19	0.29	0.38	0.48	3.5

Milrinone 200 micrograms/mL

To make 50 mL syringe:

Dilute 10 mL of milrinone 1 mg/mL with 40 mL of compatible fluid (to a total volume of 50 mL). This makes a 200 micrograms/mL solution.

Rate (mL/hr)	0.2	0.4	0.6	0.8	1	Rate (mL/hr)
Weight (kg)	Approximate micrograms/kg/minute					Weight (kg)
1	0.67	1.33	2.00	2.67	3.33	1
1.5	0.44	0.89	1.33	1.78	2.22	1.5
2	0.33	0.67	1.00	1.33	1.67	2
2.5	0.27	0.53	0.80	1.07	1.33	2.5
3	0.22	0.44	0.67	0.89	1.11	3
3.5	0.19	0.38	0.57	0.76	0.95	3.5
4	0.17	0.33	0.50	0.67	0.83	4

Maximum concentration for infusion is 200 micrograms/mL

Compatible Fluids

Sodium chloride 0.9%, Sodium Chloride 0.45%, Glucose 5%

Adverse Effects

Common

Hypotension, tachycardia, arrhythmias, nausea, somnolence

Infrequent

Mild thrombocytopenia, tremor

Monitoring

- Continuous invasive blood pressure monitoring, heart rate and rhythm
- Cardiac output
- Fluid and electrolyte changes, particularly potassium and magnesium due to increased risk of arrhythmia
- Renal function
- Platelet count

Practice Points

- Ensure adequate vascular volume prior to initiating therapy
- Arterial and central venous access must be available before commencing milrinone
- Consider co-administration of fluid bolus with loading dose of milrinone due to risk of hypotension
- Half-life of milrinone is usually 3 hours, and up to 10 hours in premature infants

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