MONOGRAPH

Milrinone

Scope (Staff):	Medical, Pharmacy, Nursing, Anaesthetic Technicians
Scope (Area):	Paediatric Critical Care (PCC), Theatre

Child Safe Organisation Statement of Commitment

CAHS commits to being a child safe organisation by applying the National Principles for Child Safe Organisations. This is a commitment to a strong culture supported by robust policies and procedures to reduce the likelihood of harm to children and young people.

This document should be read in conjunction with this DISCLAIMER

⚠ HIGH RISK MEDICINE ⚠

QUICKLINKS

Dosage/Dosage Adjustments	Administration	Compatibility	Monitoring

DRUG CLASS

Phosphodiesterase type-3 inhibitor[1]

Milrinone is a High Risk Medicine.

INDICATIONS AND RESTRICTIONS

- Restricted for use in **critical care areas** only.
- Haemodynamic support in patients with acute decompensated heart failure, septic shock or cardiogenic shock not responding to other therapy.[2]
- Prevention and treatment of low cardiac output states (including weaning from cardiopulmonary bypass pump).[1, 3, 4]
- Adjunct therapy for pulmonary hypertension.[1, 3, 5]

CONTRAINDICATIONS

- Hypersensitivity to milrinone, other bipyridines or any component of the formulation[4]
- Severe hypovolaemia[6]
- Severe obstructive aortic or pulmonary valvular disease[1]

PRECAUTIONS

- Supraventricular and ventricular arrhythmias – may occur or be aggrevated with milrinone use. Ensure continuous ECG monitoring[1]
- Atrial fibrillation/flutter – milrinone use can increase ventricular reponse rate. Ensure ventricular rate is controlled prior to initiation[2]
- Electrolyte imbalance – can increase the risk of arrhythmias. Correct electrolyte distrubances, especially hypokalemia and hypomanesemia, prior to use and throughout therapy[2]
- Hypovolaemia – can increase the risk of hypotension. Monitor blood pressure closely. Do not use in severe hypovolaemia.[2, 3]
- Renal impairment – hypotensive effects may be prolonged in patients with kidney dysfunction. Monitor closely and reduce infusion rates accordingly.[2]
- Prolonged use (> 48 hours) – milrinone has not been shown to be safe or effective when used for more than 48 hours.[2]

FORMULATIONS

Listed below are products available at PCH, other formulations may be available, check with pharmacy if required:

- Milrinone 10 mg/ 10 mL ampoule
- Milrinone pre-filled syringes (Baxter®): 6 mg in 30 mL, 50 mg in 50 mL

Imprest location: Formulary One

DOSAGE & DOSAGE ADJUSTMENTS

Neonates in NICU: Refer to Neonatal Medication Protocols

Dosing in Overweight and Obese Children: Use actual body weight up to 120kg[7]

Intravenous / Intraosseous (≥ 4 weeks):

Loading dose (optional):

- 50 micrograms/kg[2]
- Follow loading dose with a continuous intravenous or intraosseous infusion[2]

Continuous infusion:

- 0.25 – 0.75 micrograms/ kg/ minute, titrated to response.[2, 8]
- Safety and efficacy of milrinone infusion for a period of longer than 48 hours has not been established.[2]
- Taper solution slowly when discontinuing treatment[9]

Renal impairment:

- eGFR calculator
- Milrinone clearance is significantly reduced in renal impairment – consider reducing initial dose; titrate according to patient's haemodynamic status and clinical response.[2]

Hepatic impairment:

- No specific dosage adjustment required[2, 3]

ADMINISTRATION

Intravenous:

- Extravasation risk – monitor frequently for signs of extravasation[9]

Intravenous injection (loading dose):

- Administer over 10 – 60 minutes[3, 7, 9]
    - To minimise risk of hypotension, consider giving over 60 minutes[9]
- Dilute dose to a suitable volume with a compatible fluid to allow for administration via an infusion pump or injected undiluted (if volume is sufficient)[9]

Continuous intravenous infusion (maintenance dose):

Patient's Weight	Concentration	Notes
10 kg or less	6 mg in 30 mL (0.2 mg/mL) in Glucose 5%	In a 3 kg patient, 0.25 microg/kg/min = 0.2 mL/hr
Above 10 kg	50 mg in 50 mL (1 mg/mL) NEAT	In a 20 kg patient, 0.25 microg/kg/min = 0.3 mL/hr

- Administration via a central line is preferred[7, 9]
- A peripheral line can be used if necessary. Use a large peripheral vein if possible and infusion concentrations less than 0.2 mg/mL[7, 9]

COMPATIBILITY *(LIST IS NOT EXHAUSTIVE)*

Compatible fluids:

Glucose 5% (preferred), sodium chloride 0.9%, sodium chloride 0.45%, Hartmann's solution[7]

Compatible at Y-site:

Co-administration of milrinone with other medications via Y-site should be avoided as this may alter infusion rate of milrinone[7]

MONITORING

- Continuous cardiac monitoring[3, 9]
- Blood pressure[3]
- Infusion site – monitor for extravasation; acidic solution.[2, 9]
- Urea, electrolytes, creatinine[3]
- Full blood count[1]

ADVERSE EFFECTS

Common: supraventricular and ventricular arrhythmias, angina, hypotension, headache, nausea, tremor, somnolence[1]

Infrequent: Mild thrombocytopenia, hypokalaemia[1, 6]

Rare: torsades de pointes, rash, abnormal liver function, bronchospasm, anaphylaxis[1]

STORAGE

Ampoule – Store below 30°C, do not freeze. Protect from light.[4]

Baxter® pre-filled syringe – Store below 25°C.

INTERACTIONS

This medication may interact with other medications; consult PCH approved references (e.g. Clinical Pharmacology), a clinical pharmacist or PCH Medicines Information Service on extension 63546 for more information.

Please note: The information contained in this guideline is to assist with the preparation and administration of **milrinone**. Any variations to the doses recommended should be clarified with the prescriber prior to administration

Related CAHS internal policies, procedures and guidelines

High Risk Medicines

Intraosseous Access

References

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