Milrinone

Milrinone is a selective inhibitor of peak III phosphodiesterase isoenzyme in cardiac and vascular tissue. It causes slight enhancement of AV node conduction. It is a positive inotrope and vasodilator with little chronotropic activity. Also know to improve LV diastolic relaxation.

Uses

It is licensed for the short term treatment of severe congestive cardiac failure unresponsive to conventional maintenance therapy and for treatment of patients with acute heart failure including those post cardiac surgery.

Contraindications

- Hypersensitivity to milrinone or its excipients.
- Severe hypovolaemaia

Cautions

- In the setting of acute myocardial infarction use may increase oxygen demand and is therefore not recommended
- Care is required in the presence of severe obstructive aortic or pulmonary valvular disease or hypertrophic sub-acute stenosis – may aggravate outflow obstruction
- Hypotension secondary to vasodilatation may occur
- Milrinone enhances AV nodal conduction and therefore may increase the ventricular response in patients in uncontrolled atrial fibrillation or flutter. Consideration should be given to digitalisation or treatment with other agents to prolong AV node conduction time prior to commencing milrinone therapy and to discontinuation of milrinone if arrhythmias occur
- Supraventricular and ventricular arrhythmias have been observed

Monitoring

- Monitoring should include blood pressure, heart rate and rhythm, clinical state, fluid balance, serum electrolytes and renal function.
- There are no clinical trials with infusion use beyond 48 hours.

Administration

Each ampoule contains 10mg of milrinone (1mg/ml) which should be further diluted prior to administration.

Suggested dilution:

Remove 20mls from either a 100ml sodium chloride 0.9% or 100ml glucose 5% infusion bag and add 20mg (20ml) of milrinone injection. Resultant solution contains milrinone 200microgram/ml

Dose

Give as a loading dose of 50 micrograms/kg administered over a period of 10minutes usually followed by a continuous infusion at a dosage titrated between 0.375 microgram/kg/min and 0.75microgram/kg/min according to haemodynamic and clinical response. See table 1 below.

Written by Alison Warren Cardiac Pharmacist 2008.
Updated by Kevin Pickavance Pharmacist 2011
Updated by Sarah Connop, Lead Cardiology Pharmacist December 2021

Table 1: Dosing table

Milrinone infusion dose (micrograms/kg/min)	Infusion rate for milrinone 200micrograms/ml infusion (ml/kg/hour)
0.375	0.11
0.4	0.12
0.5	0.15
0.6	0.18
0.7	0.21
0.75	0.22

Renal impairment

- Renal impairment significantly increases the terminal elimination half-life of milrinone. For patients with clinical evidence of renal impairment reduced doses of milrinone should be used. See table 2 below.

Table 2 : Dosing recommended in renal impairment

Creatine Clearance (ml/min)	Milrinone infusion dose (microgram/kg/minute)	Infusion rate for milrinone 200micrograms/ml infusion (ml/kg/hour)
5	0.2	0.06
10	0.23	0.07
20	0.28	0.08
30	0.33	0.10
40	0.38	0.11
50	0.43	0.13

Example Calculation:

$$\text{Milrinone infusion rate (mL/hour)} = \frac{\text{Dose (micrograms/kg/minute)} \times \text{patient weight(kg)} \times 60\text{(minutes)}}{\text{Concentration (micrograms/mL}}$$

Written by Alison Warren Cardiac Pharmacist 2008.
Updated by Kevin Pickavance Pharmacist 2011
Updated by Sarah Connop, Lead Cardiology Pharmacist December 2021