

PROTOCOL FOR: Milrinone (Primacor): Continuous Infusion

POLICY: This drug is to be administered only in critical care areas where patient is on a cardiac monitor, and must be administered on an infusion pump, using drug guardrails.

INDICATION: Low cardiac output (CO)/cardiac index (CI), cardiogenic shock

DESIRED PATIENT

- OUTCOMES:**
1. In patient with depressed myocardial function, Milrinone produces a prompt ↑ in C.O. ↓ in PCWP and vascular resistance without a significant increase in heart rate or myocardial oxygen consumption. Improvement in LV function in patients with ischemic heart disease has been observed without increasing myocardial ischemia.
 2. Patient will not suffer negative side effects of Milrinone.

**CLINICAL
ASSESSMENT AND**

- CARE:**
- A. Prior to starting the infusion:
1. Validate solution concentration per MD/LIP order:
Standard Concentration: 40 mg/200 ml of D₅W (pre-mixed) = 200 mcg/ml, or 40 mg in NS or 0.45 NS, to be prepared by pharmacy (200 mcg/ml).
 2. Check baseline VS-BP, HR and rhythm and hemodynamic parameters. Also assess LOC, skin color, peripheral perfusion, heart and lung sounds and urinary output.
 3. Refer to dosage in **mcg/kg/minute**. A recent patient weight is necessary. A specific dose should be specified per the MD/LIP order.
 4. Attempts should be made to correct hypovolemia before starting the infusion.
 5. See package insert for dosage adjustment in renally impaired patients. Dosage adjustments for renal insufficiency are necessary because 85% of the drug is excreted unchanged in the urine for 24 hours.
- B. Beginning the infusion:
1. Milrinone may be administered with an intravenous loading dose followed by a continuous IV infusion (maintenance dose).
 2. Loading dose, if ordered, is usually **50 mcg/kg** administered over **10 minutes** (pharmacy to prepare).
 3. **Continuous infusion:** Begin the maintenance infusion at **0.25-0.75 mcg/kg/min** per MD/LIP order. Do not titrate. If a loading dose was given, begin the maintenance infusion within 15-30 minutes of the loading dose. Usual dose range is 0.25 mcg/kg/min - 0.75 mcg/kg/min for treatment of advanced CHF and low output status following cardiac surgery.

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4. The infusion rate should be adjusted only **per MD/LIP orders**, according to hemodynamic changes and clinical response, including BP, HR, heart rhythm, fluid status, and renal function.

C. During the infusion:

1. Monitor / document **HR and BP q 5-10 minutes** during the loading dose and initial infusion.
2. Check & document BP, HR **q 1°** until stable, **then q 2-4°**.
3. Monitor urine output q 1-2 hours.
4. Monitor hemodynamic parameters for desired effects (\uparrow in C.O. \downarrow in PCWP and vascular resistance) per hemodynamic monitoring protocol or MD/LIP order for hemodynamic parameter frequency. (Increased cardiac output (CO), decreased pulmonary artery wedge pressure (PAWP) and vascular resistance often occurs within 5-15 minutes in the majority of patients.)

- D. Discontinuation of the infusion: Begin downward titration per physician/LIP order. Assess VS, HR, BP, hemodynamic parameters and urine output. Monitor **BP, HR q 2° for 8°** after drug discontinued.

**POTENTIAL
COMPLICATIONS/
ADVERSE SIDE**

EFFECTS:

1. Cardiovascular:
 - a. The principal adverse effect is change from baseline rhythm, most commonly \uparrow ventricular ectopic activity. Dysrhythmias include ventricular tachycardia, ventricular fibrillation and supraventricular tachycardia.
 - b. Hypotension and angina/chest pain may occur.
 - c. Milrinone may aggravate outflow tract obstruction thus use with caution IHSS and aortic and pulmonic valve disease.
2. CNS: headaches (usually responds to withdrawal of the drug).

**PATIENT
TEACHING:**

1. Reinforce rationale for therapy.
2. Review potential side effects of therapy.
3. Review the importance that patient report any side effects.

**REPORTABLE
CONDITIONS:**

1. Notify the physician/LIP of any complications or if no response noted to drug.
2. Notify physician of adverse effects.

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APPROVAL: Nursing Standards Committee
Intensive Care Standards Committee
Cardiac Step-Down Unit Standards Committee

EFFECTIVE DATE: 1/95

REVISION DATES: 3/96, 1/00, 8/02, 10/03, 12/05, 3/08, 5/09