Drug Guideline Title: Hydralazine

Summary: Hydralazine is a potent vasodilator predominantly of the arterioles that may be used to manage hypertension in the ICU, and to control hypertension in pregnant women in either the Birthing Unit/Women’s Health or in ICU.

Approved by: ICU Medical Director

Publication (Issue) Date: September 2013

Next Review Date: September 2016

Replaces Existing Drug Guideline: Hydralazine

Previous Review Dates: 2005, 2006

1. Introduction contains:
   The risk addressed by this policy:

   Patient Safety

The Aims / Expected Outcome of this policy:

   Hydralazine will be administered safely and without adverse side effects

Related Standards or Legislation

   NSQHS Standard 1 Governance

Related Policies

   • LH_PD2013_C03.01 Drug Administration
   • LH_PD2010_C03.00 Drug Prescribing
   • LH_PD2008_C03.12 Administration of IV Medication
   • PD2011_064 Maternity Management of hypertensive Disorders of Pregnancy

2. Policy Statement:

   • All care provided within Liverpool Hospital will be in accordance with infection control, manual handling and minimisation and management of aggression guidelines.
   • Medications are to be prescribed and signed by a medical officer/authorised nurse practitioner (NP) unless required during an emergency.
   • All drugs administered during an emergency (under the direction of a medical officer/authorised nurse practitioner) are to be documented during the event, then prescribed and signed following the event.
   • Medications are to be given at the time prescribed (as close to the time as is possible when multiple drugs require ‘same time’ administration and, when the nurse is caring for more than one patient, recognition is given to a possible short delay to
administration – antibiotics and other lifesaving drugs are to be prioritised) and are to be signed by the administering nurse.

- Parenteral medication prescriptions and the drug are to be checked with a second registered or endorsed enrolled nurse prior to administration. The “rights of drug administration” must be followed: right: patient, drug, dose, route, administration, time, reason for the drug, documentation, education and evaluation/outcome.
- Adverse drug reactions are to be documented and reported to a medical officer.
- Medication errors are to be reported using the hospital electronic reporting system: IIMS.
- Guidelines are for adult patients unless otherwise stated.
- The use of hydralazine is limited to those critical care areas and specialist areas that have cardiac and blood pressure monitoring, foetal monitoring (where required) and the staff trained in the use of monitoring devices.

3. Principles / Guidelines

Actions

- Hydralazine exerts its peripheral vasodilating effect through a direct relaxation of smooth muscle tissue in vascular resistance vessels, predominantly in the arterioles.
- In hypertension, the effect results in decreased arterial blood pressure (diastolic more than systolic) with preferential dilatation of the arterioles compared with veins, minimising postural hypotension and increasing cardiac output.
- The sympathetic nervous system compensates for the fall in blood pressure in a reflex action by increasing heart rate, stroke volume and cardiac output. (A β-blocker and diuretic are often given with hydralazine to counteract this reflex response and prevent sodium and water retention, especially in oral doses).
- Hydralazine crosses the placental barrier and into human milk, although the degree of effect is regarded as minimal and certain sources state that breast feeding is safe.
- The plasma half-life generally ranges from 3 to 5 hours. Hydralazine and its metabolites are excreted by the kidney and in patients with renal impairment the half life is prolonged.

Indications

- To treat hypertensive crisis in ICU patients.
- To treat hypertensive crisis and hypertension in pre-eclampsia and eclampsia.
- Supplementary medication in the treatment of hypertension.

Contraindications

- Hypersensitivity to hydralazine.
- Severe tachycardia and heart failure with high cardiac output eg. hyperthyroidism.
- Idiopathic Systemic Lupus Erythematosus (SLE).
- Dissecting aortic aneurysm (relative – may still be administered when need outweighs risk).
- Myocardial insufficiency due to mechanical obstruction eg. aortic stenosis.
- Isolated right ventricular heart failure due to pulmonary hypertension (Cor Pulmonale).
- Teratogenic in some species, avoid during first two trimesters of pregnancy. The drug should only be used in the third trimester after weighing the needs of the mother against risk to the fetus.

Precautions

- Use with caution in patients with coronary artery disease as the myocardial stimulation may cause angina or provoke myocardial ischemia. Should be used in combination with a beta-blocker.
- Patients with renal or hepatic impairment.
- Patients suffering from cerebrovascular disease, since it can increase ischemia.
Significant Interactions
- Concomitant treatment with other vasodilators, calcium antagonists, ACE inhibitors, diuretics, antihypertensives, tricyclic antidepressants and major tranquillisers may potentiate the effects of hydralazine.
- Concurrent administration of hydralazine with beta-blockers may increase their bioavailability.
- Glucose solutions are not compatible, because contact between hydralazine and glucose causes the active substance to be rapidly broken down.

Adverse Effects
- Tachycardia, palpitation, anginal symptoms (chest pain), flushing.
- Dizziness, headache.
- Joint swelling, myalgia, rash.
- GI disturbances, nausea, vomiting, diarrhoea.

Presentation
20 mg ampoule (powder for reconstitution)

Administration Guidelines

Intravenous Bolus For Hypertension
- Reconstitute 20 mg hydralazine (1 ampoule) in 1mL sterile water for injection, then dilute with 0.9% sodium chloride to a total of 20mL (final concentration = 1mg/ml)
  → Administer 5 - 10 mg (5-10mL) IVI slowly over 1-2 minutes.
  → Repeat after 30 minutes if necessary and titrate to target blood pressure.
  → Maximum dose (15mg in pregnant women or 20mg in other patients).

IV infusion for obstetric management of hypertension in pregnancy: aim for a systolic BP between 140-160mmHg and/or diastolic BP between 90-100mmHg.
Administer hydralazine 5mg - 10mg IV bolus, can be repeated every 30mins (to a maximum of 15mg). Commence infusion if hypertension persists.

Syringe driver:
- Take 3 ampoules of 20mg hydralazine (60mg). Reconstitute one ampoule each with 1mL sterile water for injection to make a total of 3mL (60mg) hydralazine.
- Dilute 60mg hydralazine with sterile 0.9% sodium chloride to a total of 60ml (final concentration = 1mg/mL).
- Commence infusion at 5mg/hour (5mL/hr) and titrate in increments of 5mg/hour at 15-minuteley intervals until a systolic pressure of 140-160mmHg and/or diastolic blood pressure of 90-100mmHg is achieved.
- Commence continuous cardiotorcograph (CTG) monitoring if patient is antepartum or intrapartum until BP is stable.

Clinical Considerations
- Continuously monitor blood pressure with arterial pressure monitoring if patient is on a hydralazine infusion.
- If using a bolus dose of hydralazine and there is no arterial line insitu, monitor blood pressure every 5 minutes until stable, then measure every 30minutes to an hourly.
- Monitor heart rate and vital signs.

4. Performance Measures

5. References / Links
1. MIMS Online, CIAP: NSW Health Department, Copyright MIMS Australia Pty Ltd. February 2012. http://www.use.hcn.com.au

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