DRUG GUIDELINE

ISOPRENALINE

SCOPE (Area): FOR USE IN: Intensive Care Unit, Coronary Care Unit, ED, CVS and Theatre
EXCLUSIONS: Paediatrics (seek Paediatrician advice) and General Wards
SCOPE (Staff): Medical, Nursing and Pharmacy

BRAND NAME

Isuprel®.

PHARMACOLOGY AND PHARMACOKINETICS

Isoprenaline is a synthetic sympathomimetic non-selective beta agonist with no alpha effects. Cardiac output is increased by the positive inotropic and chronotropic effects of isoprenaline on the heart (beta1) and by increased venous return. This increase in cardiac output usually maintains or increases systolic blood pressure, whilst vasodilatation (beta2) may lower diastolic blood pressure. Bronchodilation may also occur from the beta2 effects, and isoprenaline may also inhibit antigen-induced histamine release. Isoprenaline is 50% excreted unchanged in the urine, and also metabolised by catechol-o-methyl transferase (COMT) in the liver, lungs and tissues. Isoprenaline has a half-life of around 2.5-5 minutes, an immediate onset of action and a 10-15 minute duration of action.

INDICATIONS

▪ Atrioventricular block (complete heart block).
▪ Bradycardia with haemodynamic compromise.

CONTRAINDICATIONS

▪ Phaeochromocytoma.
▪ Tachyarrhythmias/tachycardia.
▪ Tachycardia or atrioventricular block associated with digoxin toxicity.
▪ Hypersensitivity to isoprenaline or excipients.

PRECAUTIONS:

▪ Recent myocardial infarction - isoprenaline may produce an increase in myocardial workload and oxygen consumption resulting in increased infarct size. In addition, ventricular ectopic activity may increase. Avoid isoprenaline.
▪ Hypovolaemia causing hypotension - correct before using isoprenaline.
▪ Ventricular hyperexcitability (extrasystoles, polymorphic extrasystoles or sustained ventricular tachycardia) – if these occur during administration, reduce the dose of isoprenaline.
▪ Excessive heart rate increase – if isoprenaline increases the heart rate above 110 beats per minute the infusion may need decreasing or temporarily ceasing. Heart rate above 130 beats per minute may induce ventricular arrhythmia.
- **Hyperthyroidism** - increased risk of tachycardia and arrhythmias.
- **Ischaemic heart disease** – isoprenaline may exacerbate angina.
- **Hypertension** - isoprenaline may increase systolic blood pressure, monitor closely and decrease isoprenaline dose if necessary.

---

**PREGNANCY AND BREASTFEEDING**
Seek specialist advice before prescribing, information may update regularly.

---

**DRUG INTERACTIONS**
- **Drugs that increase heart rate or cause arrhythmias** – may have an additive effect with isoprenaline, monitor carefully.
- **Drugs that alter blood pressure** – may have an additive effect with isoprenaline (lowers diastolic blood pressure, steadies or raises systolic blood pressure).
- **Beta blockers** - may reduce the beta effect of isoprenaline.
- **Entacapone** - inhibits the metabolism of isoprenaline resulting in increased heart rate and potential for arrhythmias. Reduce isoprenaline dose and monitor carefully.
- **Theophylline or aminophylline (converts to theophylline in vivo)** – may increase hypokalaemia caused by isoprenaline, monitor potassium carefully. Secondly, isoprenaline may decrease the concentration of theophylline, monitor theophylline concentration and increase dose if necessary.
- **Cocaine** - topical use may potentiate isoprenaline’s actions.
- **Linezolid** - can increase the hypertensive effect of isoprenaline
- **Atomoxetine** – may increase tachycardia hypertensive effects of isoprenaline.

---

**DOSAGE AND ADMINISTRATION**

Requires continuous ECG monitoring.

For administration only
- in Intensive Care Unit, Coronary Care Unit, ED, CVS and Theatre
- by MET or Code Blue

Administer via CVC, midline or large peripheral vein (antecubital or proximal to this). If administering peripherally use a dedicated line (a second peripheral line is required for other infusions/access). Avoid administration on lines where other infusions may be bolused or flushed.

Isoprenaline must be diluted before use.

Note: due to the usual low rate of infusion 100 mL minibags are no longer in this guideline.

**IV injection for emergency situations (via CVC or large peripheral vein):**

**not for use in Coronary Care Unit**
Use 200 microg/1 mL ampoules (if unavailable may use 1 mg/5 mL ampoule) – both are 200 microg/mL.
Isoprenaline 200 microgram (1 mL from ampoule) diluted to 10 mL with sodium chloride 0.9%.
**Total volume:** 10 mL.
**Final concentration:** 20 microgram/mL.
**Dose:** 10-20 microgram (0.5-1 mL of prepared solution).
Repeat every 3-5 minutes as needed.
**Syringe Unit/Pump IV infusion (via CVC or large peripheral vein):**

Use 1 mg/5 mL ampoules (if unavailable may use 200 microg/1 mL ampoule) – both are 200 microg/mL.

Isoprenaline 3 mg (15 mL from THREE 1 mg in 5 mL ampoules OR FIFTEEN 200 microg/mL ampoules) diluted to 50 mL with glucose 5% in a luer lock syringe.

**Total Volume:** 50 mL.

**Final concentration:** 60 microgram/mL.

**Starting rate:** 1-3 microgram/min (1-3 mL/hr).

**Rate increase:** Can increase rate every 3-5 minutes by 0.5-1 microg/min (0.5-1 mL/hr). Use heart rate and cardiac rhythm to titrate dose.

**Coronary Care Unit dose range:** 1-10 microgram/min (1-10 mL/hr).

**Coronary Care Unit maximum rate:** 10 microgram/min (10 mL/hr).

**ICU, ED, Theatre and CVS usual rate range:** 1-20 microgram/min (1-20 mL/hr).

**ICU, ED, Theatre and CVS maximum rate:** 20 microgram/min (20 mL/hr).

---

**General Administration Information**

- **Infusion preparation:**
  
  Mix infusion thoroughly after adding isoprenaline to avoid inadvertently giving a more concentrated dose.

  Discoloured solutions (pink or brown) or solutions containing precipitates should not be used.

  Glucose 5% can be substituted for different compatible IV fluid as requested by the Medical Officer.

  Infusion stable for 24 hours.

- **Infusion pump:** Alaris® syringe unit with Guardrails® or syringe pump in ED.

- **Routes of administration:**
  
  - IV injection: Yes, diluted
  - IV intermittent infusion (15-60 minutes): No
  - IV continuous infusion: Yes
  - IM injection: Yes, but slower onset
  - Subcut injection: Yes, but slower onset

- **Compatible/incompatible IV drugs/fluids:**
  
  Consult the Australian Injectable Drugs Handbook (‘Yellow book’) in your ward area. **Assume all unlisted drugs and IV fluids are incompatible – contact Pharmacy for further advice.**

---

**MONITORING (INCLUDING BLOOD TESTS)**

- **Monitor for excessive heart rate increase – see Precautions.**

- Monitor electrolytes (especially potassium and magnesium) at baseline and at least daily.

- Dose range and clinical goals should be documented by the Medical Officer.

- A diminished therapeutic effect may occur with prolonged isoprenaline infusions due to down-regulation of receptors.
NURSING PRACTICE POINTS

▪ Continuous ECG monitoring – monitor for arrhythmias.
▪ Baseline 12 lead ECG, and then daily.
▪ When patient is unstable or infusion rate requires adjustment, monitor blood pressure, heart rate and rhythm every 2-5 minutes, or continuously via arterial line.
▪ When blood pressure, heart rate and rhythm stable, monitor every 30-60 minutes, or continuously via arterial line.
▪ Monitor fluid balance.
▪ All injections and infusions are to be labelled as per CPP0022 Labelling of Injectable Medicines and Lines.

ADVERSE EFFECTS

▪ Common – palpitations, tachycardia, hypotension, flushing, headache, nervousness, restlessness and fine tremor.
▪ Infrequent – arrhythmias, Stokes-Adams attacks, angina, hypertension, sweating, dizziness, weakness, nausea, dry mouth, insomnia, rash, itch and wheeze.
▪ Rare - skin necrosis.

DRUG PRESENTATIONS AND STORAGE
Isoprenaline 1 mg/5 mL ampoules, 200 microg/1 mL ampoules.
Store below 25°C. Protect ampoules from light.