Isoprenaline

## Applicable areas

## This section will be left blank for each hospital to complete in accordance with local practice. Examples: ICU, ED, OR, Ward 2B

## Mechanism of action/pharmacology

Isoprenaline is a non-selective β-adrenergic agonist.1,2 It has positive inotropic and chronotropic effects, increasing cardiac output by increasing the heart rate and cardiac contractility.1,2 Isoprenaline also decreases diastolic blood pressure by lowering peripheral vascular resistance.1,2

Onset of action: Immediate.3

Duration of action (IV): 10–15 minutes.3

Half-life: 2.5–5 minutes.3

## Indications

Heart block.2

Bradycardia with haemodynamic compromise.2

## Precautions

* Hypersensitivity to isoprenaline or any of the excipients4
* Hypotension due to uncorrected hypovolaemia2,4
* Tachyarrhythmias4
* Recent myocardial infarction – may increase myocardial oxygen demand2,4
* Angina – may exacerbate2
* Heart block due to digoxin toxicity4
* Phaeochromocytoma.2

## Medication presentation

1 mg/5mL ampoule (1:5000)

Also available as 200 microg/1mL ampoule (1:5000); however, due to the number of vials that would be required, this concentration is not usually used to prepare infusions.

## Medication storage

Store ampoules below 25°C. Protect from light.5

Infusion solutions are stable for up to 24 hours.6

## Preparation

|  |  |  |
| --- | --- | --- |
|  | Infusion pump | Syringe driver |
| Prescribe | 6 mg in 100 mL | 3 mg in 50 mL |
| Make up infusion in | 100 mL bag of glucose 5%\* | Glucose 5%\* (to a total of 50 mL in the syringe) |
| Volume to be removed from IV bag | 30 mL | Not applicableDraw up 35 mL in the syringe |
| Drug dose to be added | 6 mg (30 mL) | 3 mg (15 mL) |
| Final volume | 100 mL | 50 mL |
| Final concentration | 60 microg/mL | 60 microg/mL |
| 1mL/hr = | 1 microg/min | 1 microg/min |

\*Glucose 5% is preferred for diluting all inotropes and vasopressors. However, isoprenaline is also compatible with sodium chloride 0.9%.5

## Administration – this guideline is intended for central access only

Administer continuous intravenous infusion through a central access line.

Infusions should be administered via a syringe driver or infusion pump, preferably with medication error reduction software enabled.

Avoid administration in lines where other drugs or fluids may be bolused or flushed.

## Dosing

Starting dose: 0.5 to 2 microg/min.

Titrate in accordance with prescribed parameters – for example, by increments of 0.5 to 1 microg/min.

Usual dose range: 2 to 10 microg/min.3

Maximum dose: rates greater than 30microg/min have been used in advanced stages of shock.4

## Monitoring

* Continuous blood pressure and cardiac monitoring for the duration of the infusion5
* Daily 12-lead ECG
* Monitor fluid balance and electrolytes at least daily, especially magnesium and potassium.

## Side effects

* Tachycardia2
* Hypotension2
* Arrhythmias2
* Angina.2

## Compatibilities

Consult the following references, which are available online through the [Clinicians Health Channel](https://www2.health.vic.gov.au/clinicianshealthchannel):

* Australian injectable drugs handbook
* Trissel’s™ in IV compatibility (Micromedex) – from the site homepage, select the ‘IV Compatibility’ tab.

## Important drug interactions

* Combined use with other medications with **beta-agonist effects (e.g. adrenaline)** may increase the risk of arrhythmias.4
* **β-antagonists** may decrease the efficacy of isoprenaline.2
* **Entacapone** is a catechol-O-methyltransferase (COMT) inhibitor, which may inhibit the metabolism of isoprenaline, increasing the risk of side effects. Dose isoprenaline conservatively.2,7
* **Theophylline** may potentiate hypokalaemia induced by isoprenaline, monitor potassium. Isoprenaline may also decrease theophylline concentration and consequently clinical effect. Monitor theophylline concentration and adjust accordingly.2

## References

1. Micromedex [online] (accessed 20 January 2018)
2. Australian medicines handbook (AMH) [online] (accessed 20 January 2018)
3. Lexicomp [online] (accessed 20 January 2018)
4. MIMS [online] (accessed 20 January 2018)
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6. Injectable medicines guide (Medusa) – Isoprenaline – intravenous, Version 3 [online] (accessed 3 March 2017). Available from: <http://medusa.wales.nhs.uk/IVGuidePrint.asp?Drugno=2413&format=3>

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1. Kane-Gill S, Dasta J (eds). High-risk IV medications in special patient populations. Springer-Verlag London, 2011

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