

ISOPRENALINE: PROTOCOL FOR USE IN HIGH GRADE AV BLOCK
Initial: February 2019 (due review 1ST JAN 2027)

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INDICATIONS FOR USE

- High grade AV nodal block not responding to Atropine (up to 3g)
- Temporary management of high grade AV nodal block prior to emergent temporary pacemaker

PRIOR TO INITIATION OF ISOPRENALINE DISCUSS ALL PATIENTS WITH CARDIOLOGY (CONS/SpR)
CASES OF ISOPRENALINE RESISTANT AV BLOCK WILL LIKELY REQUIRE TEMPORARY CARDIAC PACING

MECHANISM OF ACTION

- Potent β -agonist, not selective for β_1
- Powerful stimulant action on heart; increases cardiac output, excitability and rate; fall in diastolic BP whilst usually maintaining or slightly increasing systolic BP
- Relaxation of bronchial, GI, and uterine smooth muscle, increased heart rate and contractility, vasodilation of peripheral vasculature

RECONSTITUTION

Typical reconstituted concentration:

Add 1mg isoprenaline to 250ml of glucose 5% or sodium chloride 0.9% (4 micrograms/ml)

Stable for 24hours in glucose 5% or sodium chloride 0.9% if below 25°C and protected from light

PHARMACODYNAMICS/KINETICS

Onset of action: immediate

Peak effects: within 15 minutes

Duration of action: dose dependent – small doses ~8minutes, large doses up to 50 minutes

ADMINISTRATION AND USE

Continuous I.V. infusion via pump, it may NOT be given via a DIRECT IV BOLUS

Usual range: 2-10 micrograms/minute (i.e. 30-150ml/hr of 4micrograms/ml)

Titrate infusion to target heart rate (HR) of ~ 60/min, reduce/cease infusion if HR >110/min

Prolonged use may result in decreased effectiveness (tachyphylaxis)

Only to be considered as a temporising or short term measure

SIDE EFFECTS

- Sinus tachycardia, atrial tachycardia, PVCs, VT, VF
- Fatal ventricular arrhythmias when HR >130/min especially in pre-existing IHD

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- CNS effects include dizziness, headache, tremor and weakness

MONITORING

PATIENTS SHOULD BE MANAGED IN A CCU ENVIRONMENT WITH CONTINUOUS ECG

MONITORING

STAFF MUST USE THE ENCLOSED ISOPRENALINE MONITORING CHART

IN ADDITION –

Daily 12 lead ECG (more frequent if chest pain)

Regular (every 6hrs) monitoring of K⁺, Ca²⁺, Mg²⁺, acid base status*

Close monitoring of Urine output (target >30mls/hr)

*Correct to ensure - K⁺>4.0mmol/l, cCa²⁺>2.2mmol/l, Mg²⁺>1.0mmol/l, HCO₃ > 15mmol/l

CONTRAINDICATIONS

Active angina, pre-existing ventricular arrhythmias, digoxin intoxication, known active hyperthyroidism

DISEASE RELATED CONCERNS

Cardiovascular disease: Use with caution in patients with cardiovascular disease (eg, coronary artery disease); may increase myocardial oxygen demand resulting in ischaemia

Vasodilatory shock: Avoid use in patients with distributive shock; will reduce systemic vascular resistance aggravating hemodynamic compromise

DRUG INTERACTIONS

- Beta-blockers - Antagonise the cardiac effects of isoprenaline; avoid concurrent use (N.B. the administration of a beta-blocker with a nitrate can be used to reverse abnormal ECG changes induced by isoprenaline)

- Theophylline - Isoprenaline increases clearance

- Epinephrine or any other adrenergic - Additive effect with increased risk of VF/VT hence administer **at least 4 hours apart**

- Caution on co-therapy with cardiac glycosides, potassium-depleting drugs and other anti-arrhythmic agents due increased risk of ventricular arrhythmias

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Cardiology governance meeting Winter 2023

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ISOPRENALINE MONITORING CHART (FOR USE IN ALL PATIENTS ON ISOPRENALINE)

For use with a concentration of 4micrograms/ml (i.e. 1mg added to 250ml Glucose 5% or NaCl 0.9%)

To find the dose in micrograms/ml and ml/hour use the charts below.

e.g. for a desired dose of 2micrograms/minute, set the flow rate at 30ml/hr.

Flow rate ml/hr	15	20	25	30	35	40	45	50	55	60	65	70	75	80
Dose micrograms/ min	1.0	1.3	1.7	2.0	2.3	2.7	3.0	3.3	3.7	4.0	4.3	4.7	5.0	5.3

Flow rate ml/hr	85	90	100	120	140	150	160	180	200	220	240	260	280	
Dose microgram/ min	5.7	6.0	6.7	8.0	9.3	10.0	10.7	12.0	13.3	14.7	16.0	17.3	18.7	

Patient Name/DOB/HCN:			Monitoring : Continuous ECG, HR and BP U&E, Ca ²⁺ , Mg ²⁺ every 6 hours Target Response and Safety Considerations: HR 60bpm If HR is > 110bpm, reduce dose or cease infusion HR > 130bpm is associated with high risk of arrhythmias				
Today's Date: _____							
Time (24hr clock)	Flow Rate (ml/hr)	Dose (micrograms /min)	HR	BP	ECG – PVC	ECG – VT	Serum K⁺

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Patient Name/DOB/HCN:			Monitoring : Continuous ECG, HR and BP U&E, Ca ²⁺ , Mg ²⁺ every 6hours Target Response and Safety Considerations: HR 60bpm If HR is > 110bpm, reduce dose or cease infusion HR > 130bpm is associated with high risk of arrhythmias				
Today's Date: _____							
Time (24hr clock)	Flow Rate (ml/hr)	Dose (micrograms /min)	HR	BP	ECG – PVC	ECG – VT	Serum K ⁺

PATIENT TRANSFER

Uses:

Isoprenaline is a sympathomimetic that acts almost exclusively on beta-adrenergic receptors. It has a powerful stimulating action on the heart and increases cardiac output, excitability and rate. It is used to maintain the heart rate temporarily in patients with heart block until a pacemaker can be fitted.

Isoprenaline should only be administered in an appropriate high care environment, or on transfer to an appropriate high care environment in emergency situations.

All emergency transfers should be via a monitored ambulance with registered nurse ***and*** doctor accompanying the patient (in case of need for transcutaneous pacing).

Continuous cardiac monitoring is mandatory for all patients on isoprenaline and staff must record on the isoprenaline monitoring chart.

All patients should have continuous monitoring of ECG, heart rate and blood pressure.

Target response and safety considerations:

Heart rate 60bpm.

If heart rate >110bpm, reduce dose.

If heart rate >130bpm, reduce dose or cease infusion as heart rate >130bpm is associated with high risk of arrhythmias.