DOCUMENT CONTROL PAGE

Title

Title: **Isoprenaline Hydrochloride Infusion protocol Adults**
Version: MFT- 1.2
Reference Number: MMC-G203

Supersedes

Historically:

	ORC	WTWA		
Unit	CICU	CTCCU	AICU	CCU
Title	Isoprenaline Sulphate	CTCCU: Isoprenaline Sulphate	AICU Wyth CPO	Isoprenaline Sulphate
Version	Version 1.0	Version May 2018	Version 1.0 Sept 2019	Version 2.0

Version 1.0

- Isoprenaline injection strength changed from 100micrograms in 2ml to 2mg in 2ml.High Strength stickers to be used during the changeover period.
- Isoprenaline Sulphate changed to Isoprenaline Hydrochloride. *Difference in salt equivalence is noted: Isoprenaline Sulphate 1.125mg= Isoprenaline Hydrochloride 1mg. However, isoprenaline is titrated to effect.*
- Change in concentration of isoprenaline standard dilution across all sites.
- Removal of sodium chloride as a diluent.
- Change in rate
- Clarity on minimum level of monitoring.

Version 1.1.

Cautions and monitoring streamlined. Removal of cardiogenic shock.

Version 1.2

- Change to 1mg/5ml licensed product
- Addition of fridge storage
- Guideline now applicable to all sites including NMGH

Minor Amend

Notified To MMC- Chairs action Date 8th April 2021

Author

		ORC		WTWA	
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	Unit Lead	---	---	CTCCU nursing team	
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NMGH: consultation with Beth Joynes (critical care pharmacist)

Original Document: Dr. Gwilym Morris, Consultant Cardiologist and Electrophysiologist Brian Wood, Lead Pharmacist for Cardiac Services

Ratification

Ratified by: Adult Medicines Management Committee- chairs action
Date of Ratification:

Application

All Staff required to prescribe, administer or check isoprenaline infusion

Circulation

Issue Date:
Circulated by: Author
Dissemination and Implementation: Pharmacy staff and all appropriate medical/nursing staff

Review	Review Date: Responsibility of: Cardiology Specialist Pharmacist
Date placed on the Intranet:	Please enter your EqIA Registration Number here: Low impact: 91/16

Isoprenaline HYDROCHLORIDE Infusion Protocol (Adults)

Formulation

Isoprenaline Hydrochloride 1mg in 5ml (concentrate for dilution)

*****Ampoules must be stored in the fridge*****

Approval

Restricted use. For specialist use/areas only.

Mode of Action

Isoprenaline is a sympathomimetic that acts almost exclusively on beta-adrenergic receptors.
Direct effects:

- Increased cardiac output, excitability and heart rate;
- Peripheral vasodilatation, reduced diastolic blood pressure and maintains or slightly increased systolic blood pressure;
- Bronchodilatation.

Indications

- Haemodynamically significant bradycardias resistant to atropine, glycopyrronium or dobutamine.
- Temporary use in 3rd degree AV block (complete heart block) until pacemaker insertion.
- Stoke Adams disease (until pacemaker fitted)

Contraindications

- Tachyarrhythmias, tachycardia or heart block caused by digitalis intoxication, ventricular arrhythmias that require inotropic therapy, angina.
- Isoprenaline hypersensitivity.
- Due to the risk of arrhythmias, isoprenaline should not be used with other potent $beta_1$ agonists such as adrenaline

Cautions

- Use extreme caution when administering the drug in the following situations: -
- Seizure disorders;
- Coronary insufficiency;
- Diabetes mellitus;
- Hyperresponsiveness to sympathomimetic amines;
- Hypertension;
- Hyperthyroidism.

Administration dosage & instructions

There are two regimes depending on route of administration available. Central is the preferred route of access. Peripheral options have also been included for emergency scenarios only. An infusion pump should be used. Adjust rate of infusion on the basis of heart rate, CVP, systemic BP and urine output.

Central Access (preferred access & should be used in fluid restriction)

- Dilute **2mg** to **50ml** with **glucose 5%.**
  [Glucose 5% preferred as isoprenaline hydrochloride is acidic and has shown significant decomposition at pH>6]
- Mix infusion thoroughly before administration.
- This gives a final concentration of **40 micrograms/ml.**
- Discard solution if it becomes pinkish or darker than slightly yellow or contains a precipitate.
- Start infusion rate at **1micrograms/minute (or 1.5ml/hour).** *Higher start rates have been used with close monitoring.*
- Adjust rate in steps of 1micrograms/min at intervals of 2 to 3 minutes until satisfactory heart rate is achieved (or when adverse effects such as hypotension or ventricular arrhythmias occur).
- **Usual maximum rate 10micrograms/min (although higher rates have been used in practice)**

	1.5	**3**	**4.5**	**6**	**7.5**	**9**	**10.5**	**12**	**13.5**	**15**

Peripheral Access.

- Dilute **2mg** in **500ml glucose 5%** (preferred diluent).
  [Glucose 5% preferred as isoprenaline hydrochloride is acidic and has shown significant decomposition at pH>6]
- This gives a final concentration of **4 micrograms/ml.**
- Mix infusion thoroughly before administration.
- Discard solution if it becomes pinkish or darker than slightly yellow or contains a precipitate.
- Start infusion rate at **1micrograms/minute (or 15 ml/hour).** *Higher start rates have been used with close monitoring.*
- Adjust rate in steps of 1micrograms/min at intervals of 2-3minutes until satisfactory heart rate is achieved (or when adverse effects such as hypotension or ventricular arrhythmias occur).
- **Usual maximum rate 10micrograms/min (although higher rates have been used in practice- See Medusa for further info)**

	15	**30**	**45**	**60**	**75**	**90**	**105**	**120**	**135**	**150**

Compatibility

See Medusa guideline for full details.

- ***Compatible (when diluted in glucose 5%):*** adrenaline, dobutamine, dopamine, dopexamine, morphine, midazolam, noradrenaline, remifentanil and fentanyl (undiluted 50mcg/ml).
- ***Incompatible:*** Aminophylline, furosemide, sodium chloride 0.9% should not be used as a diluent. Avoid alkaline products due to differences in pH

Adverse effects

Tachycardia, cardiac arrhythmias, palpitations, hypotension, tremor, headache, sweating and facial flushing. Extravasation. Prolonged use of isoprenaline has been associated with swelling of the parotid glands.

Monitoring

Minimum level of monitoring is ECG. During *peripheral* administration monitor for extravasation due to low pH.

References

2016 References:

- AHFS Drug Information: isoprenaline. Accessed via medicinescomplete.com on 21/3/16
- http://www.uclhguide.com/fragr_image/media/Arrhythmias
- Isuprel data sheet, 2010. http://www.medsafe.govt.nz/profs/datasheet/i/Isuprelinj.pdf
- Martindale: The Complete Drug Reference: Isoprenaline. Accessed via medicinescomplete.com on 21/3/16
- Medusa.wales.nhs.uk
- Minimum infusion volumes for fluid restricted critically ill patients, fourth edition, Dec 2012. United Kingdom Clinical Pharmacy (UKCPA) Critical Care Group www.ukcpa.org
- Procedures for Administering Injectable Drugs, issue 8, Dec 2012. Plymouth Hospitals NHS Trust.

2021 References

- ORC and WTWA guidelines- see list superseded.
- Torbay Pharmaceuticals 2mg in 2ml Notice.
- Medusa.wales.nhs.uk- Isoprenaline Hydrochloride Monograph version 1. Published 21/06/2017. Accessed 31/03/2021
- Minimum infusion volumes for fluid restricted critically ill patients, fourth edition, Dec 2012. United Kingdom Clinical Pharmacy (UKCPA) Critical Care Group www.ukcpa.org Version 4.4. accessed 31/03/2021
- Martindale- Isoprenaline Monograph 9th March 2021. Accessed 31/03/2021
- AHFS – Isoproterenol Hydrochloride Monograph. Accessed 12/04/2021

2022 References

- Isoprenaline Macure 0.2mg/ml concentrate for solution for infusion SPC. https://www.medicines.org.uk/emc/product/12511/smpc Accessed 13/12/2022