DOPAMINE INFUSION

FOR USE IN SUSSEX CARDIAC CENTRE (RSCH BRIGHTON)

Dopamine stimulates adrenergic receptors of the sympathetic nervous system via direct action on $beta_1$ receptors, release of noradrenaline and action on specific dopaminergic receptors leading to vasodilation and increased cardiac contractility. Dopamine has little or no effect on $beta_2$ receptors.

Pharmacokinetics

- Following IV administration onset of action within 5 minutes.
- Half-life of around 2 minutes - steady state dosing within 10 minutes.
- Dopamine is metabolised by liver, kidneys and plasma enzymes.

Uses

Used for severe heart failure and cardiogenic shock.

Dosing

Most commonly used to increase renal perfusion by dilating the renal vasculature to increase glomerular filtration rate with natureisis and diuresis (action predominately on dopaminergic receptors). This is known as 'renal dose dopamine'

'**Renal dose' dopamine = 2.5 micrograms/kg/minute**

Higher doses (rarely used)

Inotropic dose = 5-10 micrograms/kg/minute - increases cardiac output and renal blood flow (via action on $beta_1$ receptors).

Higher dose = 10-20 micrograms/kg/minute - causes vasoconstriction and is likely to reduce renal perfusion (via action on alpha receptors).

Adverse effects and warnings

- Should not be used in presence of uncorrected tachyarrhythmia or VF. May cause ectopic beats, tachyarrhythmias, anginal pain, palpitations, hypotension or hypertension and bradycardia. During administration blood pressure heart rate, ECG and urine output should be monitored closely.

- Hypovolaemia should be corrected where necessary prior to administration.

- Caution in patients with peripheral vascular disease - gangrene has been reported in cases where vasoconstriction has occurred

- **Extravasation of dopamine** causes local vasoconstriction leading to severe tissue hypoxia and ischemia; sloughing and necrosis may occur. Refer to the Medusa Injectable Medicines Guide on the intranet for advice on management

- Interactions occur with monoamine oxidase inhibitors (MAO), linezolid, phenytoin, cyclopropane and halogenated hydrocarbon anaesthetics. Patients treated with MAO inhibitors prior to dopamine administration should be given a reduced dosage ($1/10^{th}$ of usual dose).

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- May cause nausea and vomiting, headache, dyspnoea.

Administration

- Administer by continuous IV infusion after dilution using an infusion pump with ECG, BP and heart rate monitoring.

- **Central line administration advised** to avoid venous irritation (extravasation may cause necrosis and sloughing of the tissue).
  Dilute 200mg to final concentration of 50ml with sodium chloride 0.9% or glucose 5%.

- If giving via a peripheral line use a large vein and a **more dilute infusion** – e.g. 800mg in 500mls.

DOSING TABLE FOR DOPAMINE 200mg/50ml

→ FOR A DOSE OF 2.5 mcg/kg/minute

→ INFUSION RATE IN ML/HOUR (to nearest 0.1ml)

Patient weight (kg)										
50	55	60	65	70	75	80	85	90	95	100
1.9 ml/hr	2.1 ml/hr	2.3 ml/hr	2.4 ml/hr	2.6 ml/hr	2.8 ml/hr	3.0 ml/hr	3.2 ml/hr	3.4 ml/hr	3.6 ml/hr	3.8 ml/hr

Dose calculation

$$\text{Mg required/ hour} = \frac{\text{number of micrograms/kg/minute x weight (kg) x 60(minutes)}}{1000}$$

$$\text{Infusion rate} = \frac{\text{mg required/hour x total volume of solution prepared}}{\text{number of mg in prepared solution}}$$

Example

Infusion rate of 200mg/50ml solution to 80kg patient at 2.5 micrograms/kg/minute

$$\text{Mg/hour} = \frac{\text{2.5 micrograms/kg/minute x 80 kg x 60 minutes}}{1000} = 12\text{mg/hour}$$

$$\text{Infusion rate} = \frac{\text{12 mg/hour x 50 ml}}{200\text{mg}} = 3.0\text{ml/hour}$$

Always refer to the Trust Injectable Medicines Guide for most up to date information

https://nww.bsuh.nhs.uk/clinical/teams-and-departments/pharmacy/injectable-medicines-guide/

References

For full prescribing details see www.medicines.org.uk : Dopamine
Martindale and Stockley's interactions via medicines complete accessed 6th October 2020

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