Esmolol Intravenous for Adults

Who can administer

Administration RESTRICTED - see Appendix 1

Important information

- As the product is labelled in **mg** and doses are expressed in **microgram/kg/minute** particular care is required when calculating doses. Anecdotal evidence suggests that errors have occurred in the past.
- For Y-site compatibility see below

Available preparations

Brevibloc 100mg per 10ml vial

Brevibloc 2500mg per 250ml infusion (10mg/ml)

Reconstitution

Already in solution

Infusion fluids

Not required

100mg/10ml vial ready for use

2500mg in 250ml infusion bag ready for use

Methods of intravenous administration

Bolus intravenous injection (loading doses)

- Administer over 1 minute

Continuous intravenous infusion (administer using an electronically controlled infusion device)

- 2500mg in 250ml (replace bag every 24 hours), adjust dose every 4 minutes according to response - see under 'dose' opposite

Dose in adults

Supraventricular tachycardia	
Loading (using 100mg/10ml vial)	**Maintenance (using 2500mg/250ml infusion bag)**
An ADDITIONAL LOADING DOSE is given BEFORE EACH INCREASE in maintenance dose- eg give 500microgram/kg pre-dose increase to 100microgram/kg/minute - but see titration below	
500microgram/kg over 1 minute (repeat every 4 minutes as maintenance dose is increased if response is inadequate)	50microgram/kg/minute, increasing if necessary after 4 minutes to
	100microgram/kg/minute, increasing if necessary after 4 minutes to
	150microgram/kg/minute, increasing if necessary after 4 minutes to
	200microgram/kg/minute, and maintain

- **Normal range**: 50 to 200microgram/kg/minute
- **Exceptionally**: doses up to 300microgram/kg/minute have been used
- **Titration:** as the heart-rate approaches the target, **omit** the loading dose and **reduce** the incremental dose in the maintenance infusion from 50 micrograms/kg/minute to 25 micrograms/kg/minute or lower. If necessary, the interval between the titration steps may be increased from 5 to 10 minutes

Intra-operative/post-operative tachycardia or hypertension	
Peri-operative tachycardia or hypertension	**Method**
Intraoperative treatment - immediate control required	Give 80mg over 15 to 30 seconds, and start the continuous infusion at 150microgram/kg/minute. Titrate the infusion rate as required up to 300 micrograms/kg/minute
Upon awakening from anaesthesia	Give 500microgram/kg/minute for 4 minutes, followed by 300microgram/kg/minute infusion
For post-operative situations when time for titration is available	Loading dose of 500microgram/kg over 1 minute, and start the continuous infusion at 50microgram/kg/minute (adjusting upwards by 50microgram/kg/minute every 4 minutes, and stopping at desired therapeutic effect) The loading dose (500micrograms/kg over 1 minute) can be given before each titration step. Maximum dose rate=300microgram/kg/minute.

Example dosage table for 70kg patient					
Bag concentration	**Loading dose (microgram/kg)**	**Maintenance infusion rates (microgram/KG/MINUTE)**			
2500mg/250ml	500	50	100	150	200
for 70kg patient	35mg/**70kg** (3.5ml)	210mg/hr/**70kg** (21ml/hr)	420mg/hr/**70kg** (42ml/hr)	630mg/hr/**70kg** (63ml/hr)	840mg/hr/**70kg** (84ml/hr)

- Use for longer than 24 hours has not been thoroughly evaluated. Infusion durations longer than 24 hours should only be used with caution
- Caution should is advised if discontinuing esmolol infusions abruptly in patients with coronary artery disease
- In the event of an adverse drug reaction, the dose may be reduced or discontinued. Pharmacological adverse reactions should resolve within 30 minutes
- **Discontinuation of esmolol:** Once a decision has been made to change to an alternative agent, observe the following. Within the first hour after the first dose of the alternative agent, reduce the esmolol infusion rate by 50%. Following the second dose of the alternative agent, monitor the patient's response and if satisfactory control is maintained for the first hour, discontinue the esmolol infusion.
- It is advisable to stop the infusion gradually due to the risk of rebound tachycardia and rebound hypertension

Renal impairment

- The **acid** metabolite is primarily excreted unchanged by the kidney. Excretion of the metabolite is significantly decreased in end-stage renal disease, (with the elimination half-life increased to about **ten-fold** that of normal, and plasma levels considerably elevated). However the **acid** metabolite has very weak beta-blocking activity, and so the clinical significance of any accumulation is likely to be negligible.
- The Renal Drug Database recommends dosing as in normal renal function. i.e. no dose reduction

required (ref 1)

Monitoring

- Monitor blood pressure, heart rate, ECG, respiratory rate and IV site

Storage

Store below 25^{0}C

References

SPC 100mg/10ml March 2019

SPC 2,500mg/250ml March 2019

1. Renal Drug Database - accessed online 28/09/2021

Therapeutic classification

Betablocker