

PROTOCOL FOR: Esmolol Hydrochloride: IV Administration

POLICY: This drug is to be administered in critical care areas only, where the patient is on a cardiac monitor, and must be administered on an infusion pump, using drug guardrails.

INDICATION: Tachycardia (PSVT, Rapid atrial fibrillation/flutter), to achieve a specified reduction of heart rate, or a decrease in HR of 15-20%.

DESIRED PATIENT

- OUTCOMES:**
1. Patient will have decreased heart rate and control of dysrhythmias.
 2. Heart rate control will be achieved without significantly associated hypotension. Usual blood pressure target is a SBP 100-120 or MAP>60.
 3. Patient will not suffer negative side effects of esmolol.

**CLINICAL
ASSESSMENT AND**

- CARE:**
1. Prior to Starting Infusion:
 - a. Validate solution concentration per MD/LIP order;
Standard concentration: **2500 mg/250 ml NS** (10 mg/ml) - premixed.
(Use 25 mg/5 ml for IV bolus dose only.)
 - b. Perform baseline assessment:
 - 1) V/S (BP, apical HR, respiratory rate)
 - 2) Baseline rhythm strip or ECG per MD
 - 3) Lung sounds
 - 4) LOC/anxiety level
 - c. DO NOT BEGIN the infusion if HR is < 50 and/or systolic blood pressure is < 90. Notify MD/LIP.
 - d. Refer to infusion dose in **mcg/kg/min**.
 - e. A central line is preferred for med administration, however a peripheral line may be used in case of emergency until a central line can be obtained.
 - f. An arterial line or noninvasive cuff may be used for BP monitoring.
 2. Beginning/Titrating the Infusion:
 - a. Begin the infusion per MD/LIP order. Usual **loading dose** is **500 mcg/kg** IVP over 1 minute, followed by a **50 mcg/kg/min** infusion for 4 minutes.
 - b. If sufficient control of heart rate is not achieved within 5 minutes (Goal = heart rate reduction of 15%-20%), repeat loading dose (500 mcg/kg over 1 minute), then increase infusion to 100 mcg/kg/min for 4 minutes.

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c. If still insufficient response after steps a and b:

Repeat loading dose (500 mcg/kg over 1 min), then increase infusion rate by 50 mcg/kg/min, to infuse at 150 mcg/kg/min. Infusion may be increased by another 50 mcg/kg/min to 200 mcg/kg/min until adequate response - ↓ HR or ↓ BP. Infusion is not to exceed 200 mcg/kg/min for 48 hrs. (Although doses up to 300 mcg/kg/min have been used, doses over 200 mcg/kg/min are not recommended, and is infused only per a specific MD/LIP order.)

d. If sufficient response is obtained, continue maintenance infusion as required. If desired heart rate is not maintained, increase dosage by resuming titration procedure.

e. The nurse should stay at patient's bedside for initial loading and infusion, as risk of hypotension is greatest within the first 30 minutes of the infusion. Assess and document **vital signs: BP, heart rate and rhythm every 5 minutes for the first 30 minutes** of the infusion and during active titration, until stable.

3. Care During Infusion:

a. Once the drip is at a maintenance rate, reassess heart rate/rhythm and blood pressure every hour.

b. Periodically reassess lung sounds (especially related to potential side effect of CHF or bronchospasm) and LOC.

4. Complications:

a. Use assessment intervals to validate presence/absence of complications, and initiate the appropriate interventions:

1) Hypotension (systolic < 90; > 30mm drop in systolic)

a) Place patient flat; avoid Trendelenburg.

b) Decrease infusion rate to last level.

c) Stay with patient and continue decreasing rate until BP stabilizes.

d) If hypotension is severe, stop infusion and notify physician/LIP.

2) Bradycardia

a) If HR drops but remains > 50 without symptoms, continue to observe.

b) If sudden drop in HR occurs or rate < 50 creates hypotension, dizziness, or AV dissociation, place patient flat, administer 0.5 mg atropine IV, and notify physician/LIP. (Titrate esmolol off slowly, following MD/LIP orders.)

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5. Transition to alternate therapy / discontinuation:

- a. Esmolol drip should be continued for no more than 48 hours.
- b. After stabilized rate and patient condition is obtained, patient should be transitioned to an alternate dysrhythmic therapy.
- c. To transfer patient to alternate therapy, the Esmolol infusion may be decreased by 50%, 30 minutes after administration of the first dose of the alternative drug. If an adequate response is achieved and maintained for at least 1 hour after administration of the alternate drug, the esmolol infusion can be discontinued.

PATIENT

TEACHING: Review potential side effects associated with esmolol such as dizziness from either hypotension or bradycardia, respiratory symptoms, and nausea/vomiting.

APPROVAL: ICU Standards Committee
ED Standards Committee
CSDU Standards Committee
Nursing Standards Committee

EFFECTIVE DATE: 4/90

REVISION DATES: 1/92, 1/93, 1/95, 10/95, 3/96, 10/99, 8/02, 10/03, 10/05, 3/08, 5/09

REVIEWED DATES: 2/06, 9/08, 10/09