

PROTOCOL FOR: Neuromuscular Blocking Agents (NMBA): IV Administration

POLICY: NMBA will only be administered in a critical care setting while the patient is on a cardiac monitor and is intubated and on mechanical ventilation.

DESIRED

- PATIENT OUTCOMES:**
1. Patient will maintain adequate neuromuscular block as evidenced by achievement of a desired train of four response, assessed utilizing a peripheral nerve stimulator, and other desired clinical parameters (ie. minimal muscle movement, limited # spontaneous breaths above the ventilator, stable VS and hemodynamics).
 2. Patient's safety will be maintained.

**CLINICAL
 ASSESSMENT
 AND CARE:**

1. Monitor underlying neuromuscular function using the peripheral nerve stimulator per procedural guidelines. Refer to the Procedure for Peripheral Nerve Stimulator/ Train of Four Monitoring.
2. Assessments using the PNS will be completed prior to initiation of NMBA , when possible, to determine a baseline level of stimulation, 10-15 minutes after a bolus dose is given and drip is initiated, every 1-2 hours until a satisfactory level of blockade is achieved, and every 4 hours during the continuous infusion.
3. Verify with with MD the goal of therapy and desired train of four response.
4. Recommended Dosages and Timing of NMBA:

NMBA	loading dose (mg/kg)	Onset of action (min)	Clinical duration (min)	Recovery time (min)	Intermittent dose	Maintenance Infusion Dose	Comments
INTERMEDIATE DURATION							
Atracurium (Tracium ®)	0.4-0.5	2-5	25-35	40-60	0.08-0.1 mg/kg every 20 to 45 minutes	4-12 mcg/kg/min	Alternative if hepatic and/or renal failure
Cisatracurium (Nimbex ®)	0.1-0.2	3-5	45-60	60-90	0.03 mg/kg every 40 to 60 minutes	2.5-3 mcg/kg/min	Preferred if hepatic and/or renal failure
Rocuronium (Zemuron ®)	0.6-1	1-2	30	20-30	0.1-0.2 mg/kg every 15 to 30 minutes	10-12 mcg/kg/min	
Vecuronium (Norcuron ®)	0.08-0.1	2.5-3	35-45	45-60	0.01-0.015 mg/kg every 25 to 40 minutes	0.8-1.2 mcg/kg/min	
LONG DURATION							

PROTOCOL FOR: Neuromuscular Blocking Agents (NMBA): IV Administration

Pancuronium (Pavulon®)	0.06-0.1	2-4	90-100	120-180	0.04 – 0.1 mg/kg every 1 to 3 hours	1-2 mcg/kg/min	Preferred agent by bolus or infusion, unless tachycardia is contraindicated (e.g. CV disease); action is prolonged in renal & hepatic dysfunction
------------------------	----------	-----	--------	---------	-------------------------------------	----------------	---

Adapted from *Neuromuscular Blockade Task Force. Clinical practice guidelines for sustained neuromuscular blockade in the adult critically ill patient.* Crit Care Med 2002;30(1):142-56 and product prescribing information.

5. Assess every 2 hours and prn for hemodynamic changes indicative of pain in response to turning, suctioning, wound care, etc.
6. Administer sedatives and analgesics per MD order. The preferred route of administration is via continuous infusion rather than intermittent bolus. This will prevent fluctuation of med effect and hemodynamics. Benzodiazepines are recommended for their amnesia effect.
7. Re-orient the patient frequently to date, time, place, etc. and inform them of all procedures being done. Be aware that even though the patient cannot respond, they may still be aware of their surroundings and be able to understand conversations at the bedside.
8. Monitor ventilator alarms closely for disconnection as the patient will have no spontaneous ventilation.
9. Assess skin condition with turning and nursing care procedures for signs of breakdown.
10. Include passive ROM exercises every 4 hours. Turn side to side every 2 hours or as indicated.
11. Consider compression stockings to help prevent thromboembolism.
12. Consider obtaining an MD order for ophthalmic ointment or artificial tears to maintain eye moisture and prevent corneal abrasions.
13. Report to M.D.:
 - a. Any unacceptable level of blockade (evidenced by an undesirable train of four response and/or other clinical criteria).
 - b. Hemodynamic changes with painful nursing interventions which may signal the need for increased analgesia.

PROTOCOL FOR: Neuromuscular Blocking Agents (NMBA): IV Administration

c. Sustained tachycardia (a potential side-effect of pancuronium).

14. Upon discontinuation of NMBA, monitor for return of spontaneous breathing and movement (movement will return from smallest groups to largest).

PATIENT/FAMILY

- TEACHING:
1. Reinforce the rationale for continuous NMBA.
 2. Reassure the patient and family that the drug effects are temporary and the paralysis will wear off.

APPROVAL: ICU Standards Committee
Nursing Standards Committee

EFFECTIVE DATE: 6/93

REVISION DATES: 1/95, 3/96, 5/97, 6/97, 5/00, 10/03, 9/05

REVIEW DATE: 2/06