

Newborn Critical Care Center (NCCC) Clinical Guidelines

Neuromuscular Blockade in the Neonate

INTRODUCTION

Vecuronium and rocuronium are the primary paralytic agents used in the NCCC. The primary effect is to block the action of acetylcholine resulting in striated skeletal muscle paralysis with a secondary effect of decreasing intracranial pressure. They have a role in improving the success of intubation. Neuromuscular blockade may also play a role in decreasing complications associated with asynchronous breathing among ventilated infants. There have been limited studies on the use of neuromuscular blockades in neonates and thus routine use is not recommended.

Indications:

- Enhance intubation success
- Assist in neonate-ventilator asynchrony
- Severe PPHN
- Post-operative paralysis

NEUROMUSCULAR BLOCKADE AGENTS

Vecuronium

- Derivative of pancuronium
- Elimination half-life of 65 to 75 minutes, return of neuromuscular function in 27 to 80 minutes
- Metabolized in the liver and renally excreted
- Vecuronium is commonly used due to low incidence of cardiac side effects

Side effects:

- Premature infants with renal failure might experience prolonged effects of vecuronium^{3,6}
- Bradycardia & hypotension - *higher incidence with concurrent narcotic use*

Dosing:

Please see Neofax for up to date dosing recommendations.

COMMONLY PRESCRIBED DOSE:

Intermittent – Vecuronium 0.1 mg/kg/dose IV

Continuous infusion – Vecuronium 0.1 mg/kg/hr IV

Rocuronium

In the NCCC, rocuronium is used in combination with fentanyl and atropine for non-emergent intubations. Please see [Premedication for Nonemergent Neonatal Intubations](#) for details and dosing instructions.

* *Rocuronium may be given IM if necessary*

Pancuronium (less commonly used agent in the NCCC)

- Elimination half-life of 89 to 161 minutes; return of neuromuscular function in 35 to 75 minutes
- Partially hydroxylated in the liver and renally excreted
- Product contains 1% benzyl alcohol – therefore do not exceed the recommended dose

Side effects:

- Infants with renal failure may experience prolonged effects of Pancuronium
- Moderate increase in heart rate
- Hemodynamic effects - *hypertension or hypotension*
- Prolonged weakness/paralysis up to 1 week after receiving extended course
- Joint contractures (*common in hips/knees*)
- Sensorineural hearing loss

Dosing:

Please see Neofax for up to date dosing recommendations.

COMMONLY PRESCRIBED DOSE:

Intermittent – Pancuronium 0.1 mg/kg/dose IV

Continuous infusion – Pancuronium 0.05-0.1 mg/kg/hr IV

SPECIAL CONSIDERATIONS FOR NEUROMUSCULAR BLOCKADE

- Paralytics are not an analgesic – ensure pain control is adequately achieved using supplemental narcotics
- Prescribe routine eye lubrication
- Use with caution in infants with family history of neuromuscular disorders (ie: myasthenia gravis, Eaton-Lambert syndrome)
- Neuromuscular blockade agents are associated with prolonged hospital course post tracheostomy (discuss use with ENT on a case by case basis)¹

References:

1. Bauer, E., Mahida, J.B. Boomer, L.A., Lutmer, J.E., Minneci, P.C., Deans, K.J. & Elmaraghy, C.A (2016). [“Outcomes following neuromuscular blockade in patients receiving tracheostomies.”](#) *International Journal of Pediatric Otorhinolaryngology*, 84, 101-105.
2. Honsel, M., Giugni, C. & Brierley, J. (2014). [“Limited professional guidance and literature are available to guide the safe use of neuromuscular block in infants.”](#) *Acta Paediatrica*, 103, 370-373.
3. Johnson, P.N., Miller, J., & Gormley, A.K. (2011). [“Continuous-infusion neuromuscular blocking agents in critically ill neonates and children.”](#) *Pharmacotherapy*, 31(6), 609-620.
4. Nemergut, M.E., Yaster, M., & Colby, C.E. (2013). [“Sedation and analgesia to facilitate mechanical ventilation.”](#) *Clinical Perinatology*, 40, 539-558.
5. Sahni, M., Richardson, C.J., Jain, S.K (2015). [“Sustained neuromuscular blockade after vecuronium use in a premature infant.”](#) *American Journal of Perinatology*, 5, 121-123.