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. Their mechanism of action is blockade of acetylcholine signaling. This results in striated skeletal muscle paralysis with a secondary effect of decreasing intracranial pressure. In neonates, neuromuscular blockade may facilitate mechanical ventilation by reducing pulmonary resistance and decreasing asynchrony with the ventilator. In addition, recent data indicate that muscle relaxation increases the success of intubation attempts.[1]

Indications:

- Enhance intubation success [1]
- Assist in neonate-ventilator asynchrony [2]
- Severe PPHN
- Post-operative paralysis

NEUROMUSCULAR BLOCKADE AGENTS

Vecuronium

- Derivative of pancuronium (not used in NCCC)
- 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[3,4]
- Bradycardia & hypotension - *higher incidence with concurrent narcotic use*

Dosing: *Please see Neofax for up to date dosing recommendations*

Intermittent – Vecuronium 0.1 mg/kg/dose IV

Continuous infusion – Vecuronium 0.05 - 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
- Elimination half life of 20 minutes to 2 hours
- Excreted by the liver

Side Effects:

- May cause prolonged QT interval when used in conjunction with anesthesia in pediatric patients
- Associated with pulmonary vascular resistance; use cautiously in infants with pulmonary hypertension

Dosing: *Please see Neofax for up to date dosing recommendations.*

Intermittent dosing 0.45 to 0.6 mg/kg

Continuous 7 to 10 mcg/kg/min

SPECIAL CONSIDERATIONS FOR NEUROMUSCULAR BLOCKADE

- Paralytics are not an analgesic. Ensure pain control and sedation are achieved prior to and during paralysis.
- Analgesia/sedation should be assessed frequently and will likely need to be increased for infants requiring prolonged periods of paralysis.
- Prescribe routine eye lubrication while neuromuscular blockade is in use.
- Use with caution in infants with family history of neuromuscular disorders such as myasthenia gravis and Eaton-Lambert syndrome.

References:

1. Ozawa Y, Ades A, Foglia EE, et al. (2019). “Premedication with neuromuscular blockade and sedation during neonatal intubation is associated with fewer adverse events.” *Journal of Perinatology*, 39(6):848-856. doi:10.1038/s41372-019-0367-0
2. Nemergut, M.E., Yaster, M., & Colby, C.E. (2013). “Sedation and analgesia to facilitate mechanical ventilation.” *Clinical Perinatology, 40*, 539-558.
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. 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.

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