Women and Infants' Health Services
Emory Regional Perinatal Center
Angel II Neonatal Transport

Neonatal Transport Initiated Therapeutic Hypothermia for Neonatal Hypoxic Ischemic Encephalopathy (HIE)

Guidelines for referring physicians

Rationale: Moderate therapeutic hypothermia (TH), or "cooling", is standard of care for neonates with a diagnosis of moderate or severe Hypoxic Ischemic Encephalopathy (HIE) with a beneficial effect on both mortality and neurodevelopmental outcomes. However, TH has significant time constraints, with efficacy requiring patients to begin treatment by 6 hours of life.[1,2] Several studies have shown faster time to target temperature and better temperature control with a specific, servo regulated, active cooling device in transport.[3,4] There is also a potential for improved outcomes if TH can be started sooner.[5]

We will now be beginning standard of care cooling in appropriate patients with the Tecotherm Neo which was specifically designed for therapeutic hypothermia in neonates.

Eligible patients include:

1. >/= 36 and 0/7 weeks gestational age, less than 6 hours after birth
2. Acute perinatal event
3. Need for resuscitation at delivery and ongoing need for resuscitation at 10 minutes (Apgar < 5, need for PPV or Intubation, CPR)
4. Acidosis on cord gas or patient blood gas at <1 hour of life (pH <7.0 or base deficit >16 mEq/L)
5. Exam findings consistent with moderate or severe encephalopathy such as lethargy, decreased or no spontaneous activity, hypotonia, flaccid posture, abnormal suck or Moro, and seizures

**Patients with milder acidosis but a perinatal event, need for resuscitation and abnormal neurologic exam are also candidates for TH. This also applies to patients who do not have a cord gas or blood gas at <1hour of life available.

Recommendations

Neurologic Exam: The neurologic exam may change rapidly over the first several hours in response to changing clinical factors, sedation, and neurologic status. Documented timing and a detailed neurologic exam will help decide suitability for TH.

Sedation: Routine sedation should be avoided as this muddies the neurologic exam. If sedation or analgesia is necessary clinically, please describe the neurologic exam findings prior to administration.

Prophylactic phenobarbital: Prophylactic phenobarbital is not currently recommended for HIE in the absence of seizures.

Seizures: Seizures can be treated with phenobarbital or benzodiazepines. Please describe seizure (time/activity) in the medical record.

Passive cooling/pre-cooling: It is best practice to avoid hyperthermia, which is associated with poor outcomes. Passive cooling or pre-cooling in the absence of a servo-regulated device can lead to excessive hypothermia and subsequent side effects. We recommend setting the bed temperature at 35-35.5C to avoid hyperthermia.

IV access: Hypothermia causes peripheral vasoconstriction, making IV access more difficult. Placement of a UVC and UAC are requested, if this is not successful/appropriate then place 2 PIVs if possible.

1. Jacobs SE, Berg M, Hunt R, Tarnow-Mordi WO, Inder TE, Davis PG. Cooling for newborns with hypoxic ischaemic encephalopathy. *The Cochrane database of systematic reviews.* 2013(1):CD003311.
2. Laptook AR, Shankaran S, Tyson JE, et al. Effect of Therapeutic Hypothermia Initiated After 6 Hours of Age on Death or Disability Among Newborns With Hypoxic-Ischemic Encephalopathy: A Randomized Clinical Trial. *Jama.* 2017;318(16):1550-1560.
3. Akula VP, Joe P, Thusu K, et al. A randomized clinical trial of therapeutic hypothermia mode during transport for neonatal encephalopathy. *The Journal of pediatrics.* 2015;166(4):856-861 e851-852.
4. Szakmar E, Kovacs K, Meder U, et al. Feasibility and Safety of Controlled Active Hypothermia Treatment During Transport in Neonates With Hypoxic-Ischemic Encephalopathy. *Pediatric critical care medicine : a journal of the Society of Critical Care Medicine and the World Federation of Pediatric Intensive and Critical Care Societies.* 2017;18(12):1159-1165.
5. Thoresen M, Tooley J, Liu X, et al. Time is brain: starting therapeutic hypothermia within three hours after birth improves motor outcome in asphyxiated newborns. *Neonatology.* 2013;104(3):228-233.