THERAPEUTIC HYPOTHERMIA

Indications and Criteria

Therapeutic hypothermia, or total body cooling, may be an option for newborns who experience moderate to severe hypoxic-ischemic encephalopathy (HIE) related to antepartum and/or intrapartum insult. Potential acute perinatal events may include:

- Variable/late fetal HR decelerations
- Prolapsed/ruptured or tight nuchal cord
- Uterine rupture
- Maternal hemorrhage/placental abruption
- Maternal trauma or CPR
- Any event that contributes to hypoxia prior to, at, or following birth

Therapeutic hypothermia may be indicated in newborns that are ⩾35 weeks gestation, are ⩾1800 grams, and do not have any contraindications, including known cardiac disease or major congenital malformations.

Please see the decision tree below for potential therapeutic hypothermia candidate criteria. Contact a neonatologist at The Children's Hospital at OU Medical Center immediately if HIE is suspected.

CLINICAL INFORMATION	CRITERIA	DECISION TREE
1. Gestation	≥35 weeks gestation	If YES, go to 2. Weight
2. Weight	≥1800 grams	If YES, go to 3. Blood gas
3. Blood gas	Cord gas or ABG≤1 hour of life with a: pH≤ 7.0 - or - Base deficit ≥-16	If YES, **CRITERIA MET**
	No cord/blood gas obtained/available - or - pH (7.0 to 7.35) - or - Base deficit (0 to -15.9)	May be eligible, continue to 4. Acute perinatal event
4. Acute perinatal event	Known perinatal event	If YES, go to 5. APGAR score
	No known perinatal event, information missing or home birth	May be eligible, continue to 5. APGAR score
5. APGAR score	APGAR≤5 at 10 minutes	If YES, **CRITERIA MET**
	APGAR≥6 at 10 minutes	If YES, to go 6. Resuscitation
6. Resuscitation	Continued need for PPV or intubated at 10 minutes of life, required chest compressions or epinephine	If YES, **CRITERIA MET**
	Did not require PPV / intubation at 10 minutes of life	May not be eligible. Assess newborn, determine if physical signs/symptoms of HIE present, contact The Children's Hospital

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EXAM: If criteria is inconclusive, borderline, or unavailable, infant may still qualify for therapeutic hypothermia based on clinical exam. Infants with seizure activity ⩽ 6 hours of birth should always be evaluated for therapeutic hypothermia. Newborns with moderate to severe encephalopathy present with seizures or at least 3 of the following: altered level of consciousness (as shown by lethargy, stupor or coma), decreased or absent activity, abnormal neuromuscular control (abnormal posture, hypotonia or flaccid), diminished or absent primitive reflexes, and abnormalities of the autonomic system (including apnea, periodic or abnormalities of breathing, variable heart rate or bradycardia, and abnormal oculomotor or pupillary reflexes). If a newborn displays any clinical signs or symptoms of HIE, contact The Children's Hospital immediately to assess for possible therapeutic hypothermia candidacy.

Therapeutic hypothermia is time-critical and the cooling process must begin within <u>6 hours</u> of birth.
The sooner treatment is started, the better the outcome.

If you suspect that a newborn may be eligible for this therapy, or have any questions about potential candidacy, please contact us immediately to speak with a neonatologist by calling: **1-800-522-0212** -or- **405-271-7700**
Select neonatal transports (option one on the menu).
Upon confirmation of eligibility, we will send our specialized neonatal transport team, Neoflight, to your facility to transport the newborn to The Children's Hospital in Oklahoma City. Treatment will be started as early as possible within the six-hour time-frame from birth. Please see: "While Awaiting Transport" below for instructions on management and initiation of passive cooling.

Remember: Never place ice or cooling packs on the newborn to cool.

While Awaiting Transport: DON'T PANIC - STAY COOL!

TEMPERATURE

If advised to initiate "Passive Cooling":

- ✓ Turn off radiant warmer. **Do NOT place ice or cooling packs on the newborn.**
- ✓ Monitor rectal temperature every 15 minutes
- ✓ Goal temperature: 34.4 °C - 35°C (93.92°F - 95°F) rectal
  - If temperature ≤ 34°C (93.2°F), turn radiant warmer on "servo mode" with set temp 0.5 °C higher than infant's current temperature. Continue to monitor temperature every 15 minutes.
- ✓ **NEVER RAPIDLY COOL OR REWARM INFANT**
- ✓ Consult receiving facility for additional temperature/cooling management support.

FLUID MANAGEMENT

- ✓ Nothing by mouth (NPO).
- ✓ Obtain IV access. Initiate D10W at a rate of 60 mL/kg/day.
  - RATE mL/hr = (weight in kg x 60) ÷ 24
- ✓ Obtain early blood glucose level.
  - Goal Blood glucose: ≥ 50 mg/dL
  - If glucose ≤ 50 mg/dL administer D10W bolus 2 mL/kg. Recheck blood glucose ~20 minutes later.
- ✓ Avoid fluid boluses and fluid volume overload, as they may worsen cerebral edema.
- ✓ If newborn experiences persistent hypoglycemia despite D10W bolus x2 , hypotension, or significant base deficit, consult receiving facility for additional management support. Newborn may require increase in dextrose concentration, a fluid bolus, or initiation of inotropic medications.

CARDIOVASCULAR

- ✓ Continuous HR monitoring. Monitor blood pressure every 15 minutes. Assess for cardiac instability.
  - Target HR: 110 – 160 bpm
  - Target BP: MAP 35 - 50 mm Hg
- ✓ Consult receiving facility for additional cardiovascular management support.

RESPIRATORY

- ✓ Continue supportive respiratory therapy.
- ✓ Continuously monitor respiratory status and pulse oximetry.
- ✓ Obtain blood gas, preferably arterial.
  - PaCO2 Goal: 40-55 mm Hg
  - PaO2 Goal: 50 – 100 mm Hg (gradually wean FiO2 for PaO2 ≥ 100 mm Hg, maintain pulse oximetry ≥ 95%)
  - Avoid hyperventilation and hyperoxia. Consult receiving facility for additional respiratory management support.

INFECTION

- ✓ If maternal risk factors for neonatal infection present (including, but not limited to, +GBS status or GBS unknown with inadequate treatment, chorioamnionitis, maternal fever, etc.) draw a blood culture, CBC, and CRP and initiate antibiotics.
  - Ampicillin: 100 mg/kg/dose
  - Cefotaxime: 50 mg/kg/dose

SEIZURES

- ✓ If seizures present, administer loading dose of phenobarbital: 20 mg/kg IV x1
- ✓ If unsure or if seizures persist following loading dose of phenobarbital x1, consult receiving facility for additional management support.

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