Guideline: Identification and Initial Management of Infants with Hypoxic-Ischemic Encephalopathy Who Qualify for Therapeutic Hypothermia

1. Background: An infant with hypoxic-ischemic encephalopathy (HIE) must be quickly triaged as to whether they are a candidate for therapeutic hypothermia, as starting this therapy is time-sensitive. This guideline closely follows the level three NICU to which we refer infants who qualify for therapeutic hypothermia evaluation.

2. Purpose: To provide a structure for identifying infants who qualify for therapeutic hypothermia, and to provide recommendations for care prior to transportation to the level three NICU.

3. Scope: ANMC Family Birthing Services and NICU

4. Inclusion Criteria:
    a. Gestational age ≥ 35 weeks
    b. Birth weight ≥ 1800 g
    c. Less than 6 hours since birth (or time of insult) at the start of cooling

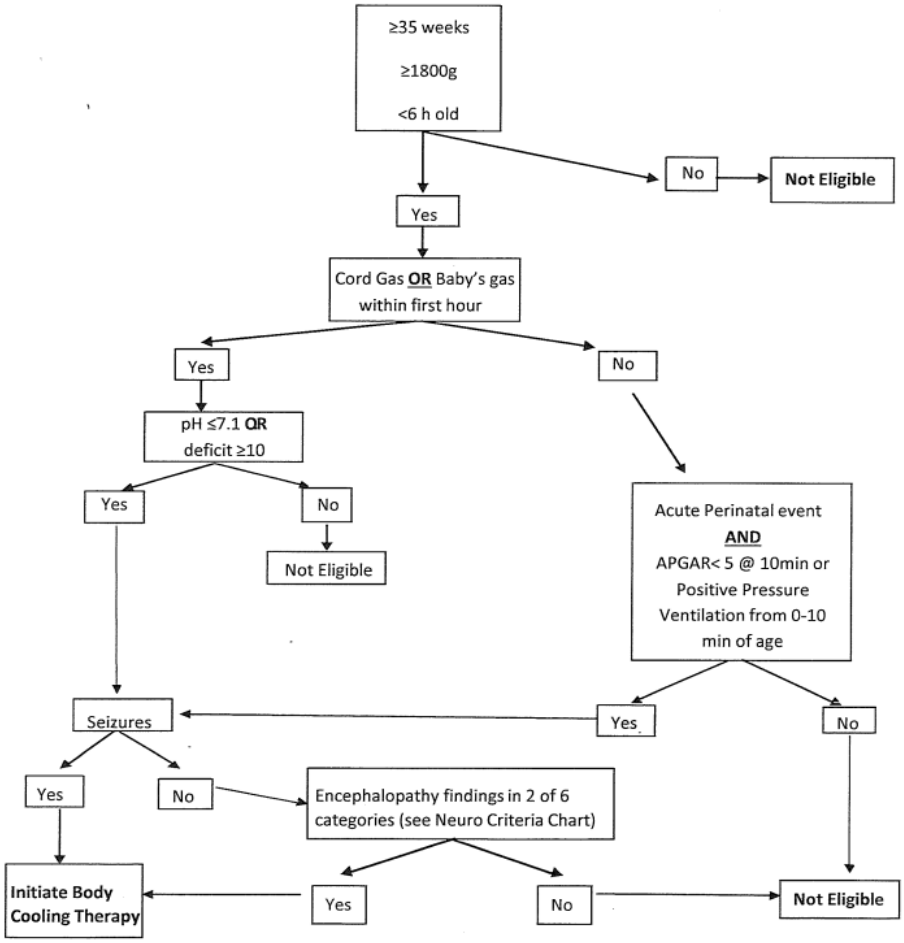
5. Infants must meet <u>both</u> physiologic and neurologic criteria:
    a. Physiologic criteria
        i. Cord gas or <u>any</u> blood gas from infant within the first hour of life: pH ≤ 7.1 or base deficit of ≥ 10, then proceed to neurologic criteria
        ii. No blood gas with an acute perinatal event (placental abruption, cord prolapse, severe fetal heart rate abnormality such as variable or late decelerations, uterine rupture, maternal hemodynamic instability, etc.) <u>plus either 1 or 2 below</u>, then proceed to neurologic criteria
            1. A 10-minute Apgar less than 5
            2. A continued need for positive pressure ventilation initiated at birth and continued for at least 10 minutes
    b. Neurologic criteria
        i. The presence of seizures is an automatic inclusion
        ii. Physical exam findings consistent with moderate or severe encephalopathy in 2 of the 6 categories that persist beyond 45 minutes of life

Neurological Exam Finding	Moderate Encephalopathy	Severe Encephalopathy
Level of consciousness	Lethargic	Stupor or coma
Spontaneous movement	Decreased activity	No activity
Posture	Distal flexion	Decerebrate
Tone	Hypotonia (focal, general)	Flaccid
Primitive reflexes • Suck • Moro	 • Weak • Incomplete	 • Absent • Absent
Autonomic system • Pupils • Heart rate • Respiration	 • Constricted • Bradycardia • Periodic breathing	 • Dilated, nonreactive • Variable • Apnea

Resource: Hypoxic Ischemic Encephalopathy Scoring Exam and Videos – Stanford

http://med.stanford.edu/wusthoff-lab/encephalopathy.html

6. PAMC NICU Body Cooling Algorithm



7. Transport/pre-admission guide for infants with suspected HIE
    a. Identify eligible infant with accepting neonatologist
    b. Ensure a PRC referral is placed for the infant's transfer
    c. Eligible infant should not be actively cooled prior to arrival of neonatal transport team
    d. Initiate passive cooling
        i. Turn off all external heat sources
        ii. Monitor core temperature (rectal most common in referral centers)
            1. Continuous is preferred – insert lubricated probe 6 cm and tape to thigh
            2. Intermittent temperatures with rectal thermometer inserted 2 cm every 15 minutes
            3. Target temperature is 33.5 degrees Celsius or 92.5 degrees Fahrenheit
    e. If temperature falls below 33.5 degrees Celsius, restart heat sources at lowest settings, avoid over cooling
    f. Secure vascular access (umbilical catheters if possible, peripheral IVs at minimum) and support with D10W at 60 mL/kg/day
    g. Send blood culture and start antibiotics (ampicillin/gentamicin) if indicated
    h. Levetiracetam for clinical seizures: Load with 20 mg/kg IV, repeat once as needed for seizure
    i. May use phenobarbital if levetiracetam not available: Load with 20 mg mg/kg IV, repeat once as needed for seizures
    j. Monitor electrolytes and maintain within normal ranges (calcium, potassium, magnesium, glucose)
    k. Avoid over-ventilation and over-oxygenation
        i. Target pCO_2 (corrected for temperature) is 45 to 55 mmHg
        ii. Target oxygen saturation is 92 to 98% with PaO_2 < 100 mmHg
    l. Tolerate heart rates < 100 in cooled infants as long as blood pressure and oxygen levels remain normal, some infants experience heart rates as low as 70 to 80 when cooled

Reference: As this guideline is meant to closely align with the level three referral hospital in Alaska, information is pulled directly from the 2023 PAMC NICU guideline to allow for seamless care and transfer of the critically ill infant.

Approved:

MCH CCBG 1/17/24