NNEPQIN
NORTHERN NEW ENGLAND
PERINATAL QUALITY IMPROVEMENT NETWORK

This guideline is intended only as a general educational resource for hospitals and clinicians, and is not intended to reflect or establish a standard of care or to replace individual clinician judgment and medical decision making for specific patient situations.

Screening and Identification of Candidates for Neonatal Therapeutic Hypothermia

March 2017

Therapeutic hypothermia, when implemented within 6 hours of birth, has been shown to significantly improve survival and neurodevelopmental outcomes in neonates with moderate to severe hypoxic ischemic encephalopathy (HIE). (Jacobs et al 2013).

Early identification of the risk factors for perinatally-acquired asphyxia and recognition of the signs and symptoms of neonatal encephalopathy are challenging. Accurate neurologic assessments and timely consultations with a regional center should occur so that appropriate decisions can be made about initiating cooling and transferring care.

Initial signs and symptoms of neonatal encephalopathy or seizures may be subtle or subclinical. Many providers at delivery hospitals may not be accustomed to conducting detailed neurologic assessments of encephalopathic newborns. Therefore, the use of a standardized screening and assessment tool followed by early consultation with a neonatologist at a regional center can greatly facilitate this critical decision-making process. If therapeutic hypothermia therapy is determined to be indicated, prompt referrals can expedite safe transport. The sooner a baby with HIE is identified, the sooner the appropriate therapies can be initiated and outcomes optimized.

The overall goal of this toolkit is to improve early screening at all delivery hospitals so that thoughtful evaluations occur for each baby with significant risk factors for HIE. It is important to recognize that these are screening criteria only, meant to improve early identification of at-risk babies. The criteria are intentionally designed to be more inclusive and are NOT by themselves qualifying criteria for cooling therapy. It is essential that these guidelines be coupled with ongoing staff education and training. We hope the strategies outlined in this toolkit will help ensure no baby who might qualify for cooling therapy would miss the opportunity to benefit from it.

References:

Jacobs SE, Berg M, Hunt R, Tarnow-Mordi WO, Inder TE, Davis PG. Cooling for newborns with hypoxic ischaemic encephalopathy. *Cochrane Database Syst Rev* 2013;1:CD003311.

California Perinatal Quality Care Collaborative. Early Screening and Identification of Candidates for Neonatal Therapeutic Hypothermia Toolkit; Released February 2015.
https://www.cpqcc.org/qi-tool-kits/early-screening-and-identification-candidates-neonatal-therapeutic-hypothermia-toolkit

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Hypothermia Initiation Criteria Checklist

	ELIGIBILITY CRITERIA			MUST MEET ALL Criteria
1	Gestational Age ≥ 35 weeks	◯ Yes	◯ No	◯ IF YES → Criteria met
2	Birth Weight ≥ 1800 grams	◯ Yes	◯ No	◯ IF YES → Criteria met
3	Severe congenital anomaly	◯ Yes	◯ No	◯ IF NO → Criteria met
4	Able to cool by 6 hours of age	◯ Yes	◯ No	◯ IF YES → Criteria met
5	Evidence of fetal or neonatal distress:			◯ IF ANY 2 below Yes → Criteria met
	Perinatal Event[1]	◯ Yes	◯ No	
	pH ≤ 7.0 OR Base deficit ≥ 16mEq/L[2]	◯ Yes	◯ No	
	10 minute APGAR ≤ 5	◯ Yes	◯ No	
	Assisted ventilation at birth ≥ 10 minutes	◯ Yes	◯ No	
6	Evidence of encephalopathy:			◯ IF ANY 1 below Yes → Criteria met
	Seizures (clinical, aEEG, or EEG)	◯ Yes	◯ No	
	Neuro Exam positive[3]	◯ Yes	◯ No	

1. Perinatal event: an event suggestive of asphyxia such as any of the following: significant placental abruption, umbilical cord prolapse / rupture, severe FHR abnormality (fetal heart rate tracing category II or III: examples include but are not limited to recurrent variable decelerations, prolonged decelerations, recurrent late decelerations), uterine rupture, or maternal trauma/hemorrhage/arrest, Biophysical profile < 6/10 within 6 hours of birth, maternal cardiovascular collapse.
2. Cord gas (venous or arterial) OR postnatal blood gas (venous, arterial, or capillary) < 1 hour after birth.
3. As performed using a standardized structured assessment by a physician, neonatal nurse practitioner, physician assistant or nurse examiner. See document “Structured Neurologic Exam Guideline”.

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Structured Neurologic Exam for Initiation Neonatal Therapeutic Hypothermia

March 2017

GESTATIONAL AGE: _____ **APGAR AT 10 MINUTES:** _____

BIRTH WEIGHT: _____ **CORD BLOOD GAS:** _____

BIRTH Date: _____ **Time**: _____

EXAM Date: _____ **Time**:_____

		ENCEPHALOPATHY CATEGORY		
Exam Category	**NONE**	**MILD**	**MODERATE**	**SEVERE**
1 Consciousness	◯ Normal	◯ Hyperalert	◯ Lethargic	◯ Stupor/coma
2 Activity	◯ Normal	◯ Normal	◯ Decreased	◯ No activity
3 Posture	◯ Normal	◯ Mild distal flexion	◯ Distal flexion	◯ Decerebrate
4 Muscle Tone	◯ Normal	◯ Normal	◯ Hypotonic	◯ Flaccid
5 Primitive Reflexes				
Suck	◯ Normal	◯ Weak	◯ Uncoordinated	◯ Absent
Moro	◯ Normal	◯ Exaggerated	◯ Incomplete	◯ Absent
6 Autonomic System				
Pupils	◯ Normal	◯ Dilated	◯ Constricted	◯ Unequal OR fixed
Heart rate	◯ Normal	◯ Tachycardia	◯ Bradycardic	◯ Variable
Respirations	◯ Normal	◯ Normal	◯ Periodic breathing	◯ Apnea

CONSCIOUSNESS

- Hyperalert – Full wakefulness with eyes open or staring but decreased frequency of blinking.
- Lethargic – Slightly delayed but complete response to stimuli with slightly increased threshold for eliciting responses.
- Stupor – No spontaneous eye opening and tactile stimulation does not elicit sustained eye opening.
- Coma – No eye opening with vigorous tactile stimulation.

ACTIVITY

- Decreased – less frequent or dampened spontaneous facial or extremity movements.
- Absent – no spontaneous movement of face or extremities.

POSTURE

- Mild distal flexion- Slight flexion of fingers and toes, near full, but not complete extension of fingers when stroked on the back of the hand (dorsal surface).
- Distal flexion- Strong flexion of fingers and toes; little extension of fingers when stroked on the back of the hand (dorsal surface); thumbs flexed and opposed across the palms.
- Decerebrate- Head, neck and back are arched in extension with elbows extended, wrists pronated (palm facing downward) and hips abducted (away from midline).

MUSCLE TONE

- Hypotonia – Decreased resistance to passive movement, associated with greater extension of the extremities than normal.
- Flaccid – No resistance to passive movement; frog leg posturing with arms, hips and legs lying in abduction.

PRIMITIVE REFLEXES – SUCK

- Weak - Some sucking noted by pacifier can easily be pulled from the mouth.
- Uncoordinated – Poorly organized suck, chomping.
- Absent- No sucking or rooting elicited.

PRIMITIVE REFLEXES- MORO

- Exaggerated- Full abduction and extension of the arms sustained or with slow or no return to midline when a Moro reflex is elicited.
- Incomplete- No full abduction or extension of the arms when a Moro reflex is elicited.
- Absent- No reflexive activity when a Moro is elicited.

AUTONOMIC SYSTEM – PUPILS

- Dilated – Larger than normal size sustained even in bright light.
- Constricted – Smaller or pinprick size sustained even in dim light.
- Unequal OR Fixed- Asymmetric pupils OR fixed in position with no change in the presence of light.

AUTONOMIC SYSTEM – HEART RATE

- Tachycardia- Resting heart rate generally greater than 160 with occasional lows to the 120 range.
- Bradycardia- Resting heart rate generally 80-90 (if baby not passively cooled) with occasional highs to the 120 range.

AUTONOMIC SYSTEM – RESPIRATORY PATTERN

- Periodic Breathing- 3 or more pauses of 3 or more seconds separated by normal breathing for less than 20 seconds. Shallow.
- Apnea- absent respiratory effort for 20 seconds or more or if shorter than 20 seconds associated with heart rate change or oxygen desaturation.