Pre-transport Therapeutic Hypothermia Guideline

Purpose
To ensure neonates, 35 weeks gestation or greater, with perinatal asphyxia receive appropriate therapeutic hypothermia to reduce mortality and improve neurodevelopmental outcomes.

To monitor patients for potential adverse effects related to therapeutic hypothermia and hypoxic ischemic encephalopathy (HIE).

To provide clear guidelines for the initiation of therapeutic hypothermia while awaiting transfer to a Level III Neonatal Intensive Care Unit.

Principles
Late preterm and term infants (greater than or equal to 35 weeks gestation) admitted to the Neonatal Intensive Care Unit with perinatal asphyxia, who meet the criteria for therapeutic hypothermia and when cooling can be implemented within the first six hours of life, will be cooled to achieve a rectal temperature of 33-34°C.

Patient Eligibility (Refer to eligibility sheets below)
The infant must satisfy criteria for A and B within 6(six) hours of birth
Infants greater than or equal to 35 weeks gestation admitted to the Neonatal Nursery will be assessed sequentially using 2(two) criteria.

Criteria A – Any ONE of the following:
- Apgar score ≤ 5 at 10 minutes
- Continued need for resuscitation at 10 minutes of age (this includes PPV)
- Cord (arterial or venous) or any arterial pH within 60 minutes of birth <7.00
- Base deficit ≥ 16 mmol/L in a cord, venous, or arterial gas sample within 60 minutes of birth

IF infant meets criteria A then assess neurological status (Criteria B).

Criteria B – Moderate to severe encephalopathy (Sarnat 2 or 3) with at least one of the following:
- Altered state of consciousness with lethargy, stupor or coma
- Hypotonia/Hypertonia
- Abnormal reflexes including oculomotor or papillary abnormalities
- Absent or weak suck
- Clinical seizures

An aEEG may be done to provide further clinical information but is not required to determine eligibility for therapeutic hypothermia.

Before Initiation of Therapeutic Hypothermia a Neurological Assessment is to be completed by a Neonatologist/Designate. (Refer to neurological assessment below)
**Patient Exclusion**
- Infants expected to be greater than 6 hours of age before therapeutic hypothermia can be initiated
- Major congenital abnormalities with known poor prognosis
- Evidence of head trauma or intracranial hemorrhage
- Infants “in extremis”, babies whom the Neonatologist recommends withdrawal of support
- Infants less than 35 weeks gestation and less than 1800 grams

**Consent**
Therapeutic hypothermia using cool blankets is a standard of care and within the guidelines for eligibility in this policy, written consent is not required. Regardless, parents should be informed by the Neonatologist/Designate about the advantages and potential side effects of induced hypothermia, and an information sheet is to be given to the parents. Discussion with the parents should be documented in the progress notes of the chart. An order for therapeutic hypothermia must be written in the patient care orders by the Neonatologist/Designate.

**Adverse Events**
Therapeutic hypothermia and HIE may be associated with adverse events. Adverse events must be documented.

**Adverse Events**
- Electrocardiographic evidence of cardiac arrhythmias, or myocardial ischemia. Hypotension lasting more than 30 minutes
- Coagulopathy (clinical bleeding with abnormal clotting studies)
- Abnormal renal function (urine output <0.5 ml/kg/hour for >24 hours after birth or elevated serum creatinine > 40μmol/L * levels may be higher in the first 24 hours of life)
- Hyponatremia (<130 mmol/L)
- Hypokalemia (<3.5 mmol/L)
- Bone Marrow depression (platelet count <100,000**9/L)
- Elevated liver enzyme levels (AST > 200 IU or ALT > 100 IU)
- Metabolic acidosis after initiating cooling (arterial pH, blood gases)
- Respiratory distress requiring ventilatory support (mechanical ventilation or CPAP) or need for ECMO or inhaled nitric oxide
- Systemic infection (blood, CSF or urine cultures)
- Hemoconcentration (increase of hematocrit by 20% or more) not associated with transfusions
- Hypoglycemia (<2.6 mmol/L)
- Hypocalcemia (<2 mmol/L) adjusted for albumin levels, or < 1.0 mmol/L on ionized calcium measurement
- Evidence of skin breakdown due to pressure of cooling blanket and shearing injury
- Difficulties in temperature control, e.g. rectal temperatures < 32°C or >35°C
- Shivering

**Serious Adverse Events**
- Major cardiac arrhythmia – e.g. ventricular tachycardia, ventricular fibrillation or acquired conduction block
- Major venous thrombosis not related to an infusion line
- Severe hypotension despite full inotrope support and volume correction
Hypothermia Treatment

To maximize the benefits of hypothermia, it should be started as soon as possible after birth. If the infant needs to be transferred to another facility to receive the total therapy they will be cooled with the use of refrigerated gel packs to a temperature of 34.5°C. The infant’s rectal temperature will then be maintained at 33.5°C +/-0.5°C by manipulation of the environment while waiting for transfer to a center that can provide controlled therapeutic hypothermia.

Temperature Monitoring
Temperatures are monitored via rectal temperatures.
- Place a disposable rectal temperature probe for continuous temperature monitoring.
- Target rectal temperature is 33-34°C.
- Check correct placement of rectal probe every hour.
- If ventilated, ventilator humidifier temperature is not adjusted.
- Temperatures are recorded on the Therapeutic Hypothermia for Treatment of Neonatal Encephalopathy Temperature Record. (Refer to record below)

Blood Work
- Blood work is collected as per the Hypothermia Blood Work Schedule. (Refer to record below)

Patient Care Precautions
- Temperature is closely tied to the baby’s metabolic rate so be aware of situations that change this. Anticonvulsants or sedation will lower the metabolic rate and may cause the baby’s temperature to drop. Seizures or increased activity increases the metabolic rate and may cause the baby’s temperature to rise.
- Babies should not have enteral feeds initiated but may receive oral immune therapy
- Interrupt cooling as infrequently and for as little time as possible.

Skin Care
- Check condition of skin in contact with the gel pack every hour – color, edema, inflammation or indications of pressure.
- Prevent excessive or prolonged tissue pressure and shearing forces.
- Keep skin dry between patient and gel packs with use of ultra-care sheeting.
- Change in positioning of baby should occur every 1 - 2 hours.

Equipment and Procedure for Pre Transport Therapeutic Hypothermia

Equipment
Rectal Temperature Probe
Phillips Extension Cable for Disposable Rectal Temperature Probe
Cold Pack
Ultra Care Sheets
Therapeutic Hypothermia Documentation Forms

Procedure

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<tr>
<td>1. Verify that an order has been written to start the cooling process and using two patient identifiers verify the correct patient to receive treatment.</td>
<td>Serious adverse events can be associated with therapeutic hypothermia.</td>
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2. Perform hand hygiene and glove prior to handling infant.  
   Standard precautions.

3. Insert a disposable rectal temperature probe 6 cm deep into the infant’s rectum and secure with tape. Connect the rectal probe to the bedside monitor.

4. Patient rectal temperature is checked on initiation of treatment and then recorded every 15 minutes for the first four hours then every hour until 72 hours of completed therapeutic hypothermia treatment, on the Therapeutic Hypothermia for Treatment of Neonatal Encephalopathy Temperature Record.
   Temperatures are closely monitored and recorded on specific records for data collection.

5. Heart rate, respirations and blood pressure are recorded hourly.

6. Turn the heat off of the radiant warmer.  
   Removes ambient heat source.

7. Place an ultra care sheet on the patient and then gently lay the gel packs over the infant’s body.
   Ultra care sheets are thin to allow for efficient exchange between the baby and the gel packs and will prevent direct contact with the gel pack. This will also absorb any moisture created.
   Placing the gel packs on the infant’s body allows for easy removal.

8. Remove the gel packs when the infant’s temperature rectal temperature reaches 34.5°C.
   The target rectal temperature is 33-34°C and once the cooling process is initiated, the infant’s temperature may drop quickly. The infant’s core temperature may continue to fall once the packs are removed.
   If the temperature falls below 33°C, apply a hat to the infant or a room temperature blanket.

9. The condition of the skin in contact with the gel pack is checked hourly for color, edema, inflammation or indications of pressure. Avoid excessive or prolonged tissue pressure and shearing forces.
   Prolonged contact with a cold surface could impair skin circulation to a degree that there is an increased risk for tissue injury.

10. Obtain hour zero blood samples as directed by the open square on the protocol sheet.  
    Refer to “Hypothermia Blood Work Schedule”.

11. Commence aEEG if available.

12. Record and report any adverse effects of cooling.
11. Ensure copies of all documentation related to cooling process are transferred with the infant.

- TBC Inclusion/Exclusion Criteria
- Hypothermia Blood Work Schedule
- Therapeutic Hypothermia for Treatment of Neonatal Encephalopathy Temperature Record
- Body Cooling – Neurologic Assessment

Related Documents
Adapted with permission from Stollery Children’s Policy and Procedure Manual:

Therapeutic Hypothermia Forms and Documentation
- Inclusion Criteria
- Exclusion Criteria
- Hypothermic Blood Work Schedule
- Therapeutic Hypothermia for Treatment of Neonatal Encephalopathy Temperature Record
- Therapeutic Hypothermia Physical Assessment Tool (THAT)
- Guidance tool for THAT
- Neonatal Encephalopathy Assessment Tool for Therapeutic Hypothermia (NEAT)
- Guidance tool for NEAT
- Parent Handout

Revisions
June 2011
May 2015
March 2017

RELATED POLICIES AND PROCEDURES
Assessment of the Newborn
Neurobehavioral Assessment Guidelines
References


### Signing

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