Q: What are the eligibility criteria for TBC?
A: The baby must be greater than or equal to 36 weeks (as determined by due date/gestational age documented by referral hospital obstetrician), greater than 1800 grams, less than 6 hours old, and suffer from moderate to severe Hypoxic Ischemic Encephalopathy to be eligible. The infant must also be free of major congenital anomalies (ie. Congenital Diaphragmatic Hernia, Chromosomal syndromes), as well as obvious head trauma causing intracranial hemorrhage. Infants will also be excluded if they are determined to be “in extremis” by the provider.

Q: How are the clinical/biochemical criteria met?
A: The clinical/biochemical criteria are met when an infant exhibits signs of severe acidosis (defined further on page 2 of protocol), either noted on blood gas, or with 10 minute APGAR score \( \leq 5 \) and/or ongoing need for ventilation for at least 10 minutes after birth.

Q: Who is responsible for doing the Neurological Exam?
A: A neonatologist, Neonatal Fellow, or the Neurologist will be doing the exam using a modified Sarnat score.

Q: What is the pathophysiology of TBC?
A: Research has suggested that modest induced hypothermia can slow and/or reduce tissue injury after an acute perinatal asphyxia event. This method has been found to be effective only when implemented within 6 hours of the insult.

Q: How should I prepare parents for total body cooling?
A: Explain the timeline of the protocol to them. Tell them to expect a baby who looks pale or dusky, feels cool to the touch and is not very active. They may also notice shivering. In order to maintain therapeutically low temperatures and low stress, parents may not hold their baby during total body cooling.

Q: How will I know what labs to order?
A: All labs are going to be on the standing orders for TBC. This will be fluid. After several cooled patients, we will re-evaluate the lab tests we’re ordering to determine their need and/or value in our care. Of course, there may be additional labs that are not included on the standing orders that may be needed, based on our exam and judgment. The labs on the TBC standing orders are strictly TBC-based.

Q: A referral hospital calls because they have a patient who they think meets the criteria for TBC? What should I tell them and what should I do?
A: Tell the referral doctor the criteria we use to determine eligibility. If the infant does meet these criteria, arrange immediate transport to Children’s. There are several things the referral center can do while awaiting transport. There will be a document available for us to fax to referral centers with some helpful hints on it.

- Turn off any overhead warmer, allowing the infant to cool through passive means while awaiting the team
- During this passive cooling, it is important to monitor the infant’s axillary temperature every 30 minutes to avoid over-cooling; at this point, we will have referral centers aim for an axillary temperature of 35 degrees Celsius or more
Place a peripheral IV and start antibiotics if a blood culture has already been obtained.

En route to the referral center, cool the transporter as much as possible by opening the side of the isolette and dropping the set point to 30 degrees Celsius.

Q: A patient is admitted who meets the criteria for TBC? What should I do?
A: There are several things that need to be done on admission for the infant being cooled:
  - The infant may be placed directly on a pre-cooled blanket (to 33 degrees Celsius) when possible, otherwise may be placed on cooling blanket prior to all other procedures
  - Place umbilical lines (double lumen UVC and UAC)
  - Place infant on the Brainz monitor
  - Place esophageal probe (nurse may also do this, but if uncomfortable, we can do it)
    - The probe should be placed orally if infant is intubated (nasally if not intubated) in the lower third of the esophagus
    - Measure the distance from nares → ear → xyphoid process, subtract 2 cm
    - Mark the probe with a marker at the correct depth after the position is confirmed
  - Document Sarnat score on admission and daily while cooling
  - Review protocol, procedure, and expectations with bedside nurse(s)
  - ETT, umbilical lines, and esophageal probe position will be confirmed by x-ray

Q: How quickly should the infant be cooled to target temperature?
A: Although we will know more once we’ve cooled a couple infants, it’s our belief that infants should be able to be cooled within one hour of initiation of cooling.

Q: What’s this 20-10-10 thing people are talking about?
A: This refers to the gradient variable setting on the Blanketrol. Basically the setting of this particular variable defaults to a 10 degree gradient, meaning the blanket will never be more than 10 degrees warmer OR cooler than the infant’s core body temperature (as determined by esophageal probe). The 20-10-10 refers to our plan for Active Cooling – Cooling period – Rewarming. So, we will use a 20 degree gradient while actively cooling the infant. This will allow us to get the infant’s temperature to our goal set point of 33.5 degrees Celsius quickly. Once the infant is at the goal temperature, the gradient will be changed to 10 degrees Celsius and remain there through the re-warming phase. This will help to decrease temperature swings and the chance of overshooting our set point of 33.5 degrees Celsius.

Q: Can X-Rays be taken through the cooling Blanket?
A: Yes. Press the ‘temp set’ button to pause the machine. The water will drain from the blanket and the x-ray can proceed. Press the ‘temp set’ button to restart the flow of water following the x-ray.

Q: Physiologically what will I notice during total body cooling?
A: ---Low resting heart rate (low alarm limit – 75)
  ---Less commonly, arrhythmias may occur
  ---Increased blood pressure, due to peripheral vasoconstriction
  ---Low electrolyte values: K, Mg, Ca, and Phos
Increased urine output, as the kidneys will experience increased perfusion, due to peripheral vasoconstriction.

Also, due to peripheral vasoconstriction, the infant may look dusky/pale and oxygen saturations may or may not be accurate.

Decreased blood glucose initially, and then increased glucose as the body becomes increasingly insulin resistant.

Q: How do I know when 72 hours is up?
A: When TBC is initiated, the nurse will print up a cheat sheet from the I:Drive. It will hang on the cupboard or fridge and the date and time cooling was initiated and the date and time target temperature was reached will be documented on it. This sheet should remain at the bedside until rewarming begins, at which time the date and time of the start of rewarming will be recorded, followed by the date and time a normal core temperature was reached.

Q: How quickly should the infant be re-warmed?
A: The infant should be re-warmed no more than 0.5 degrees Celsius per hour. Rewarming will be done over approximately 6 hours.

Q: Physiologically, what can I expect during the re-warming phase?
A: Increased heart rate
Less commonly, arrhythmias may occur
Decreased blood pressure (both due to relaxing of the peripheral vasculature)
Increased electrolyte values: K, Mg, Ca, and Phos
Decreased urine output, due to vasodilation and third spacing
Decreased blood glucose

Q: Where will Total Body Cooling be documented in Cerner?
A: There will be a new section in the I-View called Brain/Body Cooling. This will include Start/Stop times for cooling and rewarming, skin integrity, daily Sarnat scores (report to bedside nurse for documentation), and cooling blanket temperature and set point.

Q: Where do I find more information about TBC?
A: Look in the Total Body Cooling folder in the I-drive. You will find the inclusion and exclusion criteria, orders sets, the protocol and set-up procedure, a nursing Q&A document, this Q&A document, and the cheat sheet.