

Neonatal Cooling on Ground Transports

Tonya Jack MSN, RN, CCRN, CMTE
Jennifer Bee BSN, RN, CCRN



Background

Neonatal Encephalopathy is defined as “a clinically defined syndrome of disturbed neurological function in the earliest days of life, manifested by difficulty with initiating and maintaining respiration, depression of tone and reflexes, subnormal level of consciousness, and often seizures” (Nelson, Leviton Am J Dis Child 1991; 145:1325-31)

- The incidence of this occurring is 1-3/1000 live births

- A few causes are placental abruption, placental previa, nuchal cord, and uterine rupture

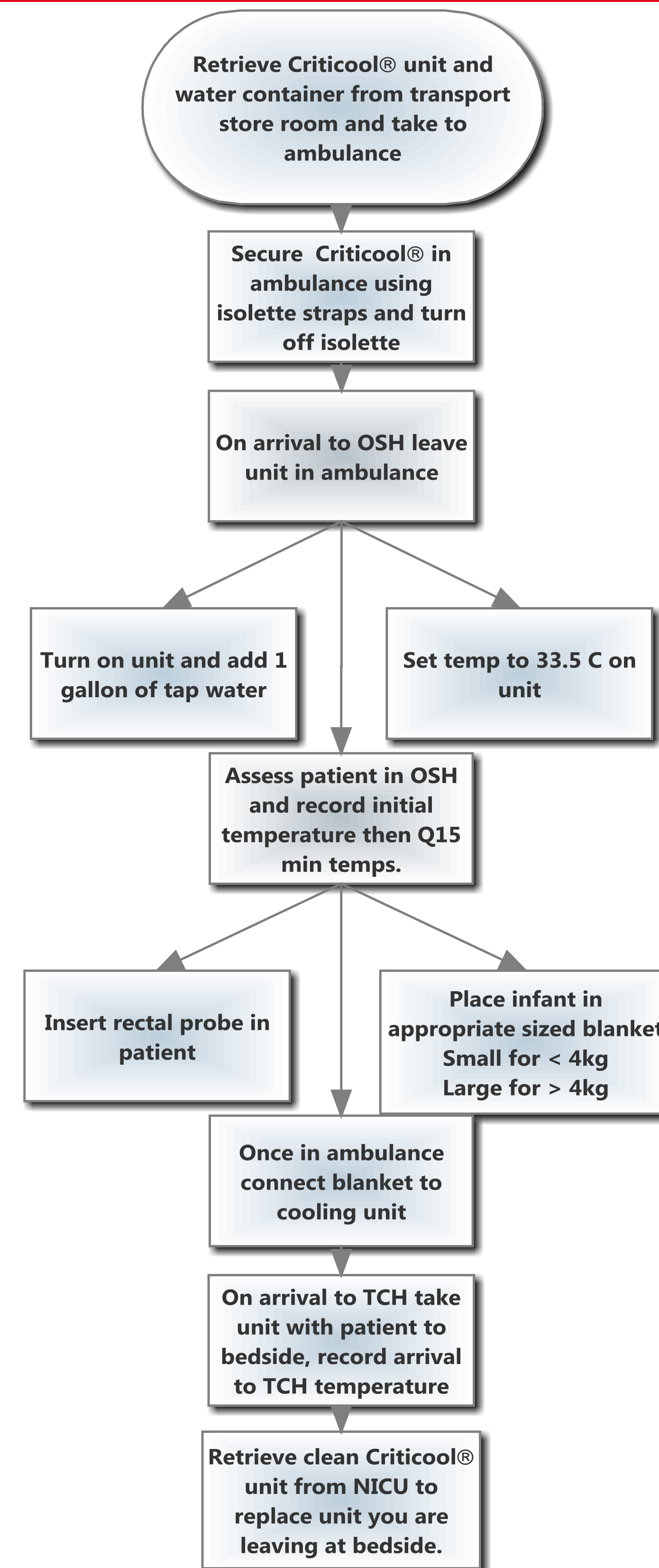
- HIE can lead to permanent impairment in infants varying from hearing loss to death

Equipment

Texas Children's Hospital chose to use the CritiCool Cooling Device for transport. This device is portable and secures easily with tie downs in the ambulance.



TCH Transport Protocol



Case Studies

Case Study 1

- Infant admitted 4/15/2014 at 39 5/7 weeks gestation with HIE
- Mother had good prenatal care starting in first trimester
- Infant delivered due to spontaneous labor with vaginal bleeding and fetal tachycardia
- Infant hypotonic at birth, CPR 1 hour after delivery and initial ph 7.19
- Was cooled for 72 hours with history of seizures noted
- Discharged 5/13/2014 on DOL 29, EEG noted no seizures and moderate diffuse brain disturbance. Developmental exam normal.

Case Study 2

- Infant admitted at 37 weeks gestation with HIE
- Mother had good prenatal care starting in first trimester
- Infant delivered as an elective induction due to mothers history of renal stones s/p stent placement and chronic pain
- Infant with no respiratory effort at birth and cord ph 6.9
- Infant was cooled for 72 hours
- Discharged on 5/12/2014 with a normal EEG

Cast Study 3

- Infant admitted 5/21/2014 at 41 6/7 weeks gestation with perinatal asphyxia and HIE.
- Mother had late prenatal care (6 months)
- Infant delivered due to presentation in an Emergency Center with legs protruding out the birth canal with unknown ROM
- Cooled for 72 hours with history of seizures noted
- Discharged 6/2/2014 on DOL 12 with a normal EEG

Discussion

Texas Children's Kangaroo Crew has completed 14 active cooling transports from January to August, of 2014

Inclusion Criteria

- History of acute perinatal event
- 10 minute APGAR score of ≤ 5
- Cord ph or any postnatal blood gas at < 1 hour of age less than < 7 or a base deficit greater than > 16
- Continued need for ventilation at 10 minutes
- Gestational age ≥ 36 weeks
- Birth weight at least 1800 grams

Implications

- Therapeutic hypothermia has emerged as a state-of-the-art treatment for neonates with HIE
- As a result ,Clinicians must have a reliable and controlled method to cool these neonates during transport to centers with hypothermia programs
- Often these Neonates are inadvertently overcooled because of the resultant changes in metabolism and heat production from HIE.
- Both Passive cooling and active cooling with gel packs can cause this overcooling
- Overcooling has the potential to increase serious side effects associated with cooling, such as arrhythmias, electrocardiogram changes, electrolyte abnormalities, thrombocytopenia, and coagulopathies
- Texas Children's supports that the Servo-controlled CritiCool is feasible for use during ground transports