Troubleshooting During Therapeutic Hypothermia

5 Minute Friday
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Hypothermia Case Study

Baby “A” is a term male IDM who was born via NSVD at referring hospital at 38+6 weeks. Delivery history was significant for shoulder dystocia. He was profoundly depressed in the DR. Infant had no HR and received bag and mask ventilation and chest compressions. Apgars 0, 4, 7. Infant's initial arterial blood gas at approximately 1 hour of life was: 7.17/42/85/14.8/-13.3. Cord gases were clotted and unable to be obtained. He was referred to LPCH for therapeutic hypothermia. He was transferred on Tecotherm blanket and reached target temp upon arrival to LPCH. Shortly after admission he was transitioned from Tecotherm blanket to Blanketrol Blanket per protocol. Admission to LPCH <6 hours of life.
Birthweight 4.1 kg (92%ile); Weight for length percentile >97%ile

Out of Range Temps >34 for 10+ hours
T max 35.3
Troubleshooting At the Bedside

- TL was supposed to be 2nd RN but was pulled into TL duties while helping bedside RN
- Wrong Set Up: Bed set up with blanketrol tubing near infant’s head..higher chance of tubing kinking
- VS not taken per protocol: instead were taken q 15 minutes for first 2 hours after admission
--Blanketrol in AC mode during induction, switched to Gradient 10C Mode and temps increased further
- Ruled out Mechanical Problem: **Temps out of range despite CXR confirmation of probe placement, cooling equipment switched out (blanketrol, tubing, esoph probe), switched back to AC mode and added sail**
- Ultimately, able to keep pt within target range on Auto Control Mode
Here’s what the Blanketrol did…
Blanketrol Modes Used In NICU

**Manual Mode**: Used for setup during Pre-Admission and during critical hypothermia (core temp <30.1° C) at LPCH. In this mode the blanket temperature is manually set and does not fluctuate with respect to the patient’s temperature.

**Gradient 10C Smart Mode**: Used at LPCH during Induction phase and Maintenance phase of therapeutic hypothermia. In this mode the blanketrol will limit the maximum allowable temperature difference between the patient and the water to be 10° C. The Smart button causes the blanketrol to reevaluate the patient’s temperature every 30 minutes. If the gradient is not large enough (and is preventing the baby from reaching or maintaining target temp) the Smart feature will open up the gradient by 5° C every 30 minutes until the goal temperature is reached (with a maximum water temp of 42° C & minimum of 4° C). Once the goal temperature is reached, the Gradient returns to its original set point (Gradient 10C).

**Auto Control Mode**: Used during Rewarming phase after patient has undergone 72 hours of therapeutic hypothermia. When in this mode the water will rapidly cool down to 4° C or rapidly heat up to 42° C. This allows for fast cooling or rewarming so one must be cautious not to overshoot goal temperatures.
Take Home Points

-Small number of patients (i.e. LGA infants) who won’t stay within target temperature range because the blanket temperature isn’t cool enough in Gradient 10C Smart mode

-Utilize Hypothermia Algorithm, Quickstart Guide & Troubleshooting Sheet in Blanketrol binder

-If all of the preceding troubleshooting tips have been tried unsuccessfully, the blanketrol should be switched from Gradient 10C Smart Mode to Auto Control Mode with temp set at 33.5⁰ C. Make sure head is not in contact with cooling blanket.

-The medical provider must place these orders in EPIC and should document an event note

- MD/NNP should contact one of the Neuro NICU Hypothermia experts. Dr. Krisa Van Meurs and Beth Ball are available 24/7 to assist in troubleshooting. Beth Ball can be reached by pager (15349) or cell (650) 279-5439.