Critical Care Temperature Management Protocol for Patients with Central Neurologic Injury

Patient Selection:

Inclusion Criteria
- Patients with central neurologic injury- including:
  - Subarachnoid hemorrhage (SAH)
  - Intracerebral Hemorrhage (ICH)
  - Traumatic Brain Injury (TBI)
  - Ischemic Stroke, new onset

Relative Exclusion Criteria
- Hematological dyscrasias which affect “clotting”
- Peripheral vasospastic disorders
- Sepsis syndrome

Absolute Exclusion Criteria
- Withholding or Withdrawing Care

Clinical Decision Support:
- **FEVER** is known to increase secondary brain injury, worsen functional outcome and increase mortality rate in patients with central neurologic injuries

Definitions:
- **HYPERthermia:** Temp > 38°C on two consecutive measures
- **Normothermia:** Temp maintained within a range of 36.5°C to 37.5°C with shivering controlled or suppressed.

Goal: Maintain Core Temperature 36.5°C – 37.5°C
- Monitor temperature by a consistent continuous core temperature measuring instrument: i.e. PA catheter, temperature Foley *(must have adequate urine flow > 30mL/hr)*, rectal or esophageal probe.
- Acetaminophen OG/PT or PR 650 mg Q 6 hrs PRN T ≥ 38°C *(max. 3 grams / 24hr)*
- Ibuprofen 600 mg OG /PT Q6hrs PRN T > 38°C *[NOT to be used in hepatic and/or renal impairment (CrCl < 30 mL/min or dialysis), thrombocytopenia (Platelet ct < 100,000), or if active GI bleed]*
- Initiate temperature management protocol *(BELOW)* when core temperature ≥ 38°C for 2 consecutive hours (temp measurement Q 1 hr) and notify physician

Protocol:
- Set the cooling device target temperature goal at 36.5°C
- Monitor temperature Q 15 min for the first hour and until temperature within goal range; then q 1 hour
- Maintain ventilator warming device temperatures ≤ 37°C
- Continuously monitor patients for shivering. Document shivering with vital signs using the Shivering Assessment scale (BSAS).
- If water temp < 10°C (50°F) :
  - Notify MD if patient not on antibiotics
  - Obtain blood cultures x 2; once every 24hrs PRN x 3
  - Obtain Sputum Culture; once every 24hrs PRN x 3
  - Obtain Urine culture; once every 24hrs PRN x 3
  - Obtain CSF culture *(if applicable)* once every 24hrs PRN x 3
- Notify MD:
  - Unable to maintain normothermia
  - After 72 hrs for reassessment of need for normothermia

**Shivering Assessment Scale (BSAS)**
- 0 no shivering
- 1 mild shivering localized to neck and/or chest
- 2 shivering involving neck and/or chest and arms
- 3 intermittent generalized shivering involving all 4 extremities

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Anti-Shivering Treatment:

**BSAS 0**
- Initiate Magnesium Replacement Protocol for Mg level with replacement for Mg < 2 mg/dL PRN while maintaining normothermia
- Place socks on feet and hands
- Buspirone 5 mg OG/PT Q 8 hrs

**BSAS 1-2:**
- Merperidine 12.5 mg IV Q 4 hrs PRN Shivering (BSAS 1-2) – Notify MD prior to administration
  
  [NOT to be used in hepatic and/or renal impairment (CrCl < 30 mL/min or dialysis), seizure disorder]
- Add convection warming blanket (Bair Hugger Device) at 40°C

**BSAS 3:**
- Increase Buspirone 10 mg OG/PT Q 8 hrs
- Notify MD for appropriate sedation and or paralytic

Normothermia Device:
- If Utilization of External Cooling with the Arctic Sun Device
  - Apply to patient per manufacturer’s suggestions, placing all 4 cooling pads on the patient with the addition of the 2 universal cooling pads for patients > 100 Kg.
  - Activate the automatic mode on the cooling unit.
  - Monitor skin integrity/condition Q 6 hours, by lifting pads. Do NOT place over non-intact skin.
  - For traveling outside of the unit, purge water (about 30 seconds required) and disconnect tubes from manifold. Leave pads ON.
  - Change pads Q 72hrs per manufacturer’s suggestion

- Utilization of Intravascular Catheter
  - Stat Portable CxR to confirm placement, if subclavian vein utilized

Labs:
- CBC Q Day x 3 days
- BMP Q Day x 3 days
- Mg Q Day x 3 days

Additional Orders:

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