

#### Initiate Shivering Assessment:

- Assess every 30 minutes during Phase I (Induction 0-4 hours)
- Assess every hour during Phase II (Maintenance 24 hours)
- Assess every 30 minutes during Phase III (Rewarming @ 0.25°C/hr)
  
- Implement Bedside Shivering Assessment Scale (goal BSAS = 0):
  - 0 = **None:** No Shivering noted on palpation of the masseter, neck or chest wall
  - 1 = **Mild:** Shivering localized to the neck, and/or thorax only
  - 2 = **Moderate:** shivering involves gross movement of the upper extremities (in addition to the neck and thorax)
  - 3 = **Severe:** shivering involves gross movements of the trunk and upper and lower extremities

#### Initiate Anti-Shivering Measures

Baseline interventions are done for all patients. Upon assessment as above, a stepwise progression should occur from steps A thru D, if the patient continues shivering. Meperidine and magnesium may be used prior to progressing from one step to the next, if appropriate. Additionally, continuous infusions may be titrated to higher doses, if the patient shivers again after the introduction of the agent, prior to progressing to the next step.

#### Baseline interventions for all patients:

1. Surface Counterwarming:
  - Warm blankets applied to exposed distal upper and lower extremities
  - Once cooling device placed, Bair Hugger may be applied to entire skin
2. Buspirone 30 mg orally every 8 hours for 24 hours (consider dose reduction in severe renal impairment)
3. Acetaminophen 1000 mg orally every 6 hours for 24 hours
4. Magnesium sulfate 1 gram every hour prn shivering (BSAS > 1) or if magnesium serum concentration < 2.5 mg/dL

#### Step-wise approach if patient shivers after introduction of baseline interventions

- A. For Shivering Scale  $\geq 1$  refractory to baseline interventions (surface counterwarming, buspirone, acetaminophen and magnesium)

Meperidine 50 mg intravenous push q 30 minutes prn BSAS  $\geq 1$  (maximum of 2 doses before progressing to next phase)

- Use with caution in patients with renal impairment

- B. For Shivering Scale  $\geq 1$  refractory to baseline interventions and meperidine:

Initiate fentanyl continuous infusion at 50 mcg/hr\*

\*If patient is already on fentanyl infusion, initiate dexmedetomidine continuous infusion at 0.5 mcg/kg/hour

- C. For Shivering Scale  $\geq 1$  refractory to baseline interventions, meperidine, fentanyl and dexmedetomidine infusions above

Initiate propofol continuous infusion at 25 mcg/kg/min

- D. For Shivering Scale  $\geq 1$  refractory to baseline, meperidine, fentanyl, dexmedetomidine and propofol infusions above:

Initiate Neuromuscular Paralysis:

Rocuronium single dose 0.6 mg/kg (preferred agent)

If Rocuronium fails:

Cisatracurium

-If bolus is desired, 0.15 mg/kg IV X 1

-1-3 mcg/kg/min continuous infusion

Note:

-Paralysis should never be used alone to control shivering

-Paralysis should only be initiated once patient appropriately sedated (consider use of BIS monitor per Continuous Infusion Neuromuscular Blockade policy [UCH-RX-MED MGMT-109-01])