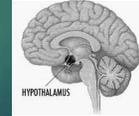


It's Not Cool to be Too Cool

PREVENTING COMPLICATIONS FROM HYPOTHERMIA/
LINDA SMITH MS RN CCRN

Regulation of Temperature

- ▶ Hypothalamus has temperature-sensitive neurons
- ▶ When we are too warm, the warm-sensitive neurons signal effector neurons to vaso-dilate and sweat.
- ▶ When we are too cold, the cold-sensitive neurons signal effector neurons to vasoconstrict, then shivering if needed.



What is Hypothermia?

- ▶ Hypothermia is defined as a core temperature < 95 F (35 C)
- ▶ Heat produced by the body cannot compensate for heat lost to the environment.
- ▶ Wet clothing ↑ evaporative heat loss 5X greater than normal.
- ▶ Young children and older adults are more prone to hypothermia
- ▶ A low body temperature can affect cognitive ability, making it difficult to think and move.

Epidemiology

- ▶ From 1999 to 2011, a total of 16,911 deaths in the United States, an average of 1,301 per year, were associated with exposure to excessive natural cold.
- ▶ During the 2017 winter season, the Chicago area had 26 cold exposure related deaths. Illinois is typically in the top 5 states for deaths from hypothermia.

Causes of Hypothermia

- ▶ Environmental
- ▶ Metabolic
- ▶ Health-Care Associated
- ▶ Other

Assessment Findings

- ▶ *Mild Hypothermia* (93.2-96.8 F or 34-36 C) have shivering, lethargy, confusion, rational to irrational behavior, and minor heart rate changes.
- ▶ *Moderate Hypothermia* (89.6-93.2 or 32 to 34 C) causes rigidity, bradycardia, slowed respiratory rate, BP obtainable only by Doppler, respiratory and metabolic acidosis. Shivering diminishes or disappears by 89.6 F (32 C). As core temperature drops, ↑ risk of dysrhythmias, ↓ GFR, cold blood becomes thick and acts as a thrombus.
- ▶ *Severe hypothermia* (below 89.6 F or 32 C) makes the person appear dead. HR and RR so slow they may be difficult to detect. Reflexes absent, dysrhythmias may occur.

Shivering-Beside Shivering Assessment Scale

- ▶ 0-None-absence of shivering on palpation of neck or pectoralis muscles
- ▶ 1-Mild-shivering localized to the neck and/or thorax only; may not be visible but noted by palpation.
- ▶ 2-Moderate-involvement of the UE with or without neck or pectoralis muscles
- ▶ 3-Severe-generalized whole body movement/shivering involves gross movement of the trunk and UE and LE.

Environmental Exposure-Frostbite

- ▶ Frostbite is tissue freezing that results in ice crystals in tissues and cells.
- ▶ Depth of injury risk factors
- ▶ Superficial and deep frostbite
- ▶ Treatment

Frostbite

Superficial



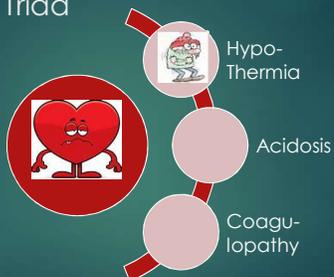
Deep



Health-care associated hypothermia-Targeted Temperature

- ▶ Lower body temperature after cardiac arrest is associated with better neurologic recovery.
- ▶ Goal temperature is 33 C (Moderate hypothermia)
- ▶ Assess for shivering, bradycardia, hypotension, seizures, electrolyte imbalances.
- ▶ Begin re-warming 24 hours after target temperature was reached.

The Lethal Triad



Hypothermia in Trauma

- ▶ Study of 71 trauma patients that had a core body temp of < 32 on admission was associated with a zero patient survival rate.
- ▶ Use of cold fluids can worsen hypothermia and coagulopathy
- ▶ Aggressive fluid resuscitation vs. Permissive hypotension
- ▶ Hypothermia can be exacerbated by removal of clothing, environmental temperatures and administration of cold IV fluids.

Treatment of Hypothermia

- ▶ Maintain ABC's
- ▶ Rewarming
- ▶ Correcting dehydration and acidosis
- ▶ Treating cardiac dysrhythmias

Hypothermia Treatment-ABC's

- ▶ Provide high-flow O₂
- ▶ Anticipate need for intubation
- ▶ Obtain EKG
- ▶ Start IV access (2 large bore)
- ▶ Anticipate need for defibrillation

Hypothermia Treatment-Rewarming

- ▶ Passive
- ▶ Active external
- ▶ Active internal

Rewarming adverse effects

- ▶ Closely monitor the patient for vasodilation & hypotension during rewarming.
- ▶ Afterdrop
- ▶ Hyperkalemia

Patient Teaching

- ▶ Dress in layers, covering the head
- ▶ Carry high CHO snacks
- ▶ Plan for survival

Prevention of Hypothermia with Trauma Patients

- ▶ Pre-hospital measures
- ▶ Re-warming techniques in the ER

References

- ▶ AACN Critical Care Webinar Series, (2015). All Shook-up: Managing Shivering in Therapeutic Hypothermia, by Mary Kay Bader, MSN, RN.
- ▶ www.chicagotribune.com/news/local/breaking/ct-met-cold-deaths-chicago-20180126-story.html
- ▶ Crossan, L., & Cole, E. ((2013). Nursing challenges with a severely injured patient in critical care. *British Association of Critical Care Nurses*, 18 (5) 236-244.
- ▶ Lewis S. L., Bucher L., Heitkemper M., Harding M., Kwong J., & Roberts D., (2017). *Medical Surgical Nursing: Assessment & Management of Clinical Problems*. 10th ed., St. Louis MO: Elsevier.
- ▶ Moffat, S. E. (2013). "Hypothermia in Trauma." *Emergency Medicine*, 30:989-996.
- ▶ Northwest Community Healthcare, (2018). *Post Cardiac Arrest Targeted Temperature Management*.