Care of Trauma Patient with Accidental Hypothermia Practice Guidelines

Purpose:

The purpose of this practice guideline is to provide guidance and standardize the approach to the management of trauma patients with accidental hypothermia.

Definition:

Hypothermia is defined as the involuntary drop of core temperature below 36°C (95°F). Symptoms vary based on severity of hypothermia (see section A. Clinical Signs).

A. Clinical Signs

Hypothermia	***Body temperature***	***Clinical features***	
Mild	32.2°C to 36°C (90°F to 96.8°F)		
			Hypertension
			Shivering
			Tachycardia
			Tachypnea
			Vasoconstriction
			Apathy
			Ataxia
			Cold diuresis—kidneys lose concentrating ability
			Hypovolemia
			Impaired judgment
Moderate	28°C (82.4°F) to 32.2°C (90°F)	Atrial dysrhythmias	
		Decreased heart rate	
		Decreased level of consciousness	
		Decreased respiratory rate	
		Dilated pupils	
		Diminished gag reflex	
		Extinction on shivering	
		Hyporeflexia	
		Hypotension	
		J wave	
Severe	< 28°C (82.4°F)		

Coma
Decreased or no activity on electroencephalography
Nonreactive pupils
Oliguria
Pulmonary edema
Ventricular dysrhythmias/asystole

B. General Principles

1. Room temperature should be maintained at approximately 85ºC (29.4ºF). Use of overhead heating lamps should be considered in the trauma bay.
2. Rewarming of the trunk should be undertaken BEFORE the extremities to minimize hypotension and acidemia due to arterial vasodilation and core temperature drop.
3. Initiate or maintain CPR if required – Palpate pulse for full minute – An initial attempt at defibrillation can be made but if unsuccessful, further attempts at defibrillation and antiarrhythmic intravenous medications should be held until the patient is warmed to above 30°C.
4. Gingerly handle patients to reduce risk of inducing malignant dysrhythmia.

C. Re-Warming

1. Mild Hypothermia 32.2°C to 36°C (90°F to 96.8°F)
    - Room temperature should be maintained at approximately 85ºC (29.4ºF).
        - Remove all wet clothing.
        - Obtain rectal temperature. If temperature will not register, insert a temperature sensing foley catheter or rectal probe thermometer.
    - Rewarm patient using passive and active external rewarming:
        - Heated blankets in neck, groin, axilla, torso
        - Bair Hugger
    - RT to place on warmed, humidified O2.
    - Infuse Warm intravenous (IV) Fluids:
        - Warmed isotonic crystalloids or
        - Place IV fluids on rapid infuser to utilize warming mechanism. Adjust flow rate so fluids are not delivered at rapid rate unless there is an indication for rapid fluid resuscitation.
2. Moderate to Severe Hypothermia 28°C to 32.2°C (82.4°F - 90°F) to < 28°C (<82.4°F)
    - Obtain temperature using either temperature sensing foley, esophageal temperature sensing probe or rectal temperature sensing probe (if utilizing gastric and/or bladder lavage, use the rectal temperature sensing probe).
    - Employ all interventions listed under mild hypothermia.
    - Consider use of Artic Sun device.
    - Consider use of body bag to maintain the warm air around the patient.
    - Per MD order, assist with active internal rewarming via:
        - Gastric lavage
        - Bladder lavage
        - Peritoneal lavage
        - Thoracic lavage

- Continuous Veno-Venous Hemodialysis (CVVHD) – Consider consulting nephrology for initiation of CVVHD.
- Extracorporeal Membrane Oxygenation (ECMO) – Consider consulting ECMO team and Cardiothoracic Surgery for initiation of ECMO.

D. Rate of Rewarming

1. Slow rewarming - increases temperature by approximately 0.3-1.2°C/h.
    1. Warmed IV solutions.
    2. Heated, humidified oxygen by mask/endotracheal tube.
    3. Warmed blankets and/or Bair Hugger
2. Moderate rewarming – increases temperature by approximately 3°C/h.
    1. Artic sun
    2. Warmed gastric lavage
    3. Warmed bladder lavage
    4. Warmed peritoneal lavage
3. Rapid rewarming – increases temperature by approximately 6°C – 19°C/h.
    1. Warmed thoracic lavage
    2. CVVHD
    3. ECMO

E. **Traumatic hypothermic cardiac arrest**

Continuation of resuscitation in traumatic hypothermic cardiac arrest will be at the discretion of the trauma surgeon and/or emergency medicine physician in accordance with previously established guidelines for traumatic cardiac arrest resuscitation *(Reference 1,2,7).*

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