SECTION: Environmental Emergencies

PROTOCOL TITLE: Environmental – Hypothermia

REVISED: 06/2017

Protocol
5-1

OVERVIEW:
Hypothermia is typically defined as a core temperature less than 35° Celsius / 95° Fahrenheit. While most commonly seen in cold climates, it may develop without exposure to extreme environmental conditions. Hypothermia is not uncommon in temperate regions and may develop indoors even during summer. Hypothermia should be considered in any patient with an altered level of consciousness in a cool and /or wet environment. Individuals at the extremes of age and those of altered mental status are more susceptible to developing hypothermia. Vasoconstriction and bradycardia may cause extreme difficulty while attempting to palpate a pulse. Radiation accounts for the greatest form of heat loss. Conduction normally accounts for a much smaller amount, but increases significantly in wet clothes and astronomically in cold water. In patients that are hypothermic, pulse and respiratory rates may be slow or difficult to detect. If the hypothermic victim has no signs of life, begin CPR without delay.

HPI	Signs and Symptoms	Considerations

• Past medical history
• Medications
• Exposure to environment even in normal temperatures
• Exposure to extreme cold
• Extremes of age
• Drug use: alcohol, barbiturates
• Infection, sepsis
• Length of exposure, wetness
	• Cold, clammy
	• Shivering
	• Mental status changes
	• Extremity pain, sensory abnormality
	• Bradycardia
	• Hypotension, shock
		• Sepsis
		• Environmental exposure
		• Hypoglycemia
		• CNS dysfunction
		  ○ Stroke
		  ○ Head injury
		  ○ Spinal cord injury

	EMR	EMT	A	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Hypothermia **WITH** a perfusing rhythm (pulse):					
a. Prevent additional evaporative heat loss by removing wet garments and insulating the victim from further environmental exposures.	•	•	•	•	•
b. Initiate passive rewarming with warmed blankets and a warm environment.	•	•	•	•	•
c. Perform procedures gently. These patients are prone to develop ventricular fibrillation.	•	•	•	•	•
4. Hypothermia **WITHOUT** a perfusing rhythm (pulse):					

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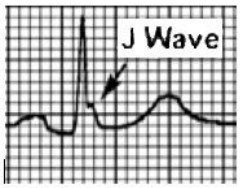
HYPOTHERMIA

	EMR	EMT	A	I	P
a. Begin CPR immediately.	•	•	•	•	•
b. Initiate rewarming procedures as noted in step #3 above.	•	•	•	•	•
c. If not breathing, start rescue breathing immediately. If possible, administer warmed, humidified oxygen.	•	•	•	•	•
d. If pulseless with no detectable signs of circulation, start chest compressions immediately. If there is any doubt about whether a pulse is present, begin compressions.	•	•	•	•	•
e. Assess cardiac rhythm:					
i. Attach AED / cardiac monitor. If the patient does not respond to one (1) defibrillation, *further defibrillation attempts should be deferred.*	•	•	•	•	•
f. Secure airway with a definitive (*Supraglottic / dual lumen)* airway device or an *endotracheal tube* (levels I and P only).		•	•	•	•
g. Establish an IV of Normal Saline.			•	•	•
h. Give initial cardiovascular drugs based on presenting rhythm. If the patient fails to respond to the initial drug therapy, defer additional boluses of medication.				•	•
i. Continue CPR and transport immediately.		•	•	•	•
5. Transport and perform ongoing assessment as indicated.		•	•	•	•

HYPOTHERMIA

Stages of Hypothermia	
Normal Cold Response (35° C – 37° C / 95.1°F – 98.6°F)	
• Feeling of cold • Shivering	• Vasoconstriction
Mild Hypothermia (34°C – 35°C / 93°F – 95°F)	
• Maximum shivering at 35°C / 95°F • Cold, pale skin (vasoconstriction) • Pulse and BP are normal or elevated	• Increasing rate of respirations • Mild confusion • Slurred speech • Unsteady gait • Amnesia
Moderate Hypothermia (30°C – 34°C / 86°F – 93°F)	
• No longer shivering • Bradycardia • Decreased respirations • Increased risk of cardiac arrhythmia (A-Fib)	• Intense vasoconstriction – surface pooling • Decreased LOC • Increased mortality in major trauma by 40 - 50%
Severe Hypothermia (< 30°C / < 86°F)	
• Intense vasoconstriction – surface pooling • Lethal cardiac dysrhythmias (V-Fib)	• Non-cardiac pulmonary edema • As core temp continues to decrease, risk of cardiac arrest increases dramatically

If the core temperature falls below 32°C / 90°F, a characteristic J-wave (Osborn wave) may occur. The J-wave occurs at the junction of the QRS complex and the ST segment. T-wave inversion and prolongation of the PR, QRS, and QT interval may be noted.



Protocol 5-1 Continued

HYPOTHERMIA

PEARLS:

1. Resuscitation efforts should not be ceased until rewarming efforts have been exhausted, unless patient presents with injuries incompatible with life.
2. Extremes of age, young and old, are more susceptible to effects of temperature.
3. With temperature less than 31°C / 88°F, ventricular fibrillation is a common cause of death.
4. Patient with extreme hypothermia MUST be handled gently.
5. Cardiac arrest patients should be warmed before administering medications, as they may build in the system due to metabolism being ineffective.
6. Defibrillation should be limited to one (1) shock prior to warming core.
7. If the temperature is unable to be measured, treat based on the suspected temperature.
8. Hypothermia may cause severe bradycardia.
9. Shivering typically ceases when core temperature is below 32°C / 90°F.
10. Hot packs can be activated and placed in the armpit and groin areas, if available.
11. If patient is found with wet clothes, patient should be exposed prior to application of blankets.
12. Hypothermic patients also exhibit cold diuresis. Peripheral vasoconstriction initially causes central hypervolemia, to which the kidneys respond by excreting large amounts of dilute urine, causing dehydration. Alcohol and water immersion increase this process.