



Hypothermia/ Frostbite



History

- Age, very young and old
- Exposure to decreased temperatures but may occur in normal temperatures
- Past medical history / Medications
- Drug use: Alcohol, barbituates
- Infections/ Sepsis
- Length of exposure/ Wetness/ Wind chill

Signs and Symptoms

- Altered mental status/ coma
- Cold, clammy
- Shivering
- Extremity pain or sensory abnormality
- Bradycardia
- Hypotension or shock

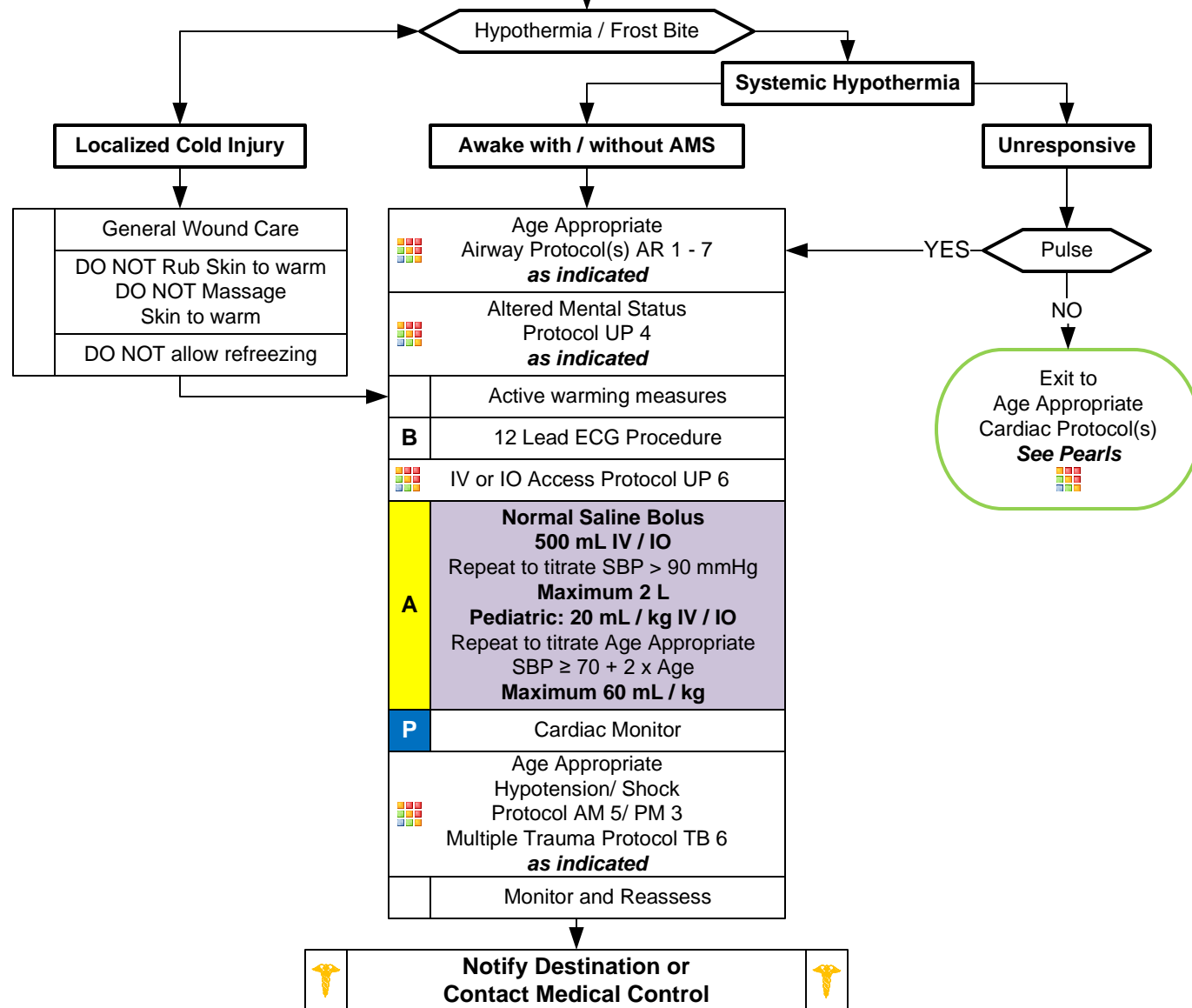
Differential

- Sepsis
- Environmental exposure
- Hypothyroidism
- Hypoglycemia
- CNS dysfunction
 - Stroke
 - Head injury
 - Spinal cord injury

Temperature Measurement Procedure
if available

Temperature Measurement should NOT delay treatment of hypothermia

	Remove wet clothing Dry/ Warm Patient
	Passive warming measures
	Blood Glucose Analysis Procedure
	Age Appropriate Diabetic Protocol AM 2/ PM 2 as indicated





Hypothermia/ Frostbite



Frostbite:

- Frostbite is the formation of ice crystals within local tissues, usually where skin is exposed and most commonly occurs in the distal extremities.

Risk Factors:

Prolonged exposure to cold temperatures (usually below freezing), exposure to wind, wearing wet clothing, inactivity/ immobility, alcohol ingestion, and diseases which cause peripheral vascular disease (atherosclerosis/ diabetes).

Superficial Frostbite Signs and Symptoms:

Numbness
Paresthesia
Poor fine motor control
Pruritis (itching)
Edema (usually after rewarming)
Coldness

Deep Frostbite Signs and Symptoms:

Hemorrhagic blisters
Diminished range of motion
Necrosis, gangrene
Cold, mottled, gray area (usually after rewarming)
Immobile tissue (lost elasticity)

Systemic Hypothermia:

- Core body (rectal temperature) below 95°F (35°C) and caused by heat loss, decreased heat production, or a combination of both.

Risk Factors:

Prolonged exposure to cold temperatures, exposure to wind, wearing wet clothing, inactivity/ immobility, alcohol ingestion, and diseases which cause peripheral vascular disease (atherosclerosis/ diabetes).

- May occur with temperatures above freezing.

Mild Hypothermia Signs and Symptoms:

Shivering
Dizziness
Nausea
Weakness
Hyperventilation
Tachypnea/ Tachycardia

Moderate Hypothermia Signs and Symptoms:

AMS
Poor judgement/ difficulty thinking
Atrial fibrillation
Bradycardia
Diuresis
Shivering stops

Severe Hypothermia Signs and Symptoms:

Hypotension
Ventricular arrhythmias/ Bradycardias
J wave on ECG
AMS/ Coma/ Unresponsive
Fixed/ Dilated Pupil
Lividity

Pearls

- Recommended Exam: Mental Status, Heart, Lungs, Abdomen, Extremities, Neuro**
- NO PATIENT IS DEAD UNTIL WARM AND DEAD (Body temperature $\geq 93.2^\circ \text{ F}$, 32° C .)**
- Temperature measurement:**
 - Obtain and document patient temperature if able.
 - Many thermometers and routes of measurement are available.
 - Order of preference for route of measurement: Rectal > oral > temporal > axillary.
 - Many thermometers do not register temperature below 93.2° F .
- Hypothermia categories:**
 - Mild $90 - 95^\circ \text{ F}$ ($32 - 35^\circ \text{ C}$)
 - Moderate $82 - 90^\circ \text{ F}$ ($28 - 32^\circ \text{ C}$)
 - Severe $< 82^\circ \text{ F}$ ($< 28^\circ \text{ C}$)
- Mechanisms of hypothermia:**
 - Radiation: Heat loss to surrounding objects via infrared energy (60% of most heat loss.)
 - Convection: Direct transfer of heat to the surrounding air.
 - Conduction: Direct transfer of heat to direct contact with cooler objects (important in submersion.)
 - Evaporation: Vaporization of water from sweat or other body water losses.
- Contributing factors of hypothermia: Extremes of age, malnutrition, alcohol or other drug use.
- If the temperature is unable to be measured, treat the patient based on the suspected temperature.
- CPR:**
 - Severe hypothermia may cause cardiac instability and rough handling of the patient theoretically can cause ventricular fibrillation. This has not been demonstrated or confirmed by current evidence. Intubation and CPR techniques should not be with-held due to this concern.
 - Intubation can cause ventricular fibrillation, so it should be done gently by the most experienced provider(s).
 - Below 86° F (30° C) antiarrhythmics may not work and if given, should be given at increased time intervals. Contact medical control for direction. Epinephrine can be administered.
 - Below 86° F (30° C) pacing should not utilized.
 - Consider withholding CPR if patient has organized rhythm or has other signs of life. Contact Medical Control.
 - If the patient is below 86° F (30° C) then defibrillate 1 time if defibrillation is required. Deferring further attempts until more warming occurs is controversial. Contact medical control for direction.
 - Hypothermia may produce severe bradycardia so take at least 60 seconds to palpate a pulse.
- Active Warming:**
 - Remove from cold environment and into warm environment protected from wind and wet conditions.
 - Remove wet clothing and provide warm blankets/ warming blankets.
 - Hot packs can be activated and placed in the armpit and groin area if available. Care should be taken not to place the packs directly against the patient's skin.