

SECTION: M-13

PROTOCOL TITLE: Adult Cold Emergencies

REVISED: 01May2018

GENERAL COMMENTS: Hypothermia is defined as a body temperature less than 95 degrees Fahrenheit. It is further sub-categorized as follows:

- Mild hypothermia is 34-35 °C / 93-95 °F
- Moderate Hypothermia is 30-34 °C / 86-93 °F
- Severe hypothermia is < 30 °C / 86 °F

BLS SPECIFIC CARE: See Adult General Medical Care Protocol M-01

- Handle gently
- Do not re-warm cold, injured extremities if there is a chance of refreezing prior to arrival at definitive care
- Obtain a temperature (core temperature if unresponsive)
- For mild hypothermia, increase heat production through exercise, and calorie/fluid replacement
- For moderate and severe hypothermia, treat gently and keep horizontal

Begin passive re-warming:

- Heat packs to critical areas
- Rewarm trunk prior to extremities

Cardiac arrest treatment for moderate to severe hypothermia:

- CPR as normal; check for pulse for at least 30 seconds
- One (1) shock, then hold until temperature is > 30 °C / 86 °F
- Keep horizontal and avoid rough treatment, but do not delay critical interventions
- Active re-warming

Fight heat loss:

- Radiation (55-65%): Cover with warm blankets. Cover the head (not the face)
- Conduction (15%): Separate the patient from cold surfaces
- Convection (15%): REMOVE WET CLOTHING
- Evaporation (15%): Cover with warm blankets. Cover the head (not the face)
- Obtain core body (i.e. rectal) temperature as necessary
- Handle patient gently; at core body temperatures less than 30°C (86°F) rough handling can precipitate lethal cardiac dysrhythmias
- Remove patient from cold environment if possible; remove wet clothing and insulate against further heat loss
- Do not attempt to re-warm cold, injured extremities if there is a chance of the extremity refreezing prior to arrival at definitive care

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BLS continued...

- Use of an AED for patients in cardiopulmonary arrest:
 - Shock as indicated
 - Continue CPR and obtain core body (rectal) temperature.
 - If core body temperature >30C/86F, administer further shocks as indicated
 - If core body temperature < 30 °C/ 86 °F, withhold further shocks
 - Focus on CPR and re-warming

AEMT/O.M. SPECIFIC CARE: See Adult General Medical Care Protocol M-01

- If available, administer warm IV fluids

ALS SPECIFIC CARE: See Adult General Medical Care Protocol M-01

- Assess and treat underlying disorder
- Obtain BGL

Severe Pain:

- Refer to “Adult Pain Control Protocol M-11” in SWO

Cardiac arrest treatment for moderate to severe hypothermia:

- (1) One total shock, then hold until temperature is > 30 °C / 86 °F
- Keep horizontal and avoid rough treatment, but do not delay critical interventions
- Active re-warming
- Temp < 30 °C / 86 °F: withhold medications
- Temp > 30 °C / 86 °F: increase intervals between meds
- Sinus bradycardia may be physiologic in severe hypothermia; therefore, cardiac pacing and medications are usually not indicated
- Focus treatment on re-warming and rapid transport of patient
- For cardiopulmonary arrest associated with hypothermia see the algorithms

Box #1:

If adequate CPR is being performed upon arrival :

1. Confirm cardiopulmonary arrest
2. Transition to high performance cardiopulmonary resuscitation (CPR) (aka "Pit Crew" CPR, see Appendix 30) while applying defib pads
3. Move on to "**Box #4**"

Box #2:

Sudden, witnessed arrest in the presence of EMS:

1. Perform high performance cardiopulmonary resuscitation (AKA "Pit Crew", see appendix 30) only long enough to apply defib pads
2. Move on to "**Box #4**"

Box #3:

If inadequate CPR, or no CPR at all, is being performed upon arrival:

1. Initiate/perform high performance cardiopulmonary resuscitation (AKA "Pit Crew", see appendix 30)
2. During CPR:
 - a. Apply defib pads
 - b. Prepare/establish airway management and/or vascular access
 - c. Medications/interventions without interruption of high performance CPR
3. Move on to, "**Box #4,**" after approximately 2 minutes/200 compressions completed

Box #4:

Rhythm Check

1. Place patient on firm surface with good workable space as soon as possible/feasible
2. ****Pre-charge Monitor to manufacturer's recommendation prior to pause**
3. **Assess blood glucose level**

VF/Pulseless VT:

- a) **Shock @ manufacturer's recommendation**
- b) Immediately resume HP-CPR without pause for rhythm check
- c) Advanced airway management as appropriate
- d) Vascular access as appropriate

Asystole/PEA:

- a) No shock indicated
- b) Immediately resume HP-CPR
- c) Advanced airway management as appropriate
- d) Vascular access as appropriate

ROSC:

- a) Provide hemodynamic support
- b) Evaluate for POST-arrest/TTM protocol
- c) Advanced airway management as appropriate
- d) Vascular Access as appropriate
- e) Monitor closely for re-arrest

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Box #5: Check Core Body (Rectal) Temperature

Core Body Temperature $< 30^{\circ}\text{C}$ (86 $^{\circ}\text{F}$):

- Continue HP-CPR**, check rhythm every 200 compressions (approx. 2 min)
- Withhold** further shocks if VF/VT present until temp $> 30^{\circ}\text{C}$ (86 $^{\circ}\text{F}$):
- Withhold** IV/IO/CETT medications until temp $> 30^{\circ}\text{C}$ (86 $^{\circ}\text{F}$)
- Active external rewarming; prevent further cooling
- Infuse warm NS fluid boluses. (43 $^{\circ}\text{C}$ / 109 $^{\circ}\text{F}$)
- Transport, and focus efforts upon raising core body temperature $> 30^{\circ}\text{C}$

Core Body Temperature $> 30^{\circ}\text{C}$ (86 $^{\circ}\text{F}$):

- Continue HP-CPR**, check rhythm every 200 compressions (approx. 2 min)
- Provide electrical therapy** as indicated by rhythm**
- Administer appropriate IV/IO/CETT medications** for presenting rhythm (i.e. VF/VT, PEA, asystole) as indicated, but at longer than standard intervals**
- Active external rewarming; prevent further cooling
- Infuse warm NS fluid (43 $^{\circ}\text{C}$ / 109 $^{\circ}\text{F}$)
- Transport, and focus efforts upon raising core body temperature $> 35^{\circ}\text{C}$ (95 $^{\circ}\text{F}$).

**** Medications and electrical therapy as found in protocols C-01, C-02a, C-02b**

Box #7: Treat (Other) Possible Causes

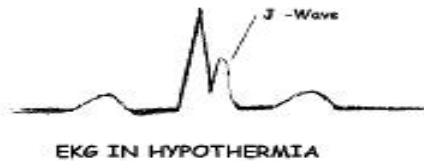
Search for & treat possible contribution factors:

- Hypovolemia**
- Hypoxia**
- Hydrogen ion (acidosis)**
- Hypo-/hyperkalemia**
- Hypothermia**
- Toxins**
- Tamponade, cardiac**
- Tension Pneumothorax**
- Thrombosis (coronary or pulmonary)**

Return to Box #5

PHYSICIAN PEARLS:

If the patient's core temperature falls below 32 °C, a characteristic J-wave (aka Osborn wave) may occur. The J wave occurs at the junction of the QRS complex and the ST segment. Also noticeable are T wave inversion and prolongation of the PR, QRS, and QT intervals.



Hypothermic patients also exhibit "cold diuresis." Peripheral vasoconstriction initially causes central hypervolemia, to which the kidneys respond by putting out large amounts of dilute urine. Alcohol and cold water immersion worsen this process. Therefore, hypothermic patients may also be dehydrated.

HYPOTHERMIA: STAGES

Normal Cold Response (98.6-95.1 °F)

- Feel cold
- Shivering
- Vasoconstriction

Mild hypothermia (34-35 °C / 93-95 °F)

- Maximum shivering at 35 °C (95°F)
- Cold, pale skin (vasoconstriction)
- Pulse and BP are normal or elevated
- Faster breathing
- Mild confusion, slurred speech, unsteady gait
- Amnesia

Moderate (30-34 °C / 86-93 °F) to Severe Hypothermia (< 30 °C/ 86 °F)

- Shivering stops
- Pulse slows (bradycardia)
- Breathing slows
- Risk of cardiac arrhythmia (AFib)
- Increased mortality in major trauma by 40-50%
- Intense vasoconstriction; surface pooling promotes "afterdrop"
- Decreased LOC

Severe Hypothermia (< 30 °C / 86 °F)

- Intense vasoconstriction - surface pooling promotes "afterdrop"
- As core temp drops, the risk of cardiac arrest increases dramatically
- Lethal cardiac dysrhythmias
- Non-cardiac pulmonary edema

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