



Environmental Emergencies

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Scenario #1

You are dispatched to the residence of a 42 YO female patient that has altered mental status. The caller reports that the patient is confused and asking repetitive questions.

What is your field impression?



Answer:

Heat Stroke



What is heat stroke?

Heat stroke is a **life-threatening condition** when the body reaches an internal temperature of $>104^{\circ}$ F. It is usually caused by prolonged exposure to environmental heat, physical exertion, or a combination of the two.

When the body reaches an internal temperature of $>104^{\circ}$ F, the body's natural functions are overwhelmed, causing organ damage and eventually organ failure to occur.



Heat Illnesses:

Prevention:

- Drink enough water
- Wear loose, breathable clothing
- Moderate exercise in hot weather



S&S:

- Heat Cramps (mild):
 - Muscle cramps and/or spasms.
- Heat Exhaustion (moderate):
 - Heavy sweating
 - Dizziness, lightheadedness
 - Nausea, headache, weakness
- Heat Stroke (severe, life-threat):
 - Body temp $>104^{\circ}\text{F}$
 - ALOC, AMS
 - AVPU, A&O
 - Confusion
 - Slurred speech
 - Hot, DRY, flushed skin.

ALCO Protocols:

Treatment:

- **REMOVE Pt. from hot environment.**
 - Bring pt. to shade, inside building, inside ambulance, etc.
- Heat Cramps:
 - Water, electrolytes.
- Heat Exhaustion:
 - Cool pt. by fanning, loosen clothing
- Heat Stroke (severe, life-threat):
 - Place ice packs in armpits, groin, and neck.
 - Spray pt. with water and fan aggressively.
 - Transport immediately, **CODE 3.**

HYPERTHERMIA / **HEAT** ILLNESS

•Routine Medical Care

- Protect patient from environment.
- If the patient is in extremis, begin treatment prior to secondary survey.
- Consider: the environment, patient age, and pre-existing conditions

1. **SIGNS AND SYMPTOMS OF A **HEAT** EMERGENCY**

- Weakness or exhaustion
- Dizziness
- Headache
- Sweating may or may not be present
- Fainting or feeling faint
- Rapid heart rate
- Muscle cramps
- Altered mental status (coma, seizures, delirium)

2. **PREEXISTING CONDITIONS THAT CAN CONTRIBUTE TO A **HEAT** EMERGENCY:**

- ▶ **Psychiatric disorder** (both because of the medications taken and perhaps the patient's poor judgement)
- ▶ **Heart disease**
- ▶ **Diabetes**
- ▶ **Alcohol**

- ▶ **Fever**
- ▶ **Fatigue**
- ▶ **Obesity**
- ▶ **Dehydration** (either decreased fluid intake or sweating)
- ▶ **Medications**

3. **TREATMENT:**

3.1 **If the patient is conscious:**

- 3.1.1 Remove patient from hot environment
- 3.1.2 Loosen or remove clothing
- 3.1.3 Place in supine position with legs elevated
- 3.1.4 Administer O₂
- 3.1.5 Fan the patient
- 3.1.6 Water may be given if patient is alert, has a gag reflex, and is not nauseated

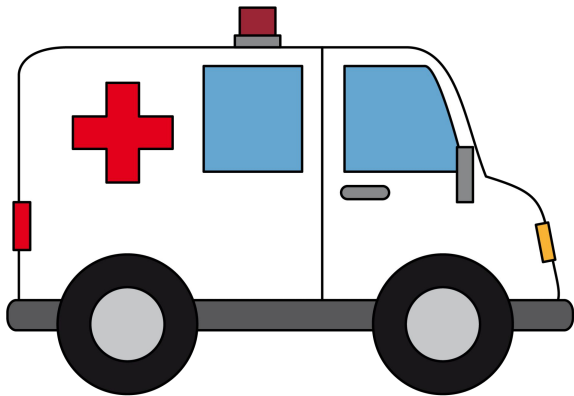
3.2 **If altered mental status is present:** (see above)

- 3.2.1 Place on left side and monitor airway
- 3.2.2 Wet the skin and fan aggressively
- 3.2.3 Apply cold packs to the axillae, groin and neck (if available)
- 3.2.4 Administer IV fluid challenge (250-500 mL NS)
- 3.2.5 Transport immediately



ALCO Protocols:

Per ALCO Protocols, do not give pt. water for heat stroke or any heat illness if patient has AMS or is nauseated (risk of vomiting).



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Hypothermia:

Prevention:

- Wear warm clothing for cold weather.
- Change out of wet clothing.
- Avoid excessive cold.



S&S:

- Body temp below 95 F
- Drowsiness
- Weak pulse
- ALOC
 - Confusion
 - Difficulty talking

ALCO Protocols:

Treatment:

- Remove pt. From cold environment.
 - Remove clothing if wet.
- Warm pt.
- Administer O₂.
- Transport immediately CODE 3



•Routine Medical Care

- Protect the patient from the environment
- If patient is in extremis, begin treatment prior to secondary survey
- Check skin temperature

1. **INTRODUCTION:** Hypothermia is a reduced core temperature where the cold challenge overwhelms heat production and heat retention factors. The rate of onset can be:

- 1.1 **Acute** (minutes to hours) e.g. immersion in cold water
- 1.2 **Sub-acute** (hours)
- 1.3 **Chronic** (often over several days) Homeless, drug users, alcoholics, and compromised individuals are at high risk. Elderly persons and those taking certain medicines are also at risk. Injured and seriously ill individuals can become hypothermic quickly

→ **Note:** a hypothermic critical trauma patient has a very high mortality and morbidity rate!

2. SIGNS AND SYMPTOMS OF HYPOTHERMIA:

- 2.1 Altered mental status including: confusion, mood changes, and speech difficulties. The patient's judgment may be affecting causing him/her to exhibit inappropriate behaviors such as removing clothing
- 2.2 Decreased motor function, poor coordination
- 2.3 Diminished sense of cold sensation
- 2.4 Pupils that respond slowly or sluggishly

3. TREATMENT:

3.1 General:

- 3.1.1 Remove the patient from the cold environment and prevent further heat loss
- 3.1.2 Remove wet clothing, begin rewarming - cover with blankets, turn up the heat in the ambulance
- 3.1.3 Do not let the patient walk or exert him/herself
- 3.1.4 Administer O₂ - titrate to 94-99% SpO₂ (warmed and humidified is preferred)
- 3.1.5 Closely monitor cardiac rhythm
- 3.1.6 Check blood glucose levels. Administer glucose as needed (see ALOC [page 35](#) - adult or [page 68](#) - pediatric)
- 3.1.7 Transport immediately

3.2 BLS:

- 3.2.1 CPR should be initiated if there is any doubt about pulselessness
- 3.2.2 Severely hypothermic patients may appear dead. If you find an unresponsive, hypothermic patient, take time (30-45 seconds) to try and find a pulse before beginning CPR. Chest compressions should be avoided if any signs of life are present
- 3.2.3 If VT or VF is present, defibrillation should be attempted. If one shock is unsuccessful, subsequent shocks should be deferred

Thermal/Temperature-Induced Shock:

Prevention:

- Avoid excessively cold or hot environments, especially if at risk for thermal shock.
 - Ex. An ice bath.



S&S:

- Rapid HR to compensate.
- Rapid RR due to panic.



ALCO Protocols:

Treatment:

- Remove pt. From cold/hot environment.
- Follow respective hypothermia/hyperthermia protocols if symptoms are present.

HYPOTHERMIA

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Scenario #2

Responding to a male presenting with snake bite, cough, hives, wrist pain

What is your field impression?

Answer

Anaphylaxis

Think “more than one system”

in this case

respiratory & cardiovascular

cough, wheezing

hives, hypotension

Signs of Anaphylaxis

Respiratory System

- Rapid, labored breathing
- Wheezing, stridor
- Persistent cough
- Tightness in chest/throat

Circulatory System

- Initial tachycardia
- Hypotension (late)
- Dizziness
- Flushed skin (early)

Skin

- Urticaria (hives)
- Swelling
- Cyanosis (late)

Other

- Altered mental status
- Anxiety
- Headache
- Itchy eyes

Reassess after administration of epinephrine!

Anaphylaxis

Epinephrine

Dose 0.3mg (adult), 0.15mg (pediatric)

Indications/Integrity anaphylactic reaction

Contraindications/Concentration (relative) cardiac chest pain; 1mg/ml

Expiry

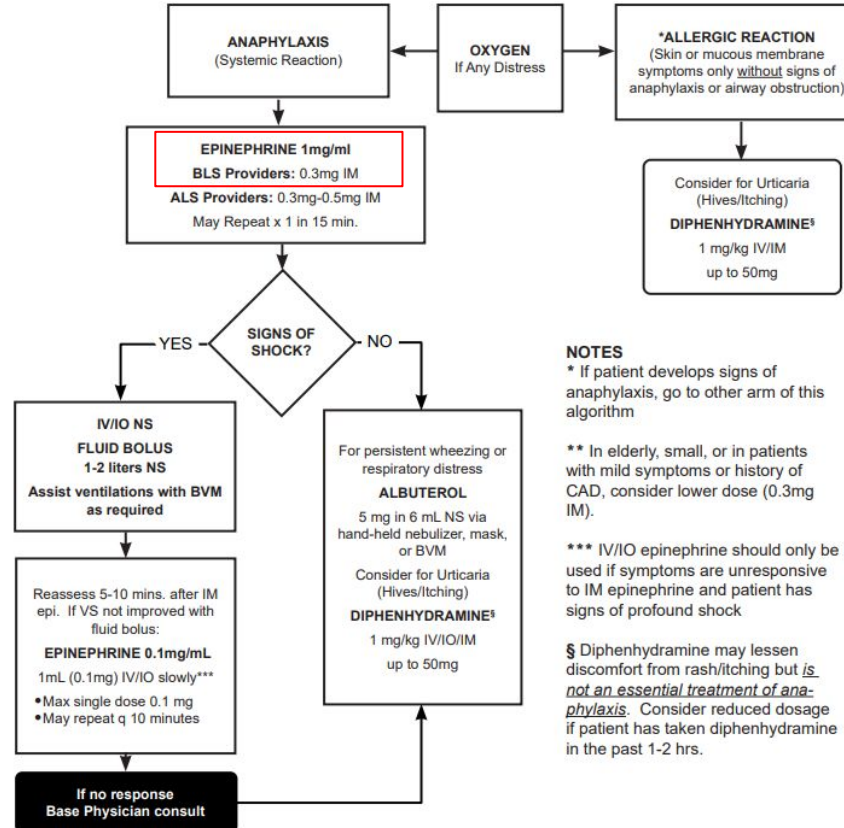
Rate/Route Intramuscular (IM), fast onset

Note: Not under BMRC First Aid Scope of Practice

ALCO Protocol

ANAPHYLAXIS / ALLERGIC REACTION

- **Epinephrine IM** is the cornerstone of treatment of anaphylaxis and should be given as early as possible. It is best absorbed from an injection in the lateral thigh
- If the patient is in severe distress, **administer Epinephrine IM** and consider immediate transport
- **SIGNS OF ANAPHYLAXIS (Systemic Reaction)** – wheezing, repetitive cough, tightness in chest, stridor, difficulty swallowing or tightness in throat, change in voice, dizziness or feeling faint, abdominal complaints (pain, repeated vomiting, diarrhea or incontinence), anxiety, lethargy
- **SIGNS OF ANAPHYLACTIC SHOCK** – pallor, hypotension, cool, clammy mottled skin, altered sensorium
- **Facial/oral swelling (Angioedema)** can accompany anaphylaxis, but is not always present



Snake Bites

How to tell if a snake bite is venomous?

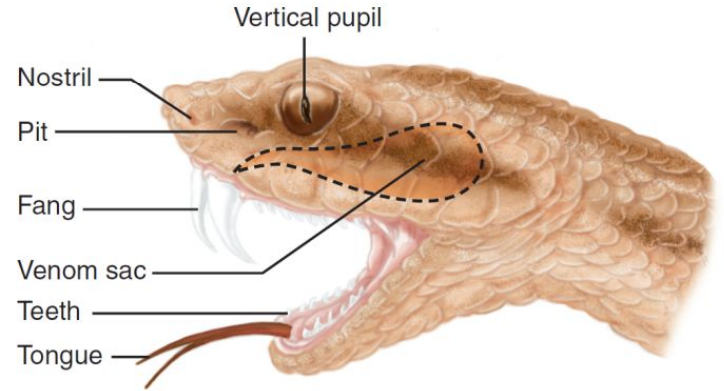
Two puncture wounds = venomous



~1/2" apart

Treatment

- Monitor for anaphylactic reaction to venom
- Calm the pt - most snake bites are non-fatal
- Advanced notice to hospital - antivenom
- Supine positioning



ALCO protocol

6. SNAKE BITE:

- 6.1 Gently wash the area with cool, wet cloth
- 6.2 Avoid constricting bands
- 6.3 Do not elevate

Scenario #3

Responding to a 19YO Female with a Left Forearm and Chest Burn

What is your field impression?

Scenario #3

Partial thickness burn covering 8-10% of body.

Types of Burns

superficial (First Degree)

- Only epidermis
- Red, painful, dry
- No blisters
- Example: mild sunburn

Partial Thickness (Second Degree)

- Epidermis + part of dermis
- Blisters
- Moist, red, very painful
- Swelling common

Full Thickness (Third Degree)

- All skin layers destroyed
- White, brown, or charred
- Dry, leathery
- Little or no pain (nerve damage)

Rule of 9s

- Head and neck: 9%
 - Each arm: 9% (4.5% front, 4.5% back)
 - Anterior torso (chest + abdomen): 18%
 - Posterior torso (back): 18%
 - Each leg: 18% (9% front, 9% back)
 - Genitals/perineum: 1%
-
- Rule of Palms, Palm \approx 1%

Critical Burns

Transport rapidly if:

- Airway/face burns
- Hands, feet, genitalia
- Major joints
- Full-thickness burns
- Large TBSA burns
- Electrical or chemical burns

BURN PATIENT CARE

2. Cool with water
3. **Maintain body temperature and observe for hypothermia**

D. CHEMICAL BURNS

1. Remove clothing
2. **Liquid chemicals:**
→ Flush **immediately** with copious amounts of tepid water for 10 - 15 minutes
3. **Dry chemicals:**
→ Brush off as much as possible, then flush with copious amount of tepid water for 10 - 15 minutes
4. Identify chemical
5. Assess for associated respiratory burns

BURN PATIENT CARE

- **Routine Medical Care**
- Rescuer safety
- Assume airway/respiratory involvement
- Stop the burning process - **DO NOT USE COLD PACKS**
- Assess for associated trauma

A. BASIC ASSESSMENT AND MANAGEMENT

1. **Assess Airway and Breathing**
 - 1.1 Assess for thermal airway injury and smoke inhalation - quick list of S/S here
 - 1.2 High flow oxygen is critical - ??? for all **burns**
 - 1.3 Be prepared for intubation
2. **Assess and expose**
 - 2.1 Perform a mini neurological exam - level of consciousness
 - 2.2 Expose and examine the patient for other areas of burn
 - 2.3 Remove jewelry, but do not remove stuck clothing
3. **Obtain vascular access**
 - 3.1 Obtain at least one IV access point for pain management and fluid resuscitation and if possible a second IV for major burns
4. **Administer IV fluids – See**
5. **Document burn severity and treat the pain**
 - 5.1 Estimate the severity of the burns using the ABA Classification or the "Rule of 9s or "Rule of 1s""
 - 5.2 **Treat pain.** Pain management should be considered mandatory for moderate to severe burns. See Pain Management Policies – Adult (**page 43**) and Pediatric (**page 74**)
6. **Protect against hypothermia and infection - dress burns**
 - 6.1 Dry, sterile dressing for any burn involving >10% TBSA (Total Body Surface Area)
 - 6.2 Keep patient warm to prevent hypothermia (use sheets or blankets)
 - 6.3 Moist, sterile dressings are OK for small burns (<10% TBSA)
7. **Elevate burned body parts - 30°**
8. **Address psychological needs**
 - 8.1 Be honest and compassionate
 - 8.2 Consider anxiolytics – **Contact Base Physician for Midazolam**
9. **Maintain body temperature and observe for hypothermia**

B. ELECTRICAL BURNS

1. Turn off the power source if patient is still attached
2. See first responder defibrillation protocol if patient is unconscious and pulseless

C. TAR BURNS

1. Do not attempt to remove the tar