CHAPTER 20

Cold and Heat Emergencies

Video – Cold & Heat Emergencies

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Lesson Objectives

1. Describe the different types of cold and heat emergencies and what you can do to prevent them.

2. Explain factors that may make a person more susceptible to a cold or heat emergency.
Lesson Objectives \textit{continued}

3. List the signs and symptoms and first aid for:
   - Frostbite
   - Hypothermia
   - Heat cramps
   - Heat exhaustion
   - Heat stroke
Heat and Cold Emergencies

- Cold or hot environments cause medical problems if body not protected.
- Injuries often begin gradually but develop into emergencies.
- Untreated, injuries can lead to serious injury or death.
Body Temperature

- Constant internal temperature necessary
- Body has several mechanisms to create or lose heat:
  - Mechanisms cannot maintain constant temperature when exposed to temperature extremes for extended period.
Mechanisms for Staying Warm

- **Metabolic processes:**
  - Most body heat produced this way.
- **Contraction of muscle tissue:**
  - Including shivering
- **Vasoconstriction:**
  - Less radiation of heat away from skin
Mechanisms for Staying Cool

- **Vasodilation:**
  - More warm blood to surface of skin to be radiated away
  - Primary heat loss method

- **Sweating:**
  - Evaporation from skin surface cools body
The Body in Temperature Extremes

- Prolonged cold exposure can lead to hypothermia.
- Prolonged heat exposure can lead to heat stroke.
- Both hypothermia and heat stroke develop gradually and worsen with continued exposure.
- Hypothermia and heat stroke can happen to anyone.
Risk Factors for Cold and Heat Injuries

- Young children
- Elderly
- Injuries
- Chronic health problems
- Mental impairment
- Dehydration
- Too little body fat (for cold injury)

- Too much body fat (for heat injury)
- Activity in extreme environments
- Medications and drugs (including alcohol)
- Environmental variables (water immersion, wind chill, humidity)
Cold Emergencies

- Frostbite
- Hypothermia
Frostbite

- Freezing of skin or deeper tissues
- More common in exposed skin areas (head, hands, feet)
- Wind chill increases risk.
- Severe frostbite kills tissue and can result in gangrene and amputation.
First Aid: Frostbite

1. Move victim to warm environment.
2. Remove wet clothing and constricting items.
3. Put dry gauze or fluffy cloth between frostbitten fingers or toes. Protect area.
4. Seek medical attention immediately.
5. Only if medical care delayed, rewarm area.
6. Protect and elevate area if possible.
Rewarming Frostbite

• If help is delayed, rewarm severe frostbite by immersing area in lukewarm water for 20-30 minutes.

• Do not apply direct heat source to skin.
  • Do this only if there is no risk of refreezing.
Hypothermia

- Occurs when body cannot make heat as fast as it loses it.
- Body temperature drops below 95°F.
- Can occur whenever and wherever person feels cold.
- Progressive
- May occur gradually or quickly.
- About 1,300 people die each year in United States.
Facts About Hypothermia

- Occurs more easily in elderly or ill people.
- Those under influence of drugs or alcohol are more at risk.
- Person immersed in cold water cools 30 times faster than in cool air.
- Victims in cold water more likely to die from hypothermia than drowning.
Facts About Hypothermia continued

• Victims in cardiac arrest after immersion in cold water have been resuscitated after a long time underwater.

Don’t Give Up!
Preventing Hypothermia

• Check weather forecast before going outdoors.

• In cold weather take along:
  • Extra clothing (especially several pair of socks)
  • Sleeping bag (or survival bag)
  • High-energy food bars
  • Sports drink (containing carbohydrates and electrolytes) to drink during endurance activities
Preventing Hypothermia continued

- Do not use tobacco or consume alcohol or caffeine.
- Dress for the cold:
  - Layer clothing
  - Wind- and waterproof outer layer
  - Hat
- During cold periods, check on people who are at risk.
Hypothermia: Early Signs and Symptoms

- Shivering
- Numbness
- Lethargy
- Poor coordination
- Slurred speech
- Infants may have bright red skin and little energy.
Hypothermia: Late Signs and Symptoms

- Shivering typically stops.
- Victim may not feel cold.
- Breathing becomes shallow.
- Mental status deteriorates.
- Victim may become unresponsive and stop breathing.
First Aid: Hypothermia

1. Check for responsiveness and normal breathing, and call 9-1-1. Except in mild cases, the victim needs immediate medical care.

2. Provide CPR if the victim is unresponsive and not breathing normally.

3. Quickly move the victim out of the cold. Remove any wet clothing.
4. Warm victim with blankets or warm clothing.

5. Only if victim is far from medical care, use active rewarming by putting the victim near a heat source and putting warm (but not hot) water in containers against the skin.

6. Monitor breathing and be ready to give CPR if needed.
Types of Heat Illness

- **Heat cramps:**
  - Least serious and usually occurs first

- **Exertional dehydration:**
  - Occurs when body loses more fluid than it takes in due to excessive sweating.

- **Heat exhaustion:**
  - Develops when body becomes dehydrated.

- **Heat stroke:**
  - Medical emergency
  - If untreated, can cause death.
Heat Emergencies

- Most occur during hot weather but can also occur in hot settings (furnace room, factory, vehicle).
- Average of 618 deaths/year
- Heat stroke is progressive – starts with milder symptoms, but can lead to death.
Preventing Heat Emergencies

- Wear loose, lightweight clothing.
- Rest frequently in cool or shady areas.
- Drink fluids before, during and after activity.
- Avoid alcohol and caffeine.
- Drink carbohydrate-electrolyte drinks, such as sports drinks, during endurance activities.
Preventing Heat Emergencies continued

- Avoid exertion if overweight or elderly.
- Acclimatize to new hot area.
- During heat waves, check on those at risk.
- Do not leave children or pets alone in vehicle.
- Use sunscreen.
Heat Cramps

- Activity in hot environment can cause painful muscle cramps.
- More common in lower legs or abdominal muscles
- Result when sweating lowers body’s sodium levels.
- May accompany heat exhaustion and heat stroke.
First Aid: Heat Cramps

1. Have person stop activity and sit quietly in cool place.
2. Give a carbohydrate-electrolyte drink, such as sports drink, or water.
3. Have person avoid strenuous activity for a few hours.

Additional Care:

• For leg cramps, stretch the muscle by extending leg and flexing ankle. Massage and ice the muscle.
• Seek medical attention for victim with heart problems or if cramps do not subside within an hour.
First Aid: Exertional Dehydration

1. Have the victim rest, in a cool environment, if possible.

2. Give the victim a carbohydrate-electrolyte drink, such as a sports drink, to promote rehydration. (Other beverages, such as 2% milk and coconut water are also effective.)

   If a carbohydrate-electrolyte drink is not available, give water.
Heat Exhaustion

• Heavy sweating may lead to dehydration and depletion of salt and electrolytes if person doesn’t drink enough fluids.

• Unrelieved, may lead to heat stroke.
First Aid: Heat Exhaustion

1. Move victim from heat to rest in cool place. Loosen or remove clothing.

2. Cool victim with wet cloths, or spraying or sponging with cool water.

3. Give carbohydrate-electrolyte drink, such as sports drink, or water.
Heat Stroke

- Life-threatening emergency
- More common during hot, summer periods
- May develop slowly over days or more rapidly with strenuous activity.
- Victim may be dehydrated and not sweating or may be sweating heavily.
- Causes body temperatures $\geq 104^\circ F$
Heat Stroke *continued*

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Signs and Symptoms: Heat Exhaustion and Heat Stroke

**Heat Exhaustion**
- Skin is pale or ashen and clammy.
- Victim is dizzy or tired or may be irritable and have a headache.

**Heat Stroke**
- Skin is flushed and feels hot to touch.
- Victim becomes confused and irrational and may become unresponsive or have convulsions.
First Aid: Heat Stroke

1. Call 9-1-1.

2. Move victim to cool place.

3. Remove outer clothing.

4. Cool victim quickly, preferably by immersion up to neck in cold water or other methods.
Chapter – Opening Scenario

After several days of bitterly cold weather, you wonder how your elderly neighbor is coping with the cold, so you stop by his house. You have to ring the door several times before he answers, and when you step inside, it feels very cold inside his house. You ask why it is so cold, and he mumbles that with rising fuel prices, he can’t afford to turn the thermostat any higher. You follow him into the living room where he stumbles before sitting on the sofa. You notice that he is shivering. You ask if you can get him a blanket. He is slow to respond, and his words are slurred.

Is he experiencing a problem?

What should you do?
Scenario 1

You are working outside on a bitterly cold day. Your coworker is wearing only thin, cotton gloves, and after a few hours he says his fingers have become numb. You look at them and the skin looks waxy and white.

What should you do?
Scenario 2

A worker broke through the ice in a shallow pond, and it was some time before he could be pulled out. His head did not go below the surface, but he is shivering uncontrollably and seems very lethargic.

What steps should you take?
Scenario 3

You are driving through a road construction area on a hot day when you see 2 men standing around a coworker lying on the ground. They do not know what happened to her or what to do. She is unresponsive and breathing fast. Her skin is flushed, dry and hot to your touch.

What should you do?