Introduction

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Overview

• Anatomy of Exposure (Heat vs Cold)
• Drowning/ Near Drowning
• Bites/ Stings
• Quiz Time

TEMPERATURE RELATED EMERGENCIES

EXPOSURES

Anatomy of Exposure

Exposure Severity Factors
• Age
  – Young vs Old
• Physical Condition
  – Out of shape vs in shape
• Hydration
• Type of Environment

EXPOSURE – Heat Transfer

• Conduction
  – Direct transfer of heat by contact
• Convection
  – Transfer of heat via circulating air
• Evaporation
  – Any liquid that turns to gas taking heat with it
• Radiation
  – Heat transfer from radiant energy
• Respiration
  – Heat from warm air in the lungs is exhaled into the environment
EXPOSURE – Cold Temps

• Types
  – Local/ isolated
    • Frost bite
    • Frost nip
  – Systemic/ entire body
    • Hypothermia

EXPOSURE - Local/ Isolated

• Frost nip
  – Prolonged exposure to cold
  – Skin may freeze
  – Deeper tissues cold but not frozen
    • For the most part unaffected
• Frost Bite
  – Most Serious of isolated injuries
  – Tissues are Frozen
    • Damaged cells
      – Can lead to Gangrene
  – Often waxy and hard to the touch

EXPOSURE - Frost Nip/Frost Bite Treatment

• Remove patient from cold
• Remove wet or restricting clothing
• Handle to injured area carefully
• With frost nip
  – Okay to rewarm affected area
• With frost bite
  – Remove jewelry
  – Loose dry sterile dressing
  – Leave rewarming for ER

EXPOSURE - Systemic/Entire Body

• Hypothermia
  – Determined by Core Temp
• Mild
  – Temp 90-95 Degrees F
• Moderate
  – Temp 89-92 Degrees F
• Severe
  – Temp 80-88 Degrees F
• Death
  – Typically with core temp below 80 F
EXPOSURE – Systemic Signs

**Mild**
- Shivering
- Constricted Blood Vessels
- Elevated respiratory rate
- LOC usually unaffected

**Moderate**
- Muscle stiffness
- Slow respirations and pulses
- LOC usually confused

**Severe**
- Comatose
- Weak pulses
- Possible arrhythmias
- Slow respirations

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**Osborne Waves of Hypothermia**

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**Hypothermia Treatment**

- Remove patient from cold environment
- ABC’s
  - When checking pulse make sure to check for minimum of 30 sec
  - Due to possible bradycardia in severe hypothermic patients
  - Avoids rough handling
  - Could cause further harm
  - Cause dysrhythmias
- Remove wet clothes and cover with warm dry blanket
- Rapid Transport
- Avoid Active Cooling
  - Passive Cooling Okay

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**ILS/ALS-Level**

- Consider securing the airway of unresponsive
- Establish IV access (Bilat, large bore, warmed bolus)
- Check glucose, if low, administer per protocol D50
- Monitor for CHF (Sluggish myocardial contractility)
- If pulseless, begin CPR
  - Withhold cardiac medications until core temp rises (>86)
  - Limit shock for VF/VT
  - Transport

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**Hyperthermia**

- Body Temp Exceeding 101 degrees F

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**Three Types of Emergencies**

- Heat Cramps
- Heat Exhaustion
- Heat Stroke
EXPOSURE – Heat Cramps

• Heat Cramps
  – Usually Painful
  – Cramps that usually occur after
    • Exercise
    • Hot outdoor activates
    • Working
  – Thought to be changes in electrolytes

EXPOSURE – Heat Exhaustion

• Heat Exhaustion
  – Follows Heat Cramps
  – Loss in fluid volumes
    • From excess sweating
  – Causes collapse
  – Signs/ Symptoms
    • Dizziness, weakness, nausea
    • Elevated body temp
    • Still sweating, pale, cool to the touch

EXPOSURE – Heat Stroke

• Heat Stroke
  – Least Common but most serious
  – Bodies loss in regulating body temp
  – Unable to shed excess heat
  – Body temp rises
    • Tissue death
    • Temp may exceed 106 degree F
  – Hot, dry skin
  – Altered LOC

HEAT STROKE

- Anxiety - Confusion
- Skin hot & dry
- Nasal and congestion
- Impaired sweating
- Dehydration
- Fever
- Altered LOC
- Hypotension
- Hypothermia
- Body temperature
- Pulse & Respiratory

EXPOSURE – High Temp

• Remove from heated environment
  – Less serious conditions
    • Okay to give fluids by mouth
  • Set A/C if possible to coldest setting
  • Remove clothing
  • Cold packs in neck, groin and arm pit
  • Active cooling okay
  • Cool IV fluids
  • O2
  • Rapid transport

WATER RELATED EMERGENCIES

DROWNING/NEAR DROWNING
**DROWNING - Types**

- **Drowning**
  - Death resulting from suffocation
- **Near Drowning**
  - Survival post suffocation
    - At least 24 hours post event
      - Many may die post complications
      - Usually aspiration related problems

**DROWNING - Statistics**

- Most drownings occur at un-guarded sites
  - Apt pools, home pools, oceanfront, lakes, rivers
  - Second leading COD for children under 14.
- 1 in 5 drowning deaths are children under 14
- About 10 drowning deaths per day
- 50% of near-drowning victims seen in hospital ED require further hospitalization and care
- Males make up 80% of drowning deaths
- Worldwide – 372,000 deaths per year
- 3rd Leading COD worldwide

**DROWNING - Wet/Dry**

- **Dry Drowning**
  - In response to water entering the upper airway, the epiglottis covers the trachea
  - Leads to laryngeal spasm
- **Wet Drowning**
  - Eventually, the laryngeal spasm relaxes, epiglottis relaxes and water enters lungs
- **Secondary Drowning**
  - Infection, cerebral edema, pulmonary edema

**DROWNING – Risk Factors**

- **Age**
  - Younger people less likely to be aware of risk
- **Swimming Ability**
  - Access to swimming lessons
- **Access to water**
  - Proximity to irrigation canals, open water, etc
- **Low Income (lower socioeconomic status)**
  -Less aware of risk, access to swim lessons, prevention devices
- **Alcohol use**

**DROWNING – Stages of Drowning**

- **Distressed Swimmer**
  - Able to call for help
  - Cramps, Tired, etc
  - Too exhausted to continue forward movement
- **Active Drowning Victim**
  - Vertical in water (no forward movement)
  - Unable to control movement
  - Falls arms to side (unable to reach for objects)
  - Usually less than a minute before submersion
  - Unable to call out for help
  - No effective leg movement

**DROWNING – Treatment**

- Extrication from water (if trained - per protocol)
- ABCs – Assist ventilation if needed
  - Consider PEEP/CPAP if allowed per protocol
  - Intubate if necessary to secure airway
  - O2 as required
- Cardiac Monitor, EtCO2, Pulse Ox
- Obtain core temp
- If in arrest, follow CPR/ACLS protocols
  - Always transport to ED for evaluation (Conscious)
DROWNING – Panic in the Water

- Something Goes Wrong
- Leads to Panic
- Breathing difficulty
  - CO2 retention
  - O2 Depletion
- Sinking below surface
- Exhaustion
- Cardiac Arrest
  - Usually post respiratory arrest

ANIMAL/INSECT BITES

NATURE LIFE EMERGENCIES

NATURE - Bites

- Insects/ Spiders
  - Rarely cause death
  - Black Widow/ Brown Recluse
    - Can deliver serious bites
    - Localized tissue death
    - Painful
    - Muscle spasms

NATURE - Stings

- Stings
  - Bees
    - Anaphylaxis
    - Local Pain
    - Swelling

NATURE – Bites/Stings Treatment

- ABC’s
- Vitals
- Ice pack for swelling/ comfort
- Anaphylaxis
  - Epi-Pen/ Epi-Pen Jr
  - Benadryl
  - Transport
- Supportive Care

NATURE – Dog Bites

- Size/Power of Dog
- Rabid?
  - Fever
  - Agitation
  - Painful Spasms
  - Foaming at the mouth (excessive saliva)
NATURE – Dog Bite Treatment

- Secure Animal (Other resources as needed)
- Control Bleeding
- ABCs
- Transport for evaluation at ER

It's Quiz Time!

POST-TEST

1.) What is the difference between Frostbite and Frosting?
   a. Frostnip is defined as tissue death of the fingers whereas Frostbite is tissue death of the extremities
   b. Frostnip is defined as superficial tissue cooling whereas Frostbite is damage or death of the surrounding tissue
   c. Frostnip is defined as mild-moderate tissue death resulting from exposure to cold for prolonged periods of time whereas Frostbite is superficial cooling of the surrounding tissue
   d. Frostnip is defined as numbness to the fingers only whereas frostbite is defined as cooling of the surrounding tissues resulting in no permanent damage

2. What is the difference between Heat Stroke and Heat Exhaustion?
   a. Heat stroke is thought to be less life threatening than heat exhaustion
   b. Heat stroke is generally a problem with the body's thermoregulation system, whereas heat exhaustion is more about fluid and electrolyte loss
   c. Heat exhaustion generally occurs when the body temp reached 99.5-100.5°F whereas heat stroke occurs at temperatures above 104°F.
   d. Heat exhaustion occurs more often in the very young, whereas heat stroke is more common in the elderly.

3. You arrive on scene where an unconscious patient has suffered from a near drowning. The patient is pulseless and apnea. They have been brought onto safe, dry land. What's your next course of action?
   a. Start the patient on a NRB at 15LPM, Place in left lateral recumbent position and provide rapid transport to the hospital.
   b. Apply a c-collar. Assess for skeletal and internal injuries. Place the patient on a backboard. Using the head-tilt-chin life, open the airway and begin CPR.
   c. Using the jaw-thrust maneuver, open the airway and begin CPR. Set up the AED. Rapid Transport.
   d. Using the head-tilt-chin lift, open the airway and begin rescue breathing. Setup the AED and transport.

4. What is your greatest concern for a patient who has suffered from what appears to be an insect or snake bite?
   a. hypovolemic shock
   b. severe edema and tissue necrosis
   c. altered level of consciousness
   d. anaphylactic shock

5. Your BLS rig has arrived on scene to a patient who has been stung in the face by a bee and is having obvious trouble breathing. The patient had no prescription for an epi pen. You didn’t check out your rig and realize that an epi pen was not restocked. A bystander offers the use of his epi pen. What should you do next?
   a. Administer the injection
   b. Encourage the patient to self-administer the bystander’s epi pen
   c. Do not give the injection. Treat for shock. Rapid Transport.
   d. Intubate the patient and rapid transport
SECRET QUESTION
An air embolism can occur in SCUBA divers because
a. the SCUBA tank was improperly filled with the incorrect mix of nitrogen/oxygen
b. the diver resurfaces too quickly, causing nitrogen to become trapped in the tissues of the body and then work its way into the blood stream
c. all divers gradually accumulate microscopic air pockets on their lungs causing small ruptures of the alveoli. This eventually leads to air embolism
d. the diver has improper training, faulty equipment or an underwater emergency leading them to hold their breath for long periods of time.

Questions?
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Certificates
EMS Live@Nite presentation, all certificates will be printed by participants or their agency. The certificate template will be available through the health training website at the same location as all presentation downloads. It will be posted the day after each monthly presentation.

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