Chapter 30 Environmental Emergencies

Introduction (1 of 2)
• Medical emergencies can result from _______________________ to heat or cold.
• Certain populations are at higher risk for heat and cold emergencies.
  • Children
  • _________________ people
  • People with chronic illnesses
  • Young adults who _______________________ themselves

Introduction (2 of 2)
• Water recreation can also create medical emergencies.
  • _________________ injuries
  • _________________ injuries
• Environmental emergencies require prompt treatment in the hospital.

Regulation of Body Temperature (1 of 3)
• Body works best at ____________ degrees F.
• Increased temp leads to _______________________ metabolic rate and tissue damage
• Decreased temp leads to _______________________ metabolic rate and tissue damage

Regulation of Body Temperature (2 of 3)
• Body temperature is maintained by _______________________ heat production with heat loss.
• If heat production >heat loss = _________________ body temperature.
• If heat loss > heat production = _________________ body temperature.

Regulation of Body Temperature (3 of 3)
• Hyperthermic Compensation
  • _________________, sweating
  • Increased cardiac output
  • Increased _______________________ rate

Factors Affecting Regulation of Body Temperature
• Physical condition
• _________________
• Nutrition and _________________
• Environmental conditions
  • Temperature
  • _________________
  • Wind

Loss of Body Heat (1 of 2)
• _________________
  • Transfer of heat from body to colder object
• _________________
• Transfer of heat through circulating air
• ______________________
• Cooling of body through sweating

9 Loss of Body Heat (2 of 2)
• Rate and amount of heat loss can be modified in three ways:
• Increase in __________________ production
• Move to sheltered area where heat loss is decreased
• Wear ______________________ clothing

10 Hypothermia
• Lowering of the body temperature below __________ F (35ºC)
• Weather does not have to be below freezing for hypothermia to occur.
• __________________ persons and infants are at higher risk.
• People with other illnesses and injuries are susceptible to hypothermia.
• Key organs begin to ______________________ down

11 General Signs and Symptoms of Hypothermia
• ______________________
• Cold skin
• Bluish skin
• ______________________ pulse
• Slow breathing

12 Signs and Symptoms of Hypothermia (93º to 95º)
• ______________________
• Constricted vessels, rapid pulse and respirations
• Red, pale, ______________________ skin
• Withdrawn LOC

13 Signs and Symptoms of Hypothermia (89º to 92º)
• Loss of ______________________, muscle stiffness
• Slowing pulse and respirations
• Confusion, lethargy, ______________________

14 Signs and Symptoms of Hypothermia (80º to 88º)
• ______________________
• Weak pulse, cardiac arrhythmias
• Very slow ______________________

15 Emergency Medical Care (1 of 3)
• Suspect hypothermia in any pt with decreased LOC in a ________________ environment.
• Remove patient from cold environment.
• Do not allow the patient to ________________________
• Remove any ______________________ clothing and cover with blankets.

16 Emergency Medical Care (2 of 3)
• Do not _______________________ extremities or allow patient to eat or to use any stimulants including tobacco.
• Prevent further heat loss. Begin passive rewarming.
• Apply warm _______________________ oxygen if available.

17  Emergency Medical Care (3 of 3)
• Check the ________________ of the hypothermic patient for 30 - 45 seconds before starting CPR.
• Only perform 1 Defibrillation on hypothermic patients in cardiac arrest
  • After 1 shock (or series of 3) perform _______________________ only
• Notify the hospital about the patient’s condition ahead of time.

18  Local Cold Injuries
• Frostnip
  • ________________ of the skin but not the deeper surface
• Immersion (trench) foot
  • Prolonged exposure to cold water
• Frost bite
  • Freezing of a body part, usually an _______________________

19  Frostbite

20  Emergency Care for Local Cold Injury
• Remove the patient from further exposure to the cold
• Handle the injured part _______________________ .
• Administer oxygen.
• Remove any wet or _______________________ clothing.
• Never rub the area.
• Do not break _______________________ .
• Transport.

21  Warm-Water Bath
• Used to actively re-warm, only when on scene or _______________________ time is prolonged
• Water temperature should be between 100-105oF.
• Recheck water temperature and stir to circulate.
• Keep body part in _______________________ until warm and sensation returns.
• Dress with _______________________ , sterile dressings.

22  Cold Exposure and You
• EMT-Bs are at risk for hypothermia when working in a cold environment.
• Stay aware of local weather conditions.
• _______________________ appropriately and be prepared.
• Vehicle must be properly equipped and maintained.
• Never allow yourself to become a _______________________ !

23  Heat Exposure
Normal body temperature is 98.6ºF.
Body attempts to maintain normal temperature despite ambient temperature.
Body cools itself by _______________________ (evaporation) and dilation of blood vessels.
High temperature and _______________________ decrease effectiveness of cooling mechanisms.

**24 Heat Cramps**

- Painful muscle spasms that occur after vigorous exercise
- Usually a healthy person working/playing in a hot environment
- Do not occur only when it is hot outdoors
- Exact cause is not well _______________________ 
- Usually occur in the leg or _______________________ muscles

**25 Treatment of Heat Cramps**

- Remove the patient from hot environment.
- Rest the cramping muscle.
- Replace _______________________ by mouth.
- If cramps persist, _______________________ the patient to hospital.

**26 Heat Exhaustion**

- A form of _______________________ shock caused by profuse sweating.
- Most common illness caused by heat.
- Caused by vasodilation and volume loss by sweating.
- Main groups affected:
  - People working in hot environments
  - _______________________ 
  - Hypertensives, diuretics

**27 Signs and Symptoms of Heat Exhaustion (1 of 2)**

- Onset while working hard or exercising in _______________________ environment
- In elderly and young, onset may occur while at rest in hot, humid, and poorly ventilated areas.
- Change in LOC with accompanying nausea, _______________________ , or headache
- _______________________ cramping

**28 Signs and Symptoms of Heat Exhaustion (2 of 2)**

- Cold, clammy skin with ashen pallor
- Dry _______________________ and thirst
- Dizziness, weakness, or fainting
- Patients usually have normal vital signs, but pulse can _______________________ and blood pressure can decrease.
- Normal or slightly elevated body temperature

**29 Emergency Medical Care**

- Remove extra clothing and remove from hot environment
• Give patient oxygen
• Have patient lie down and ____________________ legs
• Fan patient or place under A/C
• If patient is alert, give ____________________ slowly.
• Be prepared to transport.

30 **Heat Stroke (1 of 2)**
• A condition in which the body’s temperature regulation mechanism ________________ during exposure to heat.
• AKA “Sun Stroke”
• Most serious heat illness. If untreated death can easily occur.
• Hot humid environment makes body’s ________________ system ineffective

31 **Heat Stroke (2 of 2)**
• Body temps > 106 degrees leads to damage (shut down) of temperature regulating centers and loss of sweating.
• Increased core temp leads to metabolic heat ________________ which leads to increase in body temp.
• ________________ leads to cardiovascular collapse.
• 25 to 50% mortality rate

32 **S/S of Heat Stroke**
• Hot, ________________ , flushed skin (no sweating). Skin may be cool and moist early on
• Change in behavior leading to unresponsiveness
• Increase in body temperature
• Pulse rate is rapid, then slows.
• Blood pressure drops.
• ____________________
• ____________________ can occur if the patient is not treated.

33 **Care for Heat Stroke (1 of 2)**
• Move patient out of the hot environment.
• Provide A/C on high
• Remove the patient’s ________________ .
• Give the patient oxygen.
• Apply ____________________ packs to the pt’s neck, armpits, and groin.

34 **Care for Heat Stroke (2 of 2)**
• Cover the patient with ________________ towels or sheets.
• Aggressively ________________ the patient.
• Immediately transport patient.
• Notify the hospital of patient’s condition.

35 **Drowning, Near-Drowning, and Other Water Hazards**

36 **Drowning and Near Drowning**
• Death as a result of suffocation after submersion in water
• ________________ drowning
• Survival, at least temporarily (24 hours), after suffocation in water

37 Drowning Process
38 Emergency Medical Care (1 of 2)
• If ________________, rescue and remove from water.
• Begin rescue breathing as soon as possible.
• Maintain ________________ spine stabilization.
• If air does not go in, treat for obstructed airway.
• Maintain patent airway. If there is no spinal injury, turn patient on side to allow draining from upper airway.

39 Emergency Medical Care (1 of 2)
• Check pulse and start ________________ if needed.
• Make sure patient is warm, especially after cold-water immersion.
• Always ________________ a near drowning patient regardless of how good he/she looks.

40 Spinal Injuries in Submersion Incidents
• Submersion incidents may be complicated by spinal fractures and spinal cord injuries
• Suspect spinal injury if:
• Submersion has resulted from a ________________ mishap or long fall.
• Patient is ________________ .
• Patient complains of weakness, paralysis, or numbness.

41 Spinal Stabilization in Water
• Turn the patient ________________ .
• Restore the airway and begin ventilation.
• Secure a ________________ under the patient.
• Remove the patient from the water.
• Cover the patient with a ________________ .

42 Position Supine
43 Begin Ventilations
44 Position Backboard
45 Secure to Backboard
46 Remove From Water
47 Cover With Blanket
48 Resuscitation Efforts
• ________________ can protect vital organs from hypoxia.
• Documented case of a survivor of a 66-minute cold water submersion
• Diving reflex may cause heart rate to slow.
“You’re not dead until you’re _______________________ and dead”

49 Diving Problems
- _______________________ problems
  - Usually due to the sudden increase in pressure on the body as the person dives
- _______________________ problems
  - Not commonly seen
- _______________________ problems
  - Air embolism and decompression sickness

50 Diving Problems Affecting the Ears
- _______________________ 
  - Inability to equalize pressure in sinuses and middle ear
    - causes ear pain
  - Ear drum _______________________
    - Inability to equalize pressure in middle ear
    - perforation of the tempanic membrane
    - Causes disequalibrium

51 Nitrogen Narcosis (Rapture of the Deep)
- Normally caused by faulty air mixture
- Under pressure, _______________________ becomes toxic to the CNS
- Disorientation, confusion results
- Can cause drowning or _______________________ ascent
- Problems disappear upon _______________________

52 Air Embolism
- Most dangerous and most _______________________ scuba diving emergencies
- Gas bubbles in blood stream
- Pt surfaces suddenly while holding _______________________
- Compressed air in the alveoli expands
- Lung tissue tears
- Air bubbles pumped into the brain
- Can occur in as little as ________ feet of water.

53 Signs and Symptoms of Air Embolism (1 of 2)
- _______________________ of skin
  - Froth at the mouth and nose
  - Severe pain in muscle, joints, or abdomen
  - _______________________ and/or chest pain

54 Signs and Symptoms of Air Embolism (2 of 2)
- Dizziness, nausea, and vomiting
  - _______________________
Inability to speak, understand, read, or write
• Difficulty with ________________
• Paralysis and/or coma
• ________________ pulse or cardiac arrest

55 Decompression Sickness (The Bends) (1 of 2)
• Diver does not ________________ slowly enough to let dissolved nitrogen leak out of blood gradually
• Nitrogen is trapped in the tissues obstructing ________________ vessels

56 Decompression Sickness (The Bends) (2 of 2)
• Conditions that can cause the bends:
  • Too ________________ an ascent from a dive
  • Too long of a dive at too deep of a depth
  • Repeated dives on the same day
• Dive must be at least ___________ feet deep
• S/S takes 1 to 48 hours to develop

57 S/S of Decompression Sickness
• ________________ changes
• Fatigue
• Deep pain to joints (most common symptom)
• ________________ pain
• Mottling of skin
• Numbness or paralysis
• Chest pain
• ________________

58 Decompression Sickness vs. Air Embolism
• You may find it difficult to distinguish between air embolism and decompression sickness.
• Air embolism generally occurs ________________ on return to the surface.
• Symptoms of decompression sickness may not occur for several ________________.

59 Care for Air Embolism and Decompression Sickness
• ________________ the patient from the water.
  • Keep patient calm.
  • Begin BLS and administer oxygen.
  • Place the patient in the left lateral ________________ position with his or her head down.
  • Provide prompt transport to ________________ (recompression) chamber.

60 Hyperbaric Chambers

61 Lightning (1 of 3)
• Lightning is the ________________ most common cause of death from isolated environmental phenomena.
• Strikes boaters, swimmers, golfers, anyone in large, open area
  • Cardiac _______________________ and tissue damage are common.
  • Direct strikes can cause entrance and _______________________ wound

62  □ Lightning (2 of 3)
• Many individuals are _______________________ struck when standing near an object that has been struck by lightning, such as a tree.
• The cardiovascular and _______________________ systems are most commonly injured.
  • Respiratory or cardiac arrest is the most common cause of lightning-related deaths.

63  □ Lightning (3 of 3)
• Three categories of lightning injuries:
  • _______________________ : Loss of consciousness, amnesia, tingling, superficial burns
  • Moderate: Seizures, respiratory arrest, asystole (spontaneously resolves), superficial burns
  • _______________________ : Cardiopulmonary arrest

64  □ Emergency Medical Care
• Protect yourself.
• Move patient to _______________________ area or stay close to ground.
• Use reverse triage.
• Treat as for other _______________________ injuries.
• Transport to nearest facility.

65  □ Spider Bites
• Spiders are numerous and widespread in the US.
• Many species of spiders bite.
• Only the female black _______________________ spider and the brown recluse spider deliver serious, even life-threatening bites.
• Your _______________________ is of paramount importance.

66  □ Black Widow Spider
• Glossy black with a bright reddish _______________________ glass shape on its abdomen.
• Found in all states except Alaska
• Prefer dry, dim places.  woodpiles, trash, etc.
• About 1” long with legs extended.
• Venom is a _______________________ .

67  □ S/S of Black Widow Spider Bite
• Venom attacks spinal nerve centers.
• Severe _______________________ , rigid abdomen
• Tightness in chest, dyspnea.
• N/V, dizziness.
• ____________________.
• Skin rashes.
• S/S usually subside after _______ hours. However, severe muscle spasms will ensue.

68 □ Brown Recluse Spider
• Dull brown with dark “violin” mark on its abdomen.
• Prefers ____________________ areas.
• Lives mostly in the ____________ and central parts of the country, but are found throughout continental US

69 □ Brown Recluse Spider Bite
• Venom is ____________________ and produces local S/S:
  • Large, non-healing ____________________
  • Local gangrene
  • No anti-venom available
• Only effective treatment is prompt surgical ____________________ of the area

70 □ Brown Recluse Spider Bite: Day 3
71 □ Brown Recluse Spider Bite: Day 5
72 □ Brown Recluse Spider Bite: Day 6
73 □ Brown Recluse Spider Bite: Day 9
74 □ Brown Recluse Spider Bite: Day 10

75 □ Care for Spider Bites
• Ensure the scene is safe.
• Provide BLS transport.
• Administer oxygen if any breathing problems are present.
• ____________________
• Bring the spider to the emergency department if possible.
• Black widow anti-__________________ is available for the elderly, children under 5, and for the sick.

76 □ Snake Bites (1 of 2)
• More than 300,000 injuries from snake bites occur worldwide
• 40,000 to 50,000 reported snake bites in the US annually.
• 7,000 bites in the US come from poisonous snakes.
  • Deaths from snake bites are ____________________ .
  • About ____________ deaths occur each year in the US

77 □ Snake Bites (1 of 2)
• Snakes usually do not bite unless ____________________ , angered, or accidentally injured.
• Most snake bites tend to involve young ____________________ who have been drinking alcohol.
• Protect yourself from getting bit.
  • Use extreme caution and wear proper PPE.
• Of the approximately 115 different species of snakes in the United States, only __________ are venomous.

78 Four Types of Poisonous Snakes in the US
• ___________________
• ___________________
• ___________________
• ___________________ Snake

79 Pit Vipers (1 of 2)
• Rattlesnakes, copperheads, and cotton mouths
• Store poison in ______________ behind nostrils
• Inject poison to victim through ______________

80 Pit Vipers (2 of 2)

81 S/S of a Pit Viper Bite (1 of 2)
• Severe burning pain at the site of injury
• ________________ and bluish discoloration
• Weakness
• Nausea and vomiting
• ________________
• ________________ at various distant sites

82 S/S of a Pit Viper Bite (2 of 2)
• Seizures
• ________________
• Vision problems
• Changes in level of consciousness
• ________________
• S/S will depend on ________________ of envenomation

83 Care for Pit Viper Bites (1 of 2)
• ________________ the patient.
• Locate bite and cleanse the area.
• Do not apply ________________
• Splint area to minimize movement.
• Neutral ________________
• Watch out for vomiting caused by anxiety.
• Do not give anything by mouth.

84 Care for Pit Viper Bites (2 of 2)
• If the patient is bitten on the trunk, lay the patient ________________ and transport quickly.
• Remove any _______________________ on bitten extremity
• Monitor patient’s vital signs.
• _______________________ the swollen area with a pen.
• Care for shock if signs and symptoms develop.
• Bring the snake to hospital if it has been killed.

85 □ Coral Snakes (1 of 2)
• Small snake with red, yellow, and black bands
  “Red on _______________________ will kill a fellow, red on black, venom will lack.”
• Found in southern states
• Injects venom with _______________________ , using a chewing motion that leaves puncture wounds

86 □ Coral Snakes (2 of 2)
• Venom causes _______________________ of the nervous system.
• Can produce bizarre _______________________ .
• Paralysis of _______________________ movement and respirations
• Local redness and swelling.

87 □ Care for Coral Snake Bites (1 of 2)
• Quiet and reassure the patient.
• Flush the area with 1 to 2 quarts of warm, _______________________ water.
• Do not apply _______________________ .
• _______________________ the extremity.
• Check and monitor baseline vital signs.

88 □ Care for Coral Snake Bites (2 of 2)
• Keep the patient warm and _______________________ the lower extremities to help prevent shock.
• Give supplemental oxygen if needed.
• _______________________ promptly. Give advance notice to hospital of coral snake bite.
• Give the patient nothing by mouth.

89 □ Scorpion Stings
• _______________________ gland and stinger found in the tail end.
• Mostly found in southwestern US
• With one exception, the Centruroides _______________________ , most stings are only painful.
  • Provide BLS care and transport.

90 □ Tick Bites (1 of 3)
• Ticks attach themselves to the skin.
• Bite is not painful, but potential exposure to _______________________ organisms is dangerous.
• Ticks commonly carry Rocky Mountain spotted fever or ________________________
disease.

91 □ Tick Bites  (2 of 3)
• Rocky Mountain spotted fever develops _______ to _________ days after
bite.
• Symptoms include:
  • Nausea, vomiting
  • Headache
  • Weakness
  • ______________________
  • Possible cardiorespiratory ________________________

92 □ Tick Bites  (3 of 3)
• Lyme disease is the second fastest growing infectious disease next to AIDS in US
• Lyme disease symptoms may begin _________ days after the bite.
• Symptoms include:
  • Target bull’s-eye pattern
  • ______________________
  • Painful swelling of the ______________________

93 □ Caring for a Tick Bite
• Do not attempt to suffocate or burn tick.
• Use fine ______________________ to grasp tick by the body and pull it straight
out.
• Cover the area with ______________________ and save the tick for identification.
• Provide any necessary supportive emergency care and transport.

94 □ Dog Bites and Rabies  (1 of 2)
• All dog bites should be considered ______________________ until proven
otherwise.
• Place a dry sterile dressing over the wound and transport promptly.
• ______________________, an acute viral infection to the central nervous system,
is a major concern.

95 □ Dog Bites and Rabies  (2 of 2)
• Rabies can be treated with a series of ______________________ injections.
• A bitten patient can avoid shots only if the dog can be identified and
______________________ for rabies.
• Remember scene safety; the dog may still be loose when you arrive on the scene.

96 □ Care for Human Bites
• Remember, human bites that penetrate the skin can be ______________________
injuries.
• Promptly immobilize the area.
• Apply a dry, ______________________ dressing.
• Provide transport.

Coelenterates (1 of 2)
• Include _______________________ , anemones, corals, and hydras
• Responsible for more envenomations than any other marine life animal
• Has stinging cells called _______________________ .
• Results in very painful, reddish lesions
• Symptoms include headache, dizziness, ________________ cramps, and fainting.

Coelenterates (2 of 2)

Care for Stings
• Limit further discharge by minimizing patient ________________ .
• Inactivate nematocytes by applying ________________ .
• Remove the remaining tentacles by ________________ them off.
• Provide transport to hospital.