1

Environment Emergency

"Medical or Traumatic Emergencies caused or worsened by weather, terrain, or unique atmospheric conditions at high altitude or underwater."

Most of the emergencies occur during extremes of summer and winter

2

Factors For All

Physical Condition
Age
Nutrition/Hydration
Fatigue
Weather patterns
Education of surroundings
Preparation and Attitude

3

Heat Transfer

Conduction

Convection

Evaporation

Radiation

Respiration

4

Hypothermia

Factors that contribute to excess heat loss

5

Environmental Factors

- NO OR TOO LITTLE CLOTHING
- WET CLOTHES
- CONTACT WITH COLD SURFACE
- OPEN WOUNDS
- COLD WATER IMMERSION
- AIR MOVEMENT AROUND SKIN "WIND CHILL"

6

Shivering

It is the most efficient exercise in terms of heat generated per calorie expended.

"Pre-shivering muscle tone" can double basal heat production.

7

Warming Up

Provide shelter

Remove anything wet

Put a blanket between pt and backboard

Turn off the a/c

Warm Sweet Drinks*

Warm packs to armpits and groin

Warmed 0^2 and IV fluids

8

"Avoid Rough Handling"

Cold blood pools in the periphery

Any bump or jostle can cause a ripple effect to the circulation

"Avoid having the victim assist with their own rescue"

9

Severe Hypothermia (89-86^0)

Slow, careful pulse check (at least 60 seconds)

EKG confirmation

CPR decision

Limited resuscitation*

10

Frostnip / Frostbite

Depending on a lot of factors.

Skin is waxy/white, firm to palpation ➔

White/yellow-white/blue tinge. Hard and cold to palpation.

11

Frostnip / Frostbite

Wrap affected parts in dry cloth and do not disturb.

Don't try to re-warm.

DON'T rub

Reperfusion can be excruciating

12

Hyperthermia

13

When excess heat is produced/collected in the body, vasodilation occurs and you begin sweating.

As sweat evaporates, it takes a large amount of heat with it.

14

Sweat

Hard to evaporate in humid condition

Evaporates very quickly in dry climates

Easily overwhelmed if pt cannot replenish the fluids

15

Initial s/s of heat illnesses

Profuse sweating
Headache
Weakness
Muscle twitching/cramping
Dizziness
Fainting

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Exhaustion VS Stroke

Up to 104 core temp	Core temp > 105
Sweating	NO SWEATING
Normal BP	Hypotensive
Normal mental status	Complains of Chills
N/V, H/A, weakness	Altered LOC

17

Hyperthermia Treatment

Remove from heat source*
Wet patients clothing with cool water
Apply fans or air movement

If patient tolerates, allow drink SIPS of sports drinks or water*

18

Exertional Hyponatremia

Occurs when the person is drinking WATER and not eating or drinking sports drinks.

Exertional activity during heat causes excess amount of sweating

Low levels of sodium in the blood

19

Exertional Hyponatremia

Slow thinking, confusion, tremors, nausea, H/A, weakness.

Normal output of dilute urine.

Nibble on salty food
Replace water with sports drinks*
Rest.

20

Oral Fluids

Water is what the patient will want to drink

Sports drinks NOT Energy Drinks are preferred

Make your own.

Powdered fruit drinks, Fruit juice or water with salt added. 1 tsp per pint. Lite Salt is potassium

21

Diving Emergencies

22

Factors that affect a dive emergency

Number of dives in the last 72 hours
(depth, bottom time, surface intervals)

Safety stops used?

Temperature of the water (wet suit?)

Rate of ascent

Health/ETOH or medications taken

23

Lake Name	Maximum depth in feet
Lake Michigan (Great **Lakes** / Illinois, USA / Indiana, USA / Michigan, USA / **Wisconsin**, USA)	923
Lake Michigan-Huron (Ontario, Canada / Great **Lakes** / Illinois, USA / Indiana, USA / Michigan, USA / **Wisconsin**, USA)	923
Wazee **Lake** (**Wisconsin**, USA)	350
Green **Lake** (**Wisconsin**, USA)	239

24

Decompression

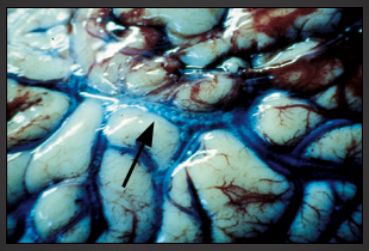
AKA: The “Bends”, Divers Disease, Caissons Disease

Diver Descends => Nitrogen is dissolved

Diver Ascends => expiration gets rid of excess Nitrogen.

25

Decompression



26

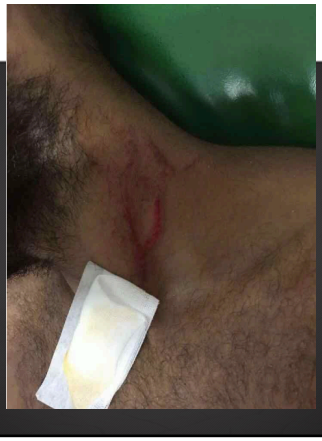
Assessment

Itching, tingling, "mottling” joint pain*.

Severe cases include altered mental status, respiratory distress and paralysis.

95% of all cases show up within the first 24 hours.

27



28

Decompression Treatment

Ideally, a slow ascent will prevent this

High flow oxygen

Contact Divers Alert Network (DAN) at 919-684-9111 to consult whether or not the patient is a candidate for Hyperbaric Chamber

Take their dive computer with you.

29

No flying within 24 hours of any dive

8000 MSL

No flying within **12** hours if **no decompression** stop

No flying within **24** hours if **decompression** stop

30

Drowning

31

Factors that affect outcomes

Water temperature

Length of submersion

Age/Health of the Patient

32

WHO 2005

"Drowning is the **process** of experiencing respiratory impairment from submersion/immersion in liquid"

Surfers are often the 1st rescuers.

33

Phrases to Avoid

Near Drowning

Wet and Dry Drowning

Active and Passive Drowning

Secondary Drowning

There are 33 different definitions of drowning
Lifeguardswithoutborders.org

34

Scene Size Up in the Water

Beginning positive pressure Ventilations while still in the water increase survival by 300%

"universal immobilization unnecessary"

35

AHA Guidelines

"CPR for drowning victims should use the traditional A-B-C approach in view of the hypoxic nature of the arrest"

"Victims with only respiratory arrest usually respond after a few artificial breaths are given"

36

First Line Treatment

Airway, Breathing, Breathing, Breathing
Drowning is a resp. problem, not a cardiac problem.

High Flow Oxygen
Anticipate Vomit
Don't worry about the "foam"
Don't worry about c-spine*

37

Lightening

38

Lightning

Altered LOC, confusion or slow thinking

Hearing problems

Numbness and tingling in limbs

Superficial Burns….

39

40

Lightening Treatment

Reverse Triage*

Remove from danger

Check Pulse and Respiration => CPR

Supportive Care and Transport

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Bites and Stings

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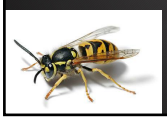
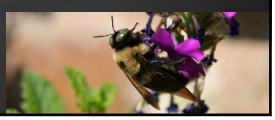
Insects

Mud Dobbers, Wasps, Bees, Hornets, Yellow Jackets, etc

Aren't deadly unless you are allergic.





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Scorpions

Only the Arizona Bark Scorpion is a potential threat to humans.

44

Classic Signs

Mydriasis (dilated pupils)
Nystagmus (roving jerky eyeballs)
Excessive drooling
Trouble swallowing

Scorpion Envenomation Clinical Presentation
Cheng, D. MD. Alcock, J. MD

45

S/S depends on type of scorpion

Very little swelling OR lots of swelling

HTN OR Hypotension

Tachypnea OR Resp arrest

Tachycardia, muscle jerking, paresthesia,

Altered LOC, ataxia, hyperthermia, Arrhythmia

46

History

Time of envenomation

Site of Sting

Nature of the Incident

Description of the scorpion (take a picture)

Local and Systemic Symptoms

47

Treatment

Monitor ABC's.

Wash area with soap and water

Apply a cool compress on the area

Keep extremity at heart level or below.

Call Poison Control to determine severity.

Arizona Poison & Drug Info 1-800-362-0101

48

ALS Treatment

IV access

Benadryl

Solumedrol or Decadron (controversial)

Ativan or Versed

Atropine if bradycardic.

49

Spiders in the U.S.

Over 4,000 types of spiders in the US & Canada

50

Brown Recluse

Found in central midwest

Nearly painless bite.

Causes necrosis and tissue death => scarring

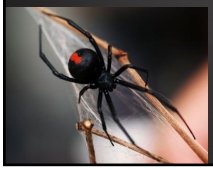
51

Black Widow and Black House

All over the U.S.

Localized pain at the site.

Causes breathing problems, cramps and temporary paralysis.



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Treatment

Positively ID the spider or take a picture
Wash wound with soap and water
Cold Packs for inflammation
Benadryl for itching
Tylenol or Motrin for inflammation

Monitor for fever, dyspnea, muscle cramps, weakness

53

Snake Bites

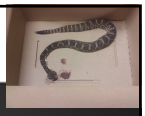
According to the Texas State Department of Health (2019)

About 7,000 people are bitten by venomous snakes in the US each year.
Less than 0.2% of those result in death.

Half of all venomous bites are "dry".

54

Treatment



Identify the type of snake (*take a picture*)

Move the victim away from the snake
Remove restrictive clothing and jewelry
Limit movement of bite area.

Do NOT suck the wound, apply ice, tight tourniquets, cut the wound, drink alcohol, or apply electricity

55

Snake Bite S/S

Hemotoxic	**Neurotoxic**
Intense pain	Minimal Pain
Weakness	Droopy eyelids
Swelling	Double Vision
Numb/Tingling	Weakness
Tachycardia	Numbness
Bruising	Trouble Swallowing

56

Antivenin

Benefits don't always outweigh the risks.

23-56% of pts develop anaphylaxis with Antivenin Crotalidea Polyvalent (ACP)

CroFab developed in 2000 results in "only" 14.3% anaphylaxis development.

COST !!!!

57

58

Marine Wildlife

Fire Coral

Hydroids

True jellyfish

Sea Wasps

Anemones

Portuguese Man of War …..

59

Assessment

Stinging, rash, burning, blistering, excruciating pain.

Nausea/vomiting, dyspnea, muscle spasms, hypotension.

Airway swelling, abnormal heart rhythms, cardiogenic shock.

60

Treatment

Rinse with sea water NOT fresh water

Scrape the stingers/nettles with a hard edge

Start with an acid rinse

(I know what you're thinking.....)

If that doesn't work, apply something alkaline

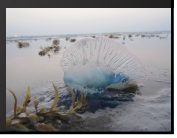
(yes, I know what you're thinking)

61

Determine the Type

If you confirm that it is a BOX jellyfish, apply vinegar and monitor closely for anaphylaxis.

If it is a Portuguese Man of War, apply HEAT



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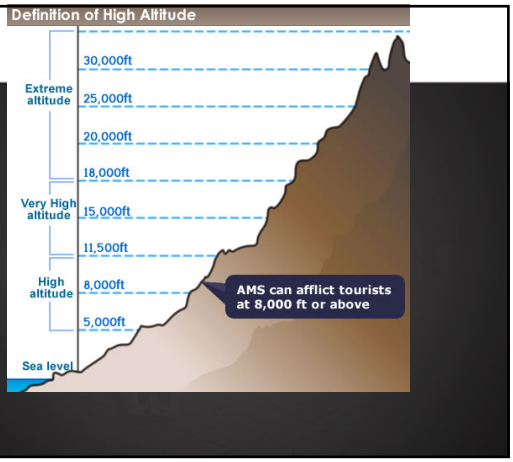
Acute Mountain Sickness

AKA: High altitude sickness

The amount of oxygen at higher elevations isn't as readily available as at lower elevations.

Assessment: headache, N/V, muscle aches, fatigue, increased respiratory rate

63



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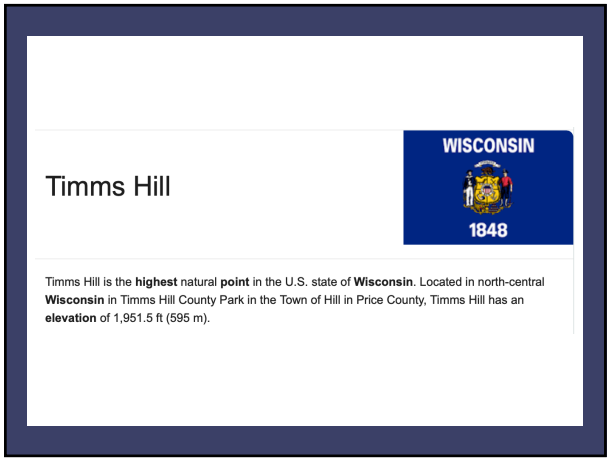

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Treatment for mild AMS

Low flow oxygen

Lots of fluids (no alcohol or caffeine)

Dexamethasone

Prophylactic Diamox (48 hours before)

Do NOT climb higher for at least 24 hours.

66

Extreme side effects

High Altitude Pulmonary Edema (HAPE)
High Altitude Cerebral Edema (HACE)

HAPE looks and acts like CHF
HACE looks and acts like a CVA

Is life threatening and must be treated immediately.

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HAPE and HACE treatment

Descend to lower elevations IMMEDIATELY

Positive Pressure Ventilation

Dexamethasone or Solumedrol

Gamow Bag for extreme situations

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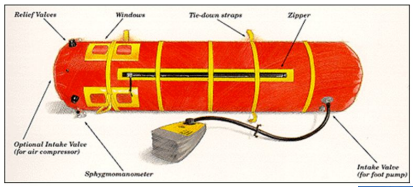
The Gamow Bag



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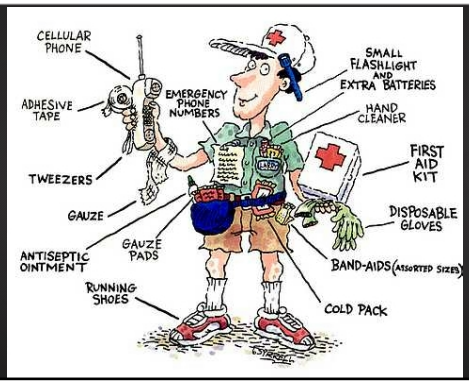
Know Your Environment



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