XX-12 GRABLE fired on May 25, 1953 at the Nevada Test Site. A 280mm artillery gun fired the 15 kiloton nuclear shell. This was the only time a nuclear artillery shell was ever fired. Ground Zero was 7 miles from the gun.

So, Why Did They Do This??

Wilderness Medicine Update

Robert C. Allen, DO, FACEP

Update

- Anaphylaxis
- Malaria
- Rabies
- Acute Mountain Sickness (AMS)

Think these Critters are Trouble?

The Venomous Little Buggers
Which is the deadliest in the United States?
Allergic reactions to these puppies kill over 40 people in the US every year...
4 times as many as are killed by venomous snakes

One reason “Why Animals Attack”

Scope of the Problem
- 1-2% Lifetime Chance of having an Anaphylactic/Anaphylactoid reaction

Severe Allergic Reactions: Allergens
- Peanuts
- Hymenoptera Stings
- PCN, vancomycin, opiates
- Idiopathic

Severe Allergic Reactions: Allergens
- Peanuts
- Hymenoptera Stings
- PCN, vancomycin, opiates
- Idiopathic

Scope of the Problem
- 1-2% Lifetime Chance of having an Anaphylactic/Anaphylactoid reaction
- For Severe Allergic Reactions, males have a slight predominance up to age 15, then females have a slight predominance

Severe Allergic Reactions: Allergens
- Peanuts
- Hymenoptera Stings
- PCN, vancomycin, opiates
- Idiopathic

Angioedema
This can appear in less than 1-2 minutes

Allergic reactions to these puppies kill over 40 people in the US every year...
4 times as many as are killed by venomous snakes

One reason “Why Animals Attack”

Scope of the Problem
- 1-2% Lifetime Chance of having an Anaphylactic/Anaphylactoid reaction
- For Severe Allergic Reactions, males have a slight predominance up to age 15, then females have a slight predominance

Severe Allergic Reactions: Allergens
- Peanuts
- Hymenoptera Stings
- PCN, vancomycin, opiates
- Idiopathic

Angioedema
This can appear in less than 1-2 minutes
American Osteopathic College of Occupational and Preventive Medicine
OMED 2013, Mandalay Bay Convention Center, Las Vegas
Thursday, October 3, 2013, Preventive Medicine & Public Health Day

No, this is not angioedema…
Etiology is different
This takes longer than 1-2 minutes to appear…

Symptoms
• Bronchospasm (wheezing, coughing)
• Rhinorrhea, stridor, hoarse voice
• Angioedema, Urticaria
• Abdominal pain, nausea, vomiting, diarrhea

Symptoms
• Tachycardia, hypotension, shock, cardiovascular collapse

• MOST COMMON:
  -Angioedema and Urticaria, occurring in 80-90% of cases

Treatment
• "Do Not Hesitate To Give Epinephrine"
• Epi is the drug of choice, everything else (H-1 and H-2 blockers, steroids) come MUCH later!
• IM Epi for Initial Treatment
  -I go to IV epi if second IM epi does not resolve symptoms or ASAP if the initial reaction is severe

Treatment
• The primary drug for field treatment of anaphylaxis is IM epinephrine
  -33-66 Lbs 0.15-0.3 mg
  -66 Lbs and up, 0.3-0.5 mg
• If using an autoinjector device, it MUST be administered into the lateral thigh, about midway between hip and knee

Multiple Doses May be Needed
• At least 2 doses of epi should be immediately available
  -Costa Rica: Patient received 7 epi injections during 2-hour evac (probably needed more)
  -California: 13 year old with peanut allergy died at a camp, despite 3 epi injections post-exposure
This is not urticaria or angioedema: This is a ‘Feathering Burn’, AKA ‘Lichtenberg Figures’, a pathognomonic sign of lightning injury. It’s not a burn, but a skin reaction to a massive shower of electrons over the surface of the skin.

Malaria

- “Suspected or confirmed malaria, especially P. falciparum, is a medical emergency, requiring urgent intervention…”
  -CDC 2014 Yellow Book

-215 million infections worldwide
-655,000 deaths worldwide
-1,500 cases/year in U.S.

- Mefloquine-resistant P. falciparum continues to spread
- No vaccine yet, although research and clinical trials continue
- Personal Protective Measures, mosquito avoidance and chemoprophylaxis are still the mainstay of prevention in travelers
Malaria

- Mefloquine now has a Black-Box warning for neurologic and psychiatric side-effects
- CDC has changed some diagnostic and treatment recommendations
- CDC Malaria Hotline: 770-488-7788
  - After Hours: 770-488-7100
  - www.cdc.gov/malaria

Malaria Diagnosis

- Suspect malaria in any patient with a fever who has traveled to a malaria zone in the last 6 months
- Early symptoms are classic ‘flu-like syndrome’
- Classic malaria fever/chill patterns are RARE in travelers these days

Malaria Diagnosis

- Gold Standard is still thick/thin smear, at least 3, taken 12-24 hours apart, read by someone skilled in microscopic diagnosis of malaria
- DO NOT 'send out' or batch for later reading, it needs to be done/read NOW
- Rapid Diagnostic Test available in US, FDA approved in 2007
Malaria Diagnosis

- RDT:
  - BinaxNOW Malaria (lab use only)
  - Tests for all species of malaria, will differentiate P. falciparum from other species
  - 99.7% Sensitive, 94.2% Specific for falciparum with > 5,000 parasites/µL
  - Still need to confirm with thick/thin smears!

CDC Malaria Treatment

- Halofantrine not recommended
- Exchange transfusions no longer recommended
- Quinidine is getting hard to find
  - Artesunate IV is available from CDC for severe cases under an IND Protocol

CDC Malaria Treatment

- Chloroquine
- Mefloquine
- Atovaquone-Proguanil (Malarone)
- Artemether-Lumefantrine (Coartem)
- Quinidine

- Treatment Table: www.cdc.gov/malaria/resources/pdf/treatmenttable.pdf

Chemoprophylaxis

- Country/Area/Season/Traveler specific considerations
- Chloroquine (Weekly)
- Mefloquine (Weekly)
- Doxycycline (Daily)
- Atovaquone-Proguanil (Daily)
- Primaquine (Daily-P. vivax areas only)

Squirrels

Not Rabid, but come on, PLAGUE??

Rabies Treatment

- Biggest Change: For most people, post-exposure prophylaxis vaccine now 4 injections rather than 5
  - HRIG 20 IU/Kg, as much as possible infiltrated around wound
  - Vaccine (PCEC or HDCV) 1.0 mL IM into deltoid (adult) or lateral thigh (child) on day 0, 3, 7, and 14
Rabies Treatment

- If had pre-exposure prophylaxis or previous rabies treatment with PCEC or HDCV
  - HRIG **NOT** needed, do not give
  - Vaccine 1.0 mL IM on day 0 and 3

- If patient is immunosuppressed, give 5th dose of vaccine on day 28
- Check rabies titer post-treatment if immunosuppressed
- If possible, hold immunosuppressive medications during rabies treatment

Rabies Serology

- Check rabies titer if:
  - Pt immunosuppressed during treatment
  - Significant deviation from vaccination schedule
  - Treatment initiated overseas with a product of questionable quality
  - Antibody status needs monitoring for occupational exposure

- Rabies Serology in Occupational Exposure
  - Depends on Risk Category
  - Continuous Risk: Rabies researchers, rabies vaccine production workers—Q 6 Months
  - Frequent Risk: Rabies Diagnostic lab workers, Vets/Staff/Animal Control in areas of high rabies endemic population, Spelunkers, people who work with bats—Q 2 years

- Infrequent Risk: Vets/Staff/Animal Control in areas where rabies is not enzootic, travelers, etc.—No need for serology

- Serology is via Rapid Fluorescent Focus Inhibition test (RFFIT), considered protected if there is complete neutralization at 1:5 dilution
Acute Mountain Sickness (AMS)

- Ataxia in Diagnosis of AMS
- Ibuprofen for prophylaxis/treatment of AMS
- Effective dose of Acetazolamide in prophylaxis of AMS?

Ataxia in AMS

- Ataxia does not help in diagnosing AMS
- However, ALWAYS check for ataxia in any suspected case of AMS
  - Ataxia in setting of AMS is an early indicator of severe AMS/early HACE
- Simple tests (Rhomberg, heel/toe walk) work fine, don’t need to get fancy...

Ibuprofen for AMS

- Several studies show 600 mg TID is effective prophylaxis for AMS (26% decrease in incidence in one study)
- Mechanism is controversial
  - Masks HA (diagnostic point for AMS)?
  - Anti-inflammatory effect prevents AMS?

Acetazolamide in AMS

- Good for prophylaxis and for treatment
- Unpleasant side effects
  - Bad taste of carbonated beverages
  - Tingling of fingers
- 125 mg PO BID appears to be effective for prophylaxis in most adults

Latest Things

- World Rabies Day: 28 Sept 2013
- Report from China 26 Sep 13
  - 28 deaths, ‘hundreds’ of injuries
  - Giant hornets near Shaanx, China
  - 2” long, 0.25” stinger
  - Multiple stings, 200+ per victim
  - Chase victims 100-200 meters
Questions?
Comments?
Obscenities?

(Note the Special 'Doctor' MP-5)