

Bites and Stings

Lecture 22

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Outcomes

- At this lecture's completion, the learner will be able to:
- Discuss the clinical presentations of insect, reptile, marine fauna, and mammalian bites and injuries
- Integrate the clinical presentations of these with the appropriate precautions and treatments
- Recognize the atypical presentations and treatments of some of the above envenomations

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Hymenoptera

Wasps, Bees, and Stinging Ants

Bees [*Apis*: honeybee]



Vespid

Wasps



Yellow jackets



Hornets



Ants



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Hymenoptera

Wasps, Bees, and Stinging Ants

Epidemiology

- Hymenoptera :
 - Wasps, yellow jackets, hornets [*vespids*],
 - Bees [*Apis*] (> 1 million stings / yr)
 - Ants (> 1 million stings / yr)
- Hymenoptera stings
 - More US deaths than any other envenomation
 - 30-120 / yr (underreported)
 - Lightning: 90/yr²
 - (Katrina: 2500 +/-)³

Animal	No. of deaths	% of fatalities
Hornet, bee, wasp	533	70.2
Other specified venomous arthropod	67	8.8
Spider	66	8.7
Snake	17	2.5
Unspecified venomous animal	23	3.0
Scorpion	5	0.66
Crocodile	5	0.66
Venomous marine animal	2	0.27
Other specified venomous animal	1	0.13

Table 3. Venomous animal-related fatalities in the US (1991-2001) ⁷

¹. Wilderness and Environmental Medicine; Vol. 16, No. 2, pp. 67-74. <http://www.wemjournal.org>
². NIAA Technical Memorandum STMG 200-101, Section 4.
³. Louisiana Department of Health and Hospitals. <http://www.louisiana.gov>

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Hymenoptera

Wasps, Bees, And Stinging Ants

- Local Reaction
 - Edema
 - Redness
 - May involve joints
 - Pruritis
 - Pain
- Systemic and anaphylactic reaction
- Delayed Reaction
- Toxic Reactions



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Hymenoptera Reactions

Toxic reactions (non- allergic)

- Non-antigenic response to multiple stings
- May resemble allergic reactions but without bronchospasm and without urticaria
- May have GI symptoms: N, V, D

Allergic reactions (IgE - mediated)

- Local
- Systemic
- Anaphylactic reaction
- Delayed reaction

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Toxic (non- IgE) Hymenoptera Stings

Toxic reaction; not due to prior antigen-Ab sensitization

- Non-antigenic ; but may be fatal
- More than 10 stings (not 1-2)
Hymenoptera can only fly at 4 mph
- Mechanism not completely understood
- Toxicosis
 - Onset may be 8-24 hr
 - More likely after
 - >50 stings Africanized (SW) bee
 - 19 stings / kg (>500) for honeybee
- Multi-organ failure
 - DIC, ARF

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Hymenoptera Stings

Allergic reactions (IgE - mediated)

- Serious allergic reactions often preceded by only a few (1-2) uneventful stings
- Reported in up to 1% of children and 3% of adults
- Fatalities are more common in **adults**
Peak incidence of anaphylaxis death : age 35-45 yr
(allergic Ab to insect venom present in up to 26% adults)
- 50% of fatal reactions had **no prior history** of allergy to stings
- Children are said to be unlikely to have anything more than systemic urticarial reaction (less than 10% risk of a systemic reaction with respiratory symptoms or vascular collapse)

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Systemic and Anaphylactic Reactions

- Mild to fatal
- Shorter interval → more severe the reaction
 - Usually within **30 min of 1-2 stings**
- Prodromal symptoms
 - Itching eyes
 - Urticaria
- Progressive anaphylactic symptoms
 - Airway and laryngeal edema
 - Bronchospasm / resp. failure
 - Shock
 - Ischemia + arrhythmias may occur
- **Atypical** symptoms
 - No urticaria; no prodrome -- just shock

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Treatment of Systemic and Anaphylactic Reactions

- Epi 1:1000 0.3-0.5 ml SQ
- IV NS WO
- H₁ : diphenhydramine
- H₂ : ranitidine
- Methylprednisolone
- Albuterol
- Dopamine
- Consider Glucagon 2 mg IV
- **No Demerol**

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Hymenoptera - Stinging Ants

- Fire ants (Solenopsis; SE US):
 - potentially lethal
- Venom is 95% alkaloid (unique to fire ants)
- Destruction of land and animals
- Range of illness:
 - from simple stings to anaphylaxis and death.
- Postmortem blood :
 - positive for fire ant venom-specific IgE antibodies
- Treat systemic reaction / treat anaphylaxis

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Brown Recluse Spider

Loxosceles reclusa

- Mild reaction: erythematous, itchy
- Systemic reactions (rarely)
 - Fever; chills
 - Nausea
 - Petechiae; hemolysis
 - Renal failure
- Complex ulceration
 - "Volcano lesion"
 - Ischemic necrosis
 - 1 to 30 cm in diameter

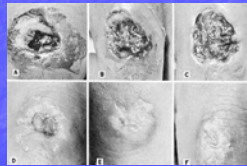


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Brown Recluse Spider

Treatment

- Supportive measures
- No antivenin in US
- Tetanus prophylaxis
- Antibiotics
- Consider steroids ;
consider hyperbaric O2
 - No proven benefit
- Dapsone
 - Adverse Rx reactions >> benefit
- No Demerol



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Black Widow Spider

Latrodectus mactans

- Bites
 - Immediate painful
 - Bite mark, "target"
 - Muscle cramps
 - Rigid abdomen; N, V (mimics appendicitis)
- Treatment
 - Benzos
 - Ca gluconate
 - Antivenom
 - No Demerol



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Other Insects that Can Cause Anaphylaxis

- Scabies
- Chiggers
- Scorpions
- Fleas ; lice
- Blister beetle
- Stinging caterpillars : puss caterpillar
 - Poisonous sacs attached to hollow needle-like hairs
 - If hairs touched they inject poison break through skin
 - Reactions: mild: severe pain; intestinal sx; anaphylaxis.
- Anything that can *inject* a foreign *protein*



Blister beetle



Puss caterpillar

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Snake Bites

US snakebites

- 8000 venomous bites / yr
- Only 4-12 deaths / yr
- Crotalids, Elapidid, other
- 25% are "dry strikes" with no venom released

Indigenous snakes in US

- Pit viper
 - Rattle snakes
 - Copperhead
 - Water moccasin "cotton mouth"
- Coral snake
- Imported snakes

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Snake Bites

Coral snake

- "red on yellow, kill a fellow; red on black, venom lack"



Eastern Coral Snake



- Neurotoxin
 - Bulbar; seizures
 - Resp depression



South American Coral Snake

Imported snakes



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Crotalid Bites

Effects of Pit Viper Venom

- Cell injury
 - Pain, swelling, ecchymosis
 - Tissue necrosis
- Systemic injury
 - Capillary damage
 - Myocardial damage
 - Pump failure → shock
- Coagulation system injury
 - Prothrombin (INR)
 - Fibrinogen level
 - Platelets



Rattlesnake

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Pit Viper Bites Clinical Features

- Fang marks and swelling
- Dose** at fang mark:
 - Reliable sign of envenomation
- Progression of local injury
 - Pain, swelling, ecchymosis
- Progression of systemic injury
 - BP, ALOC, N, V
 - Paresthesias; fasciculations
- Progression of coagulopathy
 - Labs (INR, platelets, fibrinogen)



Eastern Copperhead

• <http://www.toxinosis.com/snake-antipic.jpg>

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Crotalid Bite Treatment

- Mannitol (for compartment syndrome)
- Cardinal sins
 - Ice
 - Failure to elevate
 - Tourniquet
 - Constricting bands: decrease lymphatic flow
 - Incision
 - Surgical consult (Findlay Russell)
 - Inadequate antivenin (Findlay Russell)
- Demerol
 - Histamine release
 - Worsens neurotoxic and allergic components of any bite or sting
 - Not VS neutral [Fentanyl] is VS neutral]

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Crotalid Antivenin Treatment

- CroFabTM
 - Polyvalent crotalidae immune Fab (sheep)
 - Safer than old (horse) "Wyeth antivenin"
- Dose :
 - 4-6 vials (CIHA : \$1,037.07 / vial)
 - Infused over 1 hr
 - Repeat Q 1 hr until symptoms resolving
 - Then Q 6h x 3; total dose usually 18 vials
- Side effects
 - Anaphylaxis
 - Delayed reaction ; febrile reaction to immune complex

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Coral Snake Management

- Sx: CN, or bulbar: dysarthria, dysphagia, diplopia, ptosis
- Call poison control
 - 20 /99 reports are actual bites (chews)
- ALS
 - ET as appropriate
- No deaths in the US since coral snake antivenom available
- ALL pts receive *Microtus fulvus* Antivenin
- H₁ , H₂ , steroids – uncertain benefit
- No Demerol

NC Poison Control : 1-800-848-6046

FL Poison Center Tampa - a consultant at 813-844-4444

University of AZ Poison and Drug Information Center maintains a consultant
on call - reached any hour of the day at 520-626-6016.

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Marine Fauna

- Jellyfish
- Man-O-War
- Anemone
- Stingray
- Sea Urchin (Uni)



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Treatment for Marine Fauna Stings / Bites

- Irrigate lacerations (saline only)
 - Vibrio
 - Erysipelothrix
- No scrubbing (will release nematocyst)
- Consider irrigation with:
 - Vinegar or ammonia
 - Isopropyl alcohol
 - Meat tenderizer
- Hot, saline** water
 - Portuguese Man O' War : 45° C (113° F) ¹



• Med J Aust 184 (7): 529-31

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Gila Monster Bites

Ma, Cline

- Systemic toxicity is rare
- If reptile is still attached:
 - Place on a solid surface
 - Submerge animal
 - Cast spreader
 - Irritating flame



Southwest US

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Mammalian Bites

Dogs, cats, horses, human, etc

(will be covered more in unit 5)

- Wash wound
- All patients should be evaluated
- Antibiotics for ALL bites:
 - Augmentin (Amox./Clavulanate)

Rabies (will be covered in unit 5)

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Summary

- “bee-sting” anaphylaxis
 - Usually within **30 min of 1-2 stings**
 - **Atypical** symptoms
 - Do **not** use Demerol
- Black Widow and Brown Recluse spider bites
- Early reliable sign of envenomation : **ooze**
- Cardinal sins of mismanaging snake bite
- For any, **ANY**, signs of envenomation:
 - give adequate antivenin , **CroFab** or as appropriate
- Portuguese Man O' War : **hot** saline water
- Mammalian bites : antibiotics

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