Animal Bites and Zoonoses

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Disclosures

- Views are my own opinion, and not those of the US Army or WRAIR
- I have no financial relationships with any of the products/companies discussed
Animals Bites and Zoonoses: Outline

- Dogs
- Cats
- Monkeys
- Snakes
- Other sources of bites & zoonoses
Animal Bites and Zoonoses: Overview

- **Bite Infections:** mix of anaerobes and aerobes from the patient’s skin and the animal’s oral cavity

- **Zoonosis:** (1) disease that is transmissable from animals to human (2) spread by aerosols, feces, urine, insects, and direct contact

- **Zooanthroponosis:** Reverse zoonotic disease transmission
Animal Bites and Zoonoses: Overview

![Diagram showing location of wounds and bites]

*Figure 1. Location of Wound Infections in 50 Patients Bitten by Dogs and 57 Patients Bitten by Cats.*
Animal Bites and Zoonoses: Overview

<table>
<thead>
<tr>
<th>Table – Common bacteria in animal bites*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dog bites</strong></td>
</tr>
<tr>
<td>Pasturella (both <em>canis</em> and <em>multocida</em>)</td>
</tr>
<tr>
<td>Streptococci</td>
</tr>
<tr>
<td>Staphylococci</td>
</tr>
<tr>
<td>Neisseria</td>
</tr>
<tr>
<td>Corynebacterium</td>
</tr>
<tr>
<td>Anaerobes</td>
</tr>
<tr>
<td><strong>Cat bites</strong></td>
</tr>
<tr>
<td>Pasturella (primarily <em>multocida</em>)</td>
</tr>
<tr>
<td>Streptococci</td>
</tr>
<tr>
<td>Staphylococci</td>
</tr>
<tr>
<td>Moraxella</td>
</tr>
<tr>
<td>Corynebacterium</td>
</tr>
<tr>
<td>Neisseria</td>
</tr>
</tbody>
</table>

*Listed in order of most common to least common.
# Animal Bites and Zoonoses: Overview

### TABLE 1. Number and percentage of animal bites by demographic and military characteristics, active and reserve components, U.S. Armed Forces, 2001-2010

<table>
<thead>
<tr>
<th></th>
<th>Outside theater</th>
<th>In theater</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>19,879</td>
<td>100.0</td>
<td>643</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>4,233</td>
<td>21.3</td>
<td>86</td>
</tr>
<tr>
<td>Male</td>
<td>15,646</td>
<td>78.7</td>
<td>557</td>
</tr>
<tr>
<td><strong>Age Group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17-19</td>
<td>650</td>
<td>3.3</td>
<td>18</td>
</tr>
<tr>
<td>20-29</td>
<td>10,995</td>
<td>55.3</td>
<td>422</td>
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<tr>
<td>30-39</td>
<td>5,485</td>
<td>27.6</td>
<td>140</td>
</tr>
<tr>
<td>40+</td>
<td>2,749</td>
<td>13.8</td>
<td>63</td>
</tr>
<tr>
<td><strong>Race-ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White, non-Hispanic</td>
<td>14,964</td>
<td>75.3</td>
<td>486</td>
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<tr>
<td>Black, non-Hispanic</td>
<td>1,671</td>
<td>8.4</td>
<td>51</td>
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<tr>
<td>Hispanic</td>
<td>1,702</td>
<td>8.6</td>
<td>63</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>627</td>
<td>3.2</td>
<td>21</td>
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<tr>
<td>American Indian/Alaskan Native</td>
<td>315</td>
<td>1.6</td>
<td>7</td>
</tr>
<tr>
<td>Other</td>
<td>600</td>
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<tr>
<td><strong>Service</strong></td>
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<td></td>
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<tr>
<td>Army</td>
<td>7,714</td>
<td>38.8</td>
<td>399</td>
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<tr>
<td>Navy</td>
<td>3,965</td>
<td>19.9</td>
<td>125</td>
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<tr>
<td>Air Force</td>
<td>5,722</td>
<td>28.8</td>
<td>87</td>
</tr>
<tr>
<td>Marine Corps</td>
<td>2,021</td>
<td>10.2</td>
<td>32</td>
</tr>
<tr>
<td>Coast Guard</td>
<td>457</td>
<td>2.3</td>
<td>0</td>
</tr>
<tr>
<td><strong>Rank</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior enlisted (E1-E4)</td>
<td>7,412</td>
<td>37.3</td>
<td>292</td>
</tr>
<tr>
<td>Senior enlisted (E5-E9)</td>
<td>9,100</td>
<td>45.8</td>
<td>282</td>
</tr>
<tr>
<td>Junior officers (O1-O3 [W1-W3])</td>
<td>2,007</td>
<td>10.1</td>
<td>55</td>
</tr>
<tr>
<td>Senior officers (O4-O10 [W4-W5])</td>
<td>1,360</td>
<td>6.8</td>
<td>14</td>
</tr>
</tbody>
</table>
Animal Bites and Zoonoses: Dog
Animal Bites and Zoonoses: *Dog*

- Tens of millions worldwide
- 4.5 million people are bitten each year (United States)
  - Dogs more likely to bite: male (6.2x), chained (2.8x), intact (2.6x)
  - Pit bulls, Rottweiler's, Presa canarios, Cane corsos, Mastiffs, Dogo argentinos, fila brasileiro, Sharpeis, boxers
  - Highest amongst 5-9 y/o boys
- 885,000 seek medical treatment
- 30,000 reconstructive surgery
- ~10-20 fatalities
Animal Bites and Zoonoses: Dog
Animal Bites and Zoonoses: *Dog*

- **Bacteria:**
  - **Mixture** of dog oral flora & bacteria on the skin victim
  - Only 2-10% get infected
  - **Aerobic**
    - *Pasteurella spp, Streptococcus spp, Staphylococcus spp, Neisseria*
  - **Anaerobic**
    - *Fusobacterium, Bacteriodes, Porphyromonas, Prevotella, Capnocytophaga canimorsus*
- **Virus:** **RABIES**
  - Dogs account for 90% of rabies transmission to humans in developing countries
Animal Bites and Zoonoses: Cat
Animal Bites and Zoonoses: *Cat*
Animal Bites and Zoonoses: Cat

• ~400,000 in the US

• Bacteria:
  • **Aerobic**
    • *Pasteurella spp, Streptococcus spp, Staphylococcus spp, Neisseria, Bartonella henselae*
  
  • **Anaerobic**
    • *Fusobacterium, Bacteriodes, Porphyromonas, Prevotella*

• **Bacteria located on the skin of person bitten**

• **Virus: RABIES**
Animal Bites and Zoonoses: Cat

*Pasteurella multocida*

- Small, aerobic gram-negative bacilli
- Present in the saliva of >90% of cats; most wounds get infected
- Different species, *Pasteurella canis*, in saliva of 50% dogs, contributes to lower infection rate

Clinical signs/lesions:

- Very rapid development: within 24 hours or as early as three hours after a cat bite
- Abscesses, necrotizing soft tissue infections, septic arthritis, and osteomyelitis
- Pain, swelling, purulent discharge, intense inflammatory response
Animal Bites and Zoonoses: Cat

(Pasteurella multocida)
Animal Bites and Zoonoses: Cat

(Pasteurella multocida)

Gram-negative, non-spore-forming bacilli consistent with
Pasteurella multocida
Animal Bites and Zoonoses: Cat

*(Cat Scratch Fever)*

- *Brattonella henselae*; gram-negative, argyrophilic, bacilli.
- Cats are the major reservoir, but arthropods (fleas) and other animals may also play a role in the pathogenesis.
- Distribution: Worldwide
- Transmission: bites; scratches; licks
- Clinical signs/lesions: Single-node / regional lymphadenopathy; fever; fatigue; muscle/joint pain; skin eruptions; weight loss; and splenomegaly
- Treatment: Azithromycin; penicillin; tetracycline; cephalosporins; aminoglycosides; fluoroquinolones
Animal Bites and Zoonoses: Cat

(*Cat Scratch Fever*)

Lymph nodes, axillary & retroauricular: Lymphadenopathy
Animal Bites and Zoonoses: Cat

(Cat Scratch Fever)

Lymph node: Rare intracellular and extracellular, silver-positive, 2 x 3-5 um bacilli. (blue arrows)
Animal Bites and Zoonoses

Treatment

- Drug of Choice: **Augmentin**
- Cat & human bites, especially punctures, are highest risk
- Susceptibility: *Pasteurella*, *Fusobacterium*, *Capnocytophaga*, *Staph aureus*, *Bacteroides*, *Corynebacteria*, *Eikenella*
- For penicillin allergic:
  Cefuroxime, clindamycin, doxycycline, TMP/SMX
Beware of Herpes B virus
Animal Bites and Zoonoses: NHP (Herpes B)

NEW WORLD MONKEYS
- Nostrils are far apart and open to the side
- Some species have prehensile tails
- Thumb orientation lies in line with other digits
- Some species have fingernails on big toe
- Live in trees
  (Examples: marmosets, tamarins, squirrel monkeys)

OLD WORLD MONKEYS
- Nostrils are closer together and open downward or forward
- Tail is not prehensile
- Thumbs are opposable
- Fingernails and toenails present on digits
- Live mostly on the ground
  (Examples: macaques, baboons, African green monkeys)
Animal Bites and Zoonoses: NHP (Herpes B)

- Herpes B Virus
  - *NOT Hepatitis B (different disease)*
  - Macaquesine (formerly, Cercopethicine) herpes virus 1
  - Distribution: Worldwide
  - Transmission: *rhesus macaques* (via bites/scratches/contact w/tissue fluids)
  - 80 – 90% of adult macaques infected; **ASYMPTOMATIC**
    - Virus is shed throughout life in oral, genital and ocular secretions
  - 3 patterns of disease:
    - Vesicular/ulcerative
    - Influenza like illness
    - Neurologic with nausea and vomiting

**Human disease (encephalitis) is usually fatal (80%) if untreated or results in severe neurologic impairment**
Animal Bites and Zoonoses: NHP
(\textit{Herpes B})

Post exposure treatment:

- Wash wound for 15 minutes
  - Skin: antiseptic (betadine; chlorohexidine; or bleach 1:20)
  - Eyes, mucous membranes: flush with sterile saline
- Cultures of wound (post wash); viral transport media (refrigerate)
- Draw blood (5 mls of serum)
- Seek medical attention!!!!
Animal Bites and Zoonoses: NHP

**Herpes B (Post exposure treatment)**

**Post exposure treatment:**

- **Prophylaxis**
  - Acyclovir: (800 mg po qid) x 2 weeks, if 1 day post exposure
  - Valacyclovir: (1g po tid) x 2 weeks

- **Clinical signs**
  - If no CNS/PNS findings: IV Acyclovir
  - If CNS/PNS findings: IV Gancyclovir

- Additional treatment:
  - Antimicrobials
  - Tetanus verification/vaccination
  - Rabies post exposure prophylaxis (PEP)
Animal Bites and Zoonoses: NHP (Herpes B)

- **Samples:**
  - Blood sample (5 mls of serum)
  - Swab of wound (in viral medium)

- **Mailing address:**
  National B Virus Resource Center  
  Georgia State University  
  161 Jesse Hill Jr. Drive  
  Atlanta, Georgia 30303

  - Phone #: 404-413-6550
  - Fax#: 404-413-6556
  - Email: bvirus@gsu.edu
  - Website: http://www2.gsu.edu/~wwwvir/

**Human testing should be requested by a physician**
Animal Bites and Zoonoses: NHP

Herpes B (Cases in Afghanistan)

- 126 animal bite exposures in Afghanistan
- 10 monkey bites
- 5 received appropriate B virus prophylaxis

Monkeys Bites among US Military Members, Afghanistan, 2011
Luke E. Mease1 and Kathy Ann Baker2

Bites from Macaca mulatta monkeys, native to Afghanistan, can cause serious infections. To determine risk for US military members in Afghanistan, we reviewed records for September–December 2011. Among 126 animal bite exposures, 10 were monkey bites. Command emphasis is vital for preventing monkey bite; provider training and bite reporting promote postexposure treatment.

Military members deployed to Afghanistan face many risks; among these are bites from Macaca mulatta monkeys and possible subsequent infections. In August 2011, a 24-year-old US Army soldier died of a rabies infection contracted while in eastern Afghanistan. This tragic highlights the threat that animal bites pose to deployed military members.

During 2003–2010, a total of 643 animal bites among deployed US military members were reported (1). Dogs were implicated in 56% of these bites, but several other animals pose a risk as well. Prominent among these is the nonhuman primate Macaca nemestrina (green monkey), native to and commonly kept as a pet in Afghanistan (2) (Figure). Risks from Macaca mulatta monkey bites include physical trauma and infection with B-virus (Macaca herpesvirus 1), oral bacteria including Clostridium tetani, and rabies virus. Although not well characterized in Afghanistan, the risk for exposure to Macaca mulatta monkeys has been described (3) for researchers (4), tourism workers (5), and US military personnel (6). We examined this risk for US military members deployed to eastern Afghanistan. The work presented herein was reviewed and deemed exempt from institutional review board oversight by the Joint Combat Casualty Research Team, the human subjects review board responsible for oversight of human subjects research affecting US military members in Afghanistan.

The Study

Information about all reported animal bites and exposures affecting US military and coalition personnel is collected by preventive medicine officers assigned to Combined Joint Task Force–1 in eastern Afghanistan. We evaluated these records to identify and describe monkey bite and high-risk exposures among US military members serving in eastern Afghanistan during September–December 2011. For this study, eastern Afghanistan refers to North Atlantic Treaty Organization Regional Command–East, which covers ~13,000 sq km (~14,000 km2) of the US military population in eastern Afghanistan during the study period was 23,508 persons. Case information obtained included patient age, sex, rank, branch of military service, animal exposures, and treatment details.

We evaluated the cases for the 5 parameters that comprise appropriate initial treatment according to the literature. The parameters are wound care (appropriate cleaning of the wound) (7), antiviral medications for B-virus (valacyclovir) (8), antimicrobial drugs for oral bacteria (amoxicillin/clavulanic acid or clindamycin plus metronidazole) (9), and rabies postexposure prophylaxis (PEP). US military policy advised that rabies PEP should adhere to World Health Organization guidelines (10), which recommend giving human rabies immunoglobulin plus 5 doses of rabies vaccine. In accordance with the same policy, adherence to Advisory Committee on Immunization Practices guidelines for rabies PEP with human rabies immunoglobulin plus 4 doses of rabies vaccine was also acceptable (11).

When appropriate initial treatment was not administered, subsequent follow-up was conducted to ensure that patients received required treatment. Appropriate treatment was accomplished by contacting and coordinating with the responsible provider, the patients, and their commanders.

During the study period, we identified 126 cases of animal bites or serious exposures (involving animal neural tissue or saliva affecting the mucosal surfaces or open wounds of the patient). Among these cases, 10 were cases of monkey bites.

Among the 10 military members who had been bitten by monkeys, age range was 22–44 years (Table); most (7) were <36 years of age, and 8 were male. All were junior enlisted or noncommissioned officers; 8 were members of the Army, and 2 were members of the Air Force (Table).

In terms of treatment, 6 received appropriate wound care and washing, 5 received appropriate B-virus prophylaxis, and 8 received appropriate antimicrobial drugs (Table). In terms of prophylaxis, only 4 were evaluated for...
Animal Bites and Zoonoses: Snake
Animal Bites and Zoonoses: *Snake*

- Worldwide: > 5 million people bitten annually (majority in Africa and South-East Asia)
- ~2.4 million envenomation
- 400,000 severe health consequences (i.e.; amputation)
- 94,000-125,000 death annually

- Poisonous snakes (North America): *Rattlesnake, Cottonmouth (water moccasin), Copperhead, and Coral Snakes*
Animal Bites and Zoonoses: Snake

**Pit vipers**: rattlesnakes; copperheads; water moccasin (cotton mouth)
Animal Bites and Zoonoses: Snake

Coral & Non Venomous Snakes:

Which snake is poisonous?

Hint: “Red on yellow, kills a fellow”
“Red on black, a friend of Jack”
Animal Bites and Zoonoses: *Snake*

Snake bite **NON POISONOUS**

Puncture marks

Snake bite **POISONOUS**

Puncture marks

UNCLASSIFIED
Animal Bites and Zoonoses: Snake

- **Neurotoxins:**
  - Cytotoxins: causes local tissue damage
  - Hemotoxins: damages blood vessels/cells
  - Neurotoxins: affects the nervous system
  - Cardiotoxins: act directly on the heart

- **History (Hx):**
  - Time of bite
  - Description of the snake
  - Type of field therapy
  - Underlying medical conditions
  - Allergy to horse or sheep products
  - Hx of previous venomous snake bites & therapy

- **Physical examination:**
  - Complete physical exam performed; plus baseline measurements of limb circumference proximal & distal to site
  - **Pit vipers:** local effects; coagulopathy (specifically, Rattlesnakes); other systemic effects
  - **Coral snakes:** primarily neurotoxic effects
Animal Bites and Zoonoses: Snake
Animal Bites and Zoonoses: Snake

Treatment

- Maintain airway, breathing, and circulation
- Circumferential extremity measurements should be performed on arrival (repeat every 15-20 min)
- Outline the margins of local edema
- Bloodwork: CBC (including platelets); coagulation profile (e.g., PT, APTT, fibrinogen); FDPs, urinalysis, electrolytes, BUN, creatinine
- Moderate-severe envenomation: blood typing; cross matching; ECG; chest x-ray

****Monitor patients closely for at least 8 hours (pit viper bites); 12 hours (coral snakes)****
Animal Bites and Zoonoses: Snake

WHO Medicines
WHO Health Systems and Services: Quality and Safety of Medicines - Blood Products and related Biologicals

Venomous snakes and antivenoms search interface
This search interface can be used to explore the global distributions of venomous snake species, and access information on antivenom products and their manufacturers. Users can search by region, subregion, country, territory or other geographical areas using the drop-down choices in the first panel below, or if the name of a particular snake is known it can be selected, or entered into the second panel so that users can go direct to that entry. Information on antivenom products and their manufacturers is accessible from the drop-down lists in the last panel.

Please select or enter your search term in one or more of the relevant fields below:

Search by Region or Location
Region: Select a region
Sub region: Select a subregion
Country, territory, or geographical area: Select country/territory/geographical area

Search by Snake species
Common name: Select a name
Species name: Select a name
Snake name: Search
(Please enter at least 3 letters of the name)

Search by Antivenom products
Product name: Select a product
Manufacturer: Select a manufacturer

http://apps.who.int/bloodproducts/snakeantivenoms/database/
Animal Bites and Zoonoses: Rodent & Rabbit
Animal Bites and Zoonoses: Rodents & Rabbits
Case

- 48 y/o male in SE Asia arrives at clinic with fevers and severe myalgias
- He had been slipped a ruffi while at a club, bushwacked when exiting, roughed up, robbed and left in a back alley, awakening in his own filth, shoes, valuables and ID all stolen
- No evidence of sexual assault
- On PE, animal bite marks around right ankle
- Faint rash on extremities
- Within 24hrs, blood cultures positive for pleomorphic gram negative rods
Animal Bites and Zoonoses:

Case

Gram stain: numerous gram-negative filamentous bacilli with bulbous or sausage-shaped (moniliform) swellings appearing along the filament, resembling a string of beads.
Animal Bites and Zoonoses:

Case: *Rat Bite fever*

- *Spirilium minus* in Asia
- *Streptobacillus moniliformis* in USA
- **Transmission**: bites; scratches; water/food borne
- **Clinical signs/lesions**:
  - Polyarthralgias; headache; rash; vomiting; fever (*Streptobacillary*)
  - Fever; ulcer/swelling @ bite wound; swollen LN; rash (*Spirillary*)
  - Nausea; vomiting; pharyngitis: ("Haverhill Fever"—unpasteurized milk outbreak)
  - Maculo-papular rash (extremities); vasculitis; muscle/joint pain (polyarthritis in approximately 50% of the patients); myocarditis; meningitis; pneumonia
- **Treatment**:
  - Penicillin, Doxycycline
Animal Bites and Zoonoses:

Case: *(Rat Bite fever)*

Purpuric spots on buttocks and thighs due to rat-bite fever
Animal Bites and Zoonoses: Rodent & Rabbit (Tularemia)

- Condition synonyms: “Rabbit fever”; Deer fly fever; Ohare’s disease
- Etiology: *Francisella tularensis*; Gram negative coccobacillus
- Wide distribution: Canada, Mexico, Europe, Russia, Tunisia, Turkey, Israel, Iran, Japan, and China; United States (100-200 cases/annually)
- Transmission: vector bite (tick; deerfly); ingestion; aerosolization; direct contact
- 6 forms:
  - Aerosolization (*pneumonic*)
  - Direct contact/ingestion (*ulceroglandular; oculoglandular; oropharyngeal; glandular; typhoidal*)
- Clinical signs/lesions: variable; dermal ulcerations-lymphadenitis
- Treatment:
  - Streptomycin (30 mg/kg qd IM) for 10-14 days
  - Gentamicin (3-5 mg/kg qd IV) for 10-14 days.
Animal Bites and Zoonoses: *Rodent & Rabbit* (Tularemia)
Animal Bites and Zoonoses: *Rodent and Rabbit (Tularemia)*

**Figure 1.** Cases of Primary Pneumonic Tularemia, Tularemia with No Localizing Signs, and Ulceroglandular Tularemia on Martha’s Vineyard, May 21 through October 28, 2000, According to the Week of Onset of Illness.
Animal Bites and Zoonoses: *Rodent & Rabbit* (Tularemia)

- **Oculo-glandular**
- **Ulcero-glandular**
- **Glandular**
Animal Bites and Zoonoses: Fish
(Candira sp.)

Animal Bites and Zoonoses: Fish (Candira)

- *Vandellia cirrhosa*: "Toothpick fish": Parasitic freshwater catfish native to the water of S. America (Bolivia, Brazil, Colombia, Ecuador and Peru)
- Documented case of invasion of a human urethra
- Attracted to UREA
- BLUF: No urinating in the river!!!!
Animal Bites and Zoonoses: Ruminant (Cattle, Sheep & Goat)
Animal Bites and Zoonoses: Ruminant

Skin, lip: Proliferative and papular cheilitis & dermatitis
Animal Bites and Zoonoses: Ruminant (Orf)

- Parapoxvirus; Orf; Soremouth; Contagious Ecthyma
- Worldwide distribution
- Incubation 3-7 days; self limiting
- Transmission: entry of infected exudates (via skin abrasions); commonly occurs during shearing, docking, or slaughtering (wear gloves & wash hands)
- Clinical signs/lesions: small focal papule (dorsum of index finger); common secondary bacterial infections
- Treatment: possible surgical resection; cryotherapy
Animal Bites: Ruminant

Brucellosis

- Etiology: Brucella sp.; gram negative bacilli/coccobacilli
  - *B. abortus*: (cattle, bison, elk, caribou)
  - *B. melitensis*: (goats, sheep)
  - *B. suis*: (swine, wild pigs)
  - *B. canis*: (dogs, coyotes)
- Condition synonyms: Undulant fever; Malta fever; Bangs disease
- Transmission: consumption of raw milk; direct contact
- Clinical signs/lesions:
  - (acute) fever; sweats; malaise; anorexia; headache; muscle/joint pain; fatigue
  - (chronic) recurrent fevers; arthritis; swelling of the testicles & scrotum
- Treatment: Doxycycline & rifampin (minimum of 6-8 weeks)
Animal Bites and Zoonoses: Ruminant (Brucellosis)

Unilateral scrotal edema
Animal Bites and Zoonoses: Ruminant (Brucellosis)

Carpus (caribou): The carpal bursa is markedly swollen and fluctuant. 
*Brucella suis*
Animal Bites and Zoonoses: Ruminant (Anthrax)

- *Bacillus anthracis*; gram positive rod
- Wide distribution: Central/South America; sub-Saharan Africa; Asia; south & eastern Europe; Caribbean
- Transmission: consumption, inhalation, or direct contact with infected animals/animal products
- Types: cutaneous (most common/least dangerous); inhalation (most dangerous); gastrointestinal; injection
- Hallmark lesions: (1) moderate to marked pleural effusion (2) pericardial effusion (3) meningitis
Lung (bull): There are abundant large bacilli that occur individually or in short chains of 2 to 6 organisms.
Animal Bites and Zoonoses: Ruminant

(Anthrax)

Normal brain (fixed)

Cerebrum: Multifocal cerebral hemorrhage
Animal Bites and Zoonoses: Ruminant (Anthrax)

Skin: Focal necroulcerative dermatitis (black eschar)
Animal Bites and Zoonoses:
(Mystery Case)
Animal Bites and Zoonoses: (Mystery Case)

- 52 y/o male from Baltimore w/hand injury arrives 12 hours (post injury) to the ER.
- Presents with a swollen, red, painful fist.
- Initial treatment: wound cleaned; antibiotic (cephalexin) administration; cold compress; and discharged.
- Patient returns to ER 5 days later w/tachycardia, hypotension, fever, and confusion.
- At ER, the attending clinician observed:
  - purulent exudate through a small injury on the dorsal metacarpus
  - increase of local temperature
  - edema on the forearm
  - exacerbated pain at finger mobilization
  - no crepitation was detected
Animal Bites and Zoonoses:
(Mystery Case)
Animal Bites and Zoonoses: Human (Eikenella corrodens)

- Anaerobic small gram-negative bacilli
- Common in human oral flora
- **Treatment**: Penicillin; Doxycycline; Fluoroquinolones
- **Resistance**: Clindamycin, Erythromycin
The rest of the story.................................

- Anti-tetanus immunization was performed, and patient transferred to surgery room
- Pressure in dorsal compartment was (20mm Hg)
- Purulent material (about 120 ml) drained from pre-retinacular space
- Administered: 1 g ampicillin-sulbactam (IV q 6 hours)
Animal Bites and Zoonoses: Human (Eikenella corrodens)
Animal Bites and Zoonoses: Summary

**Treatment (“ODD BITES”)**

- **O**: open treatment
- **D**: debridement
- **D**: drugs (antibiotics)
- **B**: blood work
- **I**: irrigation
- **T**: tetanus prophylaxis
- **E**: exploration (including x-ray)
- **S**: swab (cultures)
Recognizing that human health, animal health, and ecosystem health are inextricably linked. -- http://www.onehealthinitiative.com/
References

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• Principles And Practice Of Infectious Diseases, Mandell, Douglas, and Bennett, 7th Ed
• “Bites and zoonoses from pets other than dogs and cats”, Kotten CN, UpToDate 2010.
• 15th Annual Comprehensive Review of Infectious Diseases Syllabus
• Images from online sources
This Lecture...Bites?

• Feedback appreciated

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