Chapter 61 – Mammalian Bites

Episode Overview:

1. List 5 pathogens responsible for infection from dog bite
2. List 4 risk factors for overwhelming sepsis from dog bite
3. What first line antibiotic is a good choice for cat and dog bites?
4. What species are known to cause infection with *Pasteurella multocida?*
5. What are the risk factors for infection with animal bites?
6. Describe the treatment of monkey bites
7. When is anti-viral prophylaxis NOT indicated for a monkey bite
    a. What is the duration of therapy of antiviral prophylaxis?
8. Describe the recommendations for wound closure and antibiotics in bite cases
9. When do you report animal bites?

Wisecracks:

1. What about seal bites?
2. What about rabies in BC?
3. Waterhouse-Friderichsen syndrome & Capnocytophagia-related Gangrene sepsis - what are they?

Rosen's in Perspective

Can be a big problem: Dogs can bite down with over 310 pounds of force. Dog bites most common domestic animal bite; cats are second.

The breeds most frequently responsible for fatalities include Pit Bull (59%), Rottweiler (14%), American Bulldog and Siberian Husky (5% each), and German Shepherd Dog (3%)

Bites can damage all sorts of tissue and structures: Watch out for head and neck injuries in children less than 4

1) List at least 5 pathogens responsible for infection from dog bites

Aerobic bugs: *Staphylococcus aureus,* alpha-hemolytic and beta-hemolytic streptococci, *Klebsiella, Bacillus subtilis, Pseudomonas,* Enterobacteriaceae, and *Capnocytophaga canimorsus*

Anaerobic bugs: *Bacteroides, Fusobacterium, Peptostreptococcus, Porphyromonas,* and *Prevotella* species

NOTE: *Pasteurella multocida* likely has been overstated as a primary causative pathogen

2) List 4 risk factors for overwhelming sepsis from dog bite

1. Alcoholic liver disease
2. Functional or surgical asplenia
3. Lung disease
4. Corticosteroid use

3) What first line antibiotic is a good choice for cat and dog bites?

Amox-Clav 875mg PO BID

For penicillin allergies:

- TMP-SMX
- Moxifloxacin

4) What species are known to cause infection with *Pasteurella multocida?*

- Dogs & Cats
- Opossum
- Rat
- Lion
- Rabbit
- Pig
- Wolf
- Monkey
- Cougar

5) What are the risk factors for infection with animal bites?

Table 61-1 Risk Factors for Bite Wound Infection

FACTOR	HIGH RISK	LOW RISK
Species	Cat Human Primate Pig, camel	Dog (excluding hand) Rodent
Location of wound	Hand Over joint or superficial tendon (CFI) Through-and-through oral Below the knee	Face Scalp Mucosa
Wound type	Puncture Extensive tissue damage Contaminated or devitalized tissue Old (delayed presentation) or sutured	Large Superficial Clean Recent
High-risk patients	Immunosuppressed, HIV positive Transplant patient, steroid dependent Diabetes, cancer chemotherapy Prosthetic valve patients Peripheral vascular disease Elderly, alcoholic, cirrhosis Social and compliance problems	

CFI, closed-fist injury; *HIV,* human immunodeficiency virus.

6) Describe the treatment of monkey bites

- Highly virulent virus
  - *Herpes virus simiae*
- Case fatality of 70% without antiviral therapy

Treatment: Mechanical debridement and vigorous irrigation immediately for 15 min

Prophylaxis: Valacyclovir: 1g orally PO q8h x 14 days
or
Acyclovir 800mg PO Q5 times daily x 14 days

Note: These bites are also high risk for bacterial infection
-> Amox-Clav for covering S. aureus and Bacteroides

7) When is anti-viral prophylaxis NOT indicated for a monkey bite

Box 61-1 Prophylaxis for Monkey B Virus Exposure

Prophylaxis Recommended
Skin exposure (with loss of skin integrity) or mucosal exposure to a high-risk source: macaque that is ill, immunocompromised, known to be shedding virus or has visible lesions compatible with B virus
Inadequately cleaned skin or mucosal exposure
Laceration of head, neck, or torso
Deep puncture wound
Needle-stick associated with tissue or fluid from the nervous system, lesions suspicious for B virus, eyelids, or mucosa
Puncture or laceration after exposure to objects (1) contaminated with fluid from monkey oral or genital lesions or with nervous system tissues or (2) known to contain B virus
Postcleaning culture-positive B virus

Prophylaxis Considered
Mucosal splash that has been adequately cleaned
Laceration (with loss of skin integrity) that has been adequately cleaned
Needle-stick involving blood from an ill or immunocompromised macaque
Puncture or laceration occurring after exposure to either objects contaminated with body fluid (other than from a lesion) or potentially infected cell culture

Prophylaxis Not Recommended
Skin exposure in which the skin remains intact
Exposure associated with nonmacaque species of nonhuman primates

Adapted from Cohen JI, et al: Recommendations for prevention of and therapy for exposure to B virus (cercopithecine herpesvirus 1). Clin Infect Dis 35:1191, 2002.

8) Describe the recommendations for bite wound closure and antibiotics in bite cases

Table 61-2 Recommendations for Bite Wound Closure and Prophylactic Antibiotic Consideration

SPECIES	SUTURING	PROPHYLACTIC ANTIBIOTICS
Dog	All (except hands)	High-risk wounds only* (all hand wounds)
Cat	Face only	All
Human	Face (as needed)	Hand, especially CFI
Monkey	No	Yes
Pig, camel	Face (as needed)	Yes
Rodent	Yes (rarely needed)	No
Hand bites	No	Yes
Other locations Mucosa Oral through-and-through bite	Yes Yes (as needed) Yes (as needed)	High-risk wounds only* No Yes

CFI, closed-fist injury.
*High-risk wounds: hand wounds, deep structure involvement (tendon, joint, bone), delayed presentation (>12 hours), contaminated wounds with foreign bodies or devitalized tissue, deep puncture wounds, high-risk patients (see Table 61-1).

Table 61-3 Suggested Regimens for Prophylactic Antibiotics in Bite Wounds

TYPE OF INJURY	ANTIBIOTIC	PENICILLIN ALLERGIC
1. Bite wounds to hand		
A. Human (including CFI*)	Augmentin 500 mg PO q12h × 5d Ceftin 250-500 mg PO bid × 5d	Moxifloxacin 400 mg q24h × 5d TMP-SMX 160 mg PO bid × 5d
B. Other (e.g., dog, cat)	Augmentin Ceftin	Moxifloxacin Clindamycin 300 mg PO q6h × 5d
2. Cat bite wounds	Augmentin Ceftin	Moxifloxacin TMP-SMX
3. High-risk patients (Table 61-1)†		
A. Dog (*Capnocytophaga canimorsus* concern)	Augmentin Dicloxacillin 250 mg PO q6h × 5d	Clindamycin Moxifloxacin
B. Cat (*Pasteurella multocida* concern)	Augmentin Ceftin	Moxifloxacin TMP-SMX
C. Other	Augmentin Ceftin	Moxifloxacin Clindamycin
4. Other bite wounds†	Keflex 250-500 mg PO q6h × 5d Dicloxacillin	Erythromycin TMP-SMX

**CFI,* clenched fist injury; *PO,* orally; *TMP-SMX,* trimethoprim-sulfamethoxazole.
†Methicillin-resistant *Staphylococcus aureus* (MRSA) coverage is not currently thought to be necessary and thus is not recommended.
Most regimens are 3 to 5 days.
Antibiotic prophylaxis in high-risk patients has no proven efficacy but is relatively common practice. Although acknowledging the lack of scientific support in the literature for improved outcomes, to offer prophylaxis and discuss this option with the patient seems reasonable and prudent.
In the category of "other bite wounds," there are no data to demonstrate an effect of antibiotic prophylaxis. We would consider this practice optional, to be weighed against considerations of antibiotic overuse and emerging resistance. There should be no mandate or standard of care issues here.
If one decides on antibiotic prophylaxis, we would suggest use of simpler, cheaper, and narrow-spectrum antibiotics, as these have historically been used in the various studies, and there is no evidence to support broader-spectrum coverage at increased expense.

Wisecracks:

1) What about seal bites?

UptoDate: Nada.

Paper: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2827281/

It's authored by the one and only Dr. McDreamy! (Dr. Colin White)

Punch line: *Mycoplasma phocacerebrale* can mess you up! Don't forget about possible *Vibrio vulnificus* infection as well. *Mycoplasmas* lack a cell wall, the major site of action for beta-lactam antibiotics. No cell wall, no worky worky, no good for seal finger.

Doxycycline for two doses and then switched to tetracycline 500 mg four times a day for two weeks

2) What about rabies in BC?

CALL BC Public Health Vet: 604-829-2110

"Epidemiology of rabies in BC: The only known reservoirs for rabies in BC are a number of bat species. Because of altered behaviour, infected bats are considered more likely to come into contact with humans and subsequently be tested. Between 4 and 10% of the bat specimens sent for testing to the CFIA are positive (1). It **is estimated that less than 0.5% of bats are actually infected.**

Other species that have tested positive for rabies in BC include (except as noted, all were found to have bat-variant rabies): 1 cat in Maple Ridge (2007), 4 striped skunks in Stanley Park (2004), 3 cats in Delta (one cat had skunk strain) (1992), 1 beaver (skunk strain) (late 80s), 1 horse in the Sorrento area (1984), 1 cat on Vancouver Island (strain unknown, but presumed to be bat-variant) (1969).

A wildlife survey in Delta (prior to 1989), following the isolation of the skunk strain rabies in a beaver, intense testing of cats following the Delta incident as well as a study examining raccoons indicated that the skunk and other specific strains of rabies are not enzootic in BC.

Human cases of rabies in Canada are very rare. In BC, there has only been 1 human case diagnosed since 1983: an adult male who died of bat-variant rabies in 2003 (2)."

From: http://www.bccdc.ca/health-info/diseases-conditions/rabies

BC Centre for Disease Control
An agency of the Provincial Health Services Authority

BC Rabies Guidance for Veterinarians

May 2016

Table 1: Criteria to determine if rabies exposure has occurred by species and location, assuming saliva or neural tissue from the exposing animal may have contaminated an open wound or mucous membranes

"Exposing" Species	Location of exposure	Exposure?
Bat	Globally	Consider rabies exposure unless animal is tested and shown to be negative
Domestic or wild terrestrial mammal	BC	No rabies exposure unless animal demonstrated neurological behavior indicative of rabies or dies; if so, consider rabies exposure unless tested and shown to be negative
Skunk, raccoon, coyote, bobcat, fox, monkey and other wild animals	Outside BC (except in rabies-free countries)[1]	Consider rabies exposure unless tested and shown to be negative
Domestic animals	Enzootic areas outside BC	Consider rabies exposure unless animal tested and shown to be negative. The vaccination status of the 'exposing' animal should be considered.

3) Waterhouse-Friderichsen syndrome & Capnocytophagia related Gangrene sepsis

Adrenal hemorrhage from overwhelming sepsis: this is BAD! Super high mortality rates. (30% overall, with 70% of these deaths in immuno compromised)

If you see gangrene at the site of a cat or dog bite, think about this. These patients can get SICK. DIC, renal failure, refractory hypotension. You can get metastatic endocarditis and meningitis.

Replace steroids early (eg Hydrocortisone 50-100mg IV Q6hrs). Look for adrenal hemorrhage on CT: not very sensitive. Cultures can be negative, even after 14 days of running the plates. Think about running a PCR for *C. canimorsus.*