



TREATMENT OF ANIMAL BITES IN PATIENTS ADMITTED TO ADULT SERVICES

Pre-emptive and Empiric Treatment Antimicrobial therapy				
Animal and Usual Organism	Oral Therapy	Intravenous Therapy	Duration	Comments
<u>Dog</u> <i>Pasteurella canis</i> <i>Capnocytophaga canimorsus</i> <i>S. aureus</i> <i>Fusobacterium spp.</i> Oral flora	<u>Preferred</u> Amoxicillin-clavulanate 875-125 mg PO BID	<u>Preferred</u> Ampicillin-sulbactam 3 g IV q6h		Elevation is required if any edema is present. Lack of elevation is a common cause of therapeutic failure.
<u>Cat</u> <i>Pasteurella multocida</i> <i>Staphylococcus spp</i> Oral flora	<u>Mild PCN Allergy (rash)</u> Cefuroxime 500 mg PO BID + Clindamycin 450 mg PO TID	<u>Mild PCN Allergy (rash)</u> Ceftriaxone 1 g IV q24h + Clindamycin 600 mg IV q8h		For serious infections, addition of MRSA coverage is reasonable until MRSA is excluded especially in human bites.
<u>Human</u> <i>Viridans streptococcus</i> <i>Staph epidermidis</i> <i>Corynebacterium sp.</i> <i>Staph aureus</i> <i>Eikenella sp.</i> <i>Bacteroides sp.</i> <i>Peptostreptococcus sp.</i> Oral flora	<u>Severe PCN Allergy</u> Doxycycline 100 mg PO BID + Clindamycin 450 mg PO TID	<u>Severe PCN Allergy</u> Levofloxacin 750 mg PO/IV daily (PO preferred) + Clindamycin 600 mg IV q8h	<u>Pre-emptive</u> 3 days	Dog bites in patients with asplenia, chronic alcoholism, chronic liver disease, immunosuppression is at high risk of severe sepsis due to <i>Capnocytophaga canimorsus</i>
<u>Monkey bites</u> Similar to human flora	<u>Antibacterial therapy:</u> See dog/cat/human bite above <u>Antiviral postexposure prophylaxis (indicated in all macaque B virus exposures):</u> Valacyclovir 1 g PO TID <u>Antiviral treatment with CNS symptoms present:</u> Ganciclovir 5 mg/kg IV q12h <u>Antiviral treatment without CNS symptoms present:</u> Acyclovir 15 mg/kg IV q8h		<u>Mild infection</u> 5 days <u>Complicated infections</u> 10-14 days Recommend ID consult	Require additional work-up for <i>Macacine herpes virus</i> ⁱ <u>Antiviral postexposure prophylaxis:</u> 14 days <u>Antiviral treatment:</u> Until symptom resolution and ≥2 cultures are negative for B virus, then stepdown to 6 - 12 months post-exposure prophylaxis
<u>Non-meat eaters</u> Pig Ferrets / weasels Horse Sheep Raccoons Skunks	Same as <u>dog and cat</u>	Same as <u>dog and cat</u>		In 2015 according to the CDC, 5,508 cases of animal rabies were reported, 92.4% involved wildlife. Major animal groups were as follows: <ul style="list-style-type: none"> • Bats 30.9% • Raccoons 29.4% • Skunks 24.8% • Foxes 5.9% • Cats 4.4% • Cattle 1.5% • Dogs 1.2%
<u>Meat eaters</u> Bears Coyote / Wolf Bobcat Fox	Same as <u>reptiles</u>	Same as <u>reptiles</u>		

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<p><u>Reptiles</u> (Iguana, turtle, lizard)</p> <p>Oral flora <i>Salmonella</i> spp <i>Yersinia</i> spp <i>S. marcescens</i> <i>Aeromonas</i> spp</p>	<p><u>Preferred</u> Amoxicillin-clavulanate 875-125 mg PO BID</p> <p><u>Mild PCN Allergy (rash)</u> Cefpodoxime 400 mg PO BID + Metronidazole 500 mg PO TID</p> <p><u>Severe PCN Allergy</u> Levofloxacin 500 mg PO daily + Metronidazole 500 mg PO TID</p>	<p><u>Preferred</u> Piperacillin-tazobactam 4.5 g IV q6h</p> <p><u>Mild PCN Allergy (rash)</u> Ceftriaxone 1 g IV q24h + Metronidazole 500 mg IV q8h</p> <p><u>Severe PCN Allergy</u> Levofloxacin 750 mg PO/IV daily (PO preferred) + Metronidazole 500 mg IV q8h</p>	<p><u>Pre-emptive</u> 3 days</p> <p><u>Mild infection</u> 5 days</p>	<p>For serious infections, addition of MRSA coverage is reasonable until MRSA is excluded.</p>
<p><u>Snake bites</u> ⁱⁱ</p> <p>Oral flora Fecal flora of ingested prey <i>Staphylococcus</i> spp. <i>Streptococci</i> <i>Escherichia coli</i> <i>Morganella morganii</i> <i>Enterococcus faecalis</i> <i>Pseudomonas aeruginosa</i></p> <p>ED Snake Bite Envenomation Protocol</p>	<p><u>Preferred</u> Amoxicillin-clavulanate 875-125 mg PO BID + Ciprofloxacin 750 mg PO BID</p> <p><u>PCN Allergy</u> Linezolid 600 mg PO BID + Ciprofloxacin 750 mg PO BID + Metronidazole 500 mg PO TID</p>	<p><u>Preferred</u> Piperacillin-tazobactam 4.5 g IV q6h</p> <p><u>PCN Allergy</u> Vancomycin 15 mg/kg IV q12h + Aztreonam 2 g IV q8h + Metronidazole 500 mg IV q8h</p>	<p><u>Complicated infections</u> 10-14 days Recommend ID consult</p>	<p>Only a minority of snake bites become infected and need antibiotics.</p> <p>Most infection of snakebites are associated with the introduction of pathogenic bacteria during attempts at management in the field For serious infections, addition of MRSA coverage is reasonable until MRSA is excluded.</p>
<p><u>Rat</u> <i>Streptobacillus moniliformis</i> (USA) <i>Spirillum minus</i> (Asia)</p> <p>Recommend ID consult for follow up purposes</p>	<p><u>If no evidence of infection prophylactic antibiotics can be considered</u> Penicillin VK 500 mg PO QID or Doxycycline 100 mg PO BID</p>		<p><u>Duration</u> 3 days</p>	<p>Up to 10% of rat bites can lead to infection.</p> <p><i>S. moniliformis</i> can also be carried by hamsters and other laboratory rodents</p>
	<p><u>If clinical evidence of infection</u> Penicillin 2 million units IV q4h or Ceftriaxone 1 g IV q24h or Doxycycline 100 mg PO q12h</p>		<p><u>Duration</u> 10-14 days for uncomplicated infections</p>	<p>Handling of a dead rat has been reported to cause rat bite fever</p> <p>Can observe if decide not to use antibiotics as most patients will present within 7 days</p>

Empiric Vaccination Recommendations			
Animal	Organism	Vaccination indications	Vaccination Recommendations
ALL	<i>Clostridium tetani</i> (tetanus)	<p>Those vaccinated <5 years ago with DTaP, Tdap, or Td revaccination is not indicated</p> <p>Those vaccinated >5 years ago or never vaccinated, vaccination is indicated</p>	<p>Never received Tdap: Tdap (ADACEL®) IM x1 dose</p> <p>If previously vaccinated with Tdap: Td (TENIVAC®) IM x1 dose</p> <p>If severe or uncleaned wound and ≤2 previous vaccines (or unknown vaccination history): Tetanus Immune Globulin (HYPERTET®) ⁱⁱⁱ 250 units IM x1 dose</p>
Bats, Raccoons, Skunks, Foxes, Coyotes, Mongoosees, Woodchucks, Dogs, Cats, Ferrets, Most other carnivores ^{iv}	<i>Lyssavirus</i> spp. (rabies)	<p>Contact health department for further direction on animal containment and testing (see below text for instructions)</p> <p>If the animal tests positive for rabies or the status is unknown and the animal has a high likelihood of being a carrier, rabies immune globulin and vaccine can be considered (see Michigan Rabies Assessment for guidance)</p>	<p>If immunocompetent and previously unvaccinated with rabies vaccine: Rabies Immune Globulin 20 units/kg infiltrated to the wounds (with remaining administered IM into the deltoid) x1 dose + Human Diploid Rabies Vaccine ^v IM x4 doses (dosed on days 0, 3, 7, and 14)</p> <p>If immunocompromised and previously unvaccinated with rabies vaccine: Rabies Immune Globulin 20 units/kg infiltrated to the wounds (with remaining administered IM into the deltoid) x1 dose + Human Diploid Rabies Vaccine ⁷ IM x5 doses (dosed on days 0, 3, 7, 14, and 28)</p> <p>If previously vaccinated with rabies vaccine ^{vi}: Human Diploid Rabies Vaccine ⁷ IM x2 doses (dosed on days 0 and 3)</p> <p>Further questions can be directed to Infectious Diseases.</p>

ACTIONS

1. Inform the patient that the animal bite will be reported to the Public Health Department and to Law Enforcement (for purposes of reporting to the appropriate Animal Control Authorities).
2. All animal bites and exposures to bats should be reported to the Washtenaw County Public Health Department (WCPHD) by staff. Complete the attached Animal Bite Report form and fax to WCPHD at (734) 544-6706. Go to WCPHD website for more info: <https://www.washtenaw.org/1795/Rabies>
3. Contact WCPHD at (734)544-6700 for advice regarding sending bats or other animals for rabies testing.
4. Hospital Security, Law Enforcement & Animal Control Notification:
 - a. Healthcare provider must report the bite to UMHS Hospital Security by providing Security with the following information: animal bite victim's name; hospital registration number; date of birth; hospital location/room number.
 - b. Upon notice from health care provider, Hospital Security will dispatch a security officer to obtain the details about the animal bite incident from the animal bite victim. The type of information obtained includes:
 - i. Full Name and address of the victim;
 - ii. Information about the animal (e.g., type of animal, whether wild or domestic pet, etc., as applicable);
 - iii. If known and applicable, name and address of the animal's owner;
 - iv. Location where the incident occurred;
 - v. Cause, character and extent of the injury;
 - vi. How the incident occurred; and
 - vii. Other related and/or aggravating circumstances regarding the incident (e.g., was animal provoked)
 - c. In cases where a patient or his/her personal representative is not able to provide the information directly to the Hospital Security Officer (e.g., unconscious patient, no personal representative available) the Hospital Security Officer may obtain information about the animal bite (e.g., location, severity, etc.) verbally from the treating health care providers.
 - d. UMHS Hospital Security reports only the animal bite information set forth in Section 4B above to the University of Michigan Department of Public Safety (DPS) via phone and security dispatch report (DPS thereafter notifies the appropriate law enforcement agency/animal control officer for the jurisdiction in which the bite occurred).
5. Wound management:
 - a. Stabilization/Evaluation – Animal bites should be treated as contusions though they may also have significant lacerations or deep punctures. Initial treatment with ice and elevation will help reduce swelling. Direct pressure will control actively bleeding wounds. Consideration should be given to potential injury to deep or surrounding structures. A careful neurovascular examination of the injured area should be performed prior to the instillation of local anesthetics. A musculoskeletal exam should be performed with attention to integrity of deep and adjacent structures. Consider imaging if concern for boney injury or foreign body exists (e.g., plain radiograph or ultrasound). Lacerations over the metacarpophalangeal joints should raise suspicion for possible human bite (i.e., fight bite) injuries.
 - b. Clean wound – Appropriate local anesthesia facilitates adequate wound cleaning. Wounds should be washed with soap and water as soon as possible thorough wound cleaning may help reduce likelihood of rabies transmission.
 - c. Lacerations – To reduce the counts of bacteria present in the wound, the surface should be cleaned with povidone iodine and the depths irrigated with copious amounts of saline using pressure irrigation from a syringe. Wounds should be explored for foreign body, or deep structure injury, devitalized tissue should be debrided. Wounds over or near joints should be explored carefully through a range of motion to assess for damage to the underlying tendon sheath, fascia, joint capsule, etc.
 - d. Puncture wounds – Inspect wound for evidence of deep puncture, especially if the wound is located in the scalp or near a joint. Remove any foreign bodies or gross wound contaminants. Superficially irrigate the wound, avoiding high pressure irrigation into the wound. Avoid removal of deep tissue (e.g., "coring").
 - e. Wound closure – Closure of a bite wound may increase the risk of infection depending on species inflicting the bite, location, type and age of wound and host factors. In general, wound closure is discouraged except in locations where cosmetic or functional impairment may result. (e.g., facial bite wounds, etc.)

References

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8. Michigan Department of Health and Human Services. Emerging and Zoonotic Infectious Diseases Section. Rabies assessment flowchart.
9. Stevens DL, Bisno AL, Chambers HF, et al. Practice guidelines for the management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America. [Clin Infect Dis. \(2014\) 59 \(2\): e10-e52.](#)
10. University of Michigan Health System Emergency Department Guideline 02-10-131 ([UMHS ED Snake Bite Envenomation Protocol](#))
11. University of Michigan Health System Emergency Department Policy 02-16.3-014 ([Animal Bites, excluding monkeys](#))
12. University of Michigan Health System Emergency Department Guideline 02-16-087 ([Monkey Bite/Scratch/Exposure Protocol](#))
13. Washtenaw County Public Health. Animal bites & bats & rabies. <https://www.washtenaw.org/1795/Rabies>

ⁱ Macaque monkey bites require additional workup for Macacine herpesvirus 1 (Herpes Simiae or Herpes B), please see the [ED Monkey Bite/Scratch/Exposure Protocol](#) (Macacine herpesvirus 1)

ⁱⁱ Snake bites require contact with Michigan Poison Control (1-800-222-1222, ask specifically to speak with the toxicologist). Poison Control tracks available anti-venom supply and can assist in rapidly obtaining appropriate anti-venom. Please see the [ED Snake Bite Envenomation Protocol](#)

ⁱⁱⁱ IVIG can be used in place of Tetanus Immune Globulin if Tetanus Immune Globulin is unavailable.

^{iv} Bites of squirrels, hamsters, guinea pigs, gerbils, chipmunks, rats, mice and other rodents, rabbits, hares, and pikas almost never require rabies post-exposure prophylaxis

^v Rabies vaccinations should not be administered at or near the same site as the Rabies Immune Globulin. Rabies vaccinations should not be administered to the gluteal region; may decrease efficacy

^{vi} Patients who received post exposure prophylaxis for a previous exposure, people who received a 3-dose, IM pre-exposure regimen, or those who have a documented adequate rabies virus antibody titer after previous immunization with any vaccine.

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The recommendations in this guide are meant to serve as treatment guidelines for use at Michigan Medicine facilities. If you are an individual experiencing a medical emergency, call 911 immediately. These guidelines should not replace a provider's professional medical advice based on clinical judgment, or be used in lieu of an Infectious Diseases consultation when necessary. As a result of ongoing research, practice guidelines may from time to time change. The authors of these guidelines have made all attempts to ensure the accuracy based on current information, however, due to ongoing research, users of these guidelines are strongly encouraged to confirm the information contained within them through an independent source.

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