

EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER
DEPARTMENT OF EMERGENCY MEDICINE



Care Warriors

Author: Mahmudur Rahman | Editor: Ajith Susai D.O.

Vol 4 | Issue 54

Animal Bite Wound

A 35-year-old female with no past medical history presents to the ED with left hand pain starting 1 hour prior to arrival. She states that she was breaking up a fight between her friend and a neighbor when the neighbor's pit-bull bit her on the left hand. The pain is rated as a 9/10, constant, and described as "throbbing and stinging" localized to the dorsal, lateral aspect of her left palm without radiation. She admits to decreased range of motion and swelling to her lateral palm and lateral 2 digits. She denies fever, paresthesia, or weakness to the LLE. She denies being bitten in the past and is unsure of the dog's vaccination history.

Patient is afebrile and vitals are within normal limits. On physical exam, the patient was in not distressed, and had a diffusely swollen left hand with 2 open puncture wounds on the dorsal aspect and 1 puncture wound on the palmar aspect overlying the 4th and 5th metacarpals. Sensation was intact, however decreased ROM in 4th and 5th digits in all directions. Remainder of the physical exam was unremarkable.

Which of the following is the most appropriate initial antibiotic therapy for this patient's injury?

- A. Ampicillin-sulbactam 3 g IV every six hours
- B. Ciprofloxacin 400 mg IV every 12 hours
- C. Cephalexin 250 mg IV every 6 hours
- D. Gentamicin 3-5 mg/kg/day divided q8h
- E. All of the above



<https://pethelpful.com/dogs/dog-training-bite-inhibition>



Image courtesy of <http://leerburg.com/dogbites2.htm>

-Dog bite wounds can range from a scratch to mutilation, even amputation!
-Bites typically cause a crushing-type injury because of their rounded teeth and strong jaws.
-Some large dogs such as Pit bulls, Rottweilers, and German Shepherds can exert up to 450 psi! ^[1]
-Out of the 4.5 million estimated dog bites that occur each year, nearly 1 out of every 5 requires medical attention. ^[2]

EM Case of the Week is a weekly "pop quiz" for ED staff.

The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

BROWARD HEALTH MEDICAL CENTER

Department of Emergency Medicine
1625 SE 3rd Avenue
Fort Lauderdale, FL 33316

Correct answer is **A**. Typically, monotherapy with a beta-lactam/beta-lactamase inhibitor such as ampicillin/sulbactam or piperacillin/tazobactam is a popular choice for empiric antibiotic therapy in the inpatient setting.

Discussion

Dog bites comprise approximately 80-90% of animal bites in the United States. Dog bite related deaths range from 20-35 annually. Age of the patient and size/breed of the dog are major factors in determining severity of the wound. **Preadolescents**, ages 5 to 9, typically present with the most severe wounds as their head and neck are at an ideal height during an attack. [2]



<http://17barks.blogspot.com/2015/05/>

In **adults**, bites to the hand and wrist are fairly common. Bites of the hand generally have a high risk for infection because of the relatively poor blood supply of many structures in the hand. Anatomy and functionality of our hands make adequate cleaning of the wound difficult.

A major concern in all bite wounds is subsequent infection caused by bacteria. The top five most common dog-bite related infections in order of decreasing frequency are caused by **Pasturella**, Staphylococcus, Streptococcus, Neisseria, and Corynebacterium. [3]



<http://www.eatonhand.com/img/img00098.htm>

Osteomyelitis of 4th digit proximal phalanx secondary to dog bite

Complications of bite wounds include cellulitis, abscess, sepsis, osteomyelitis, loss of function, loss of limb, and cosmetic deformity. The above image depicts a dog bite to the proximal 4th phalanx with osseous involvement. Meningitis, tenosynovitis, pneumonia, endocarditis, and septic arthritis are other potential concerns. If patient presents with rabies, it is usually fatal. [4]

If a proper history is unobtainable, strong **differential diagnoses** can be made with objective findings. These diagnoses can include, but are not limited to, cellulitis, human bite, trauma, other animal bite, etc.

Management

Inspection, debridement, irrigation and closure of bite wounds are essential for infection prevention. Removal of nonviable tissue and any foreign bodies followed by irrigate with 100-200 mL of saline solution per inch of wound (tap water is safe). [5] Start **broad spectrum antibiotic** therapy with pip/tazo or amp/subactam. In addition to antibiotics, consider **tetanus** prophylaxis for all wounds when the dog's vaccination status is unknown. Perform primary closure vs secondary closure based on wound severity.

If patient presents with an apparent infected bite wound, a **wound culture** can be considered with radiograph in **finger series** (PA, oblique, and lateral). [6]

Inpatient admission and consultation with a **hand surgeon** is recommended if the bite wound is severe and involves deeper structures of the hand. **Rabies post-exposure prophylaxis** must also be considered.

For a list of educational lectures, grand rounds, workshops, and didactics please visit BrowardER.com and **click** on the **"Conference"** link.

All are welcome to attend!

Warriors

RABIES PROPHYLAXIS

Several factors need to be considered when deciding if post-exposure prophylaxis is needed after a potential exposure to rabies.

What is an exposure?

- A bite or scratch from an animal with rabies.
- An open wound or mucous membrane exposure to saliva, cerebrospinal fluid, or central nervous system (CNS) tissue from an animal with rabies

Was it a provoked or unprovoked bite?

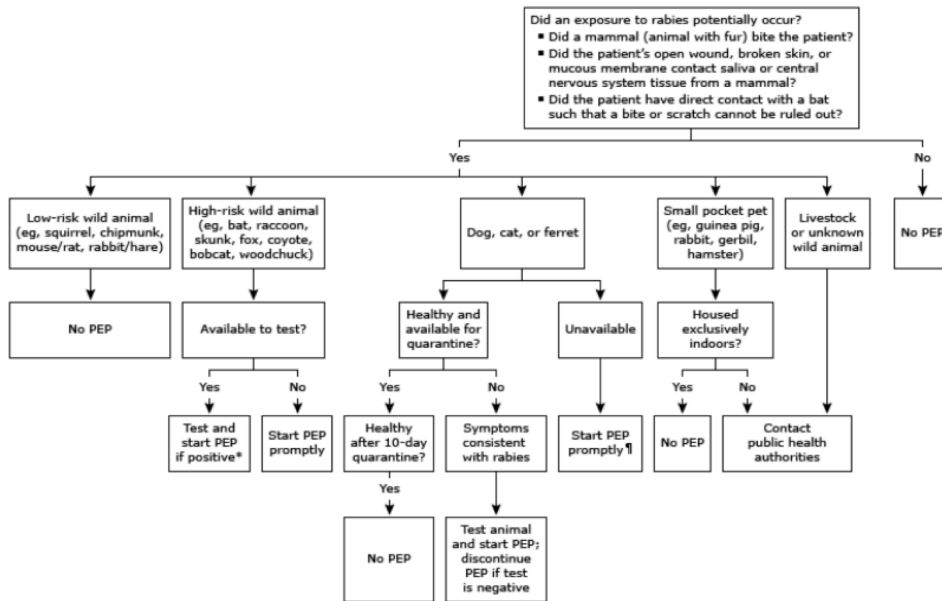
- Should always be evaluated from the point of view of the animal.
- Local public health authorities can help with making this decision.

Vaccination status of the animal?

- Is the animal domestic? Domestic animals should receive periodic rabies vaccination and should have records of this by the owner.

With a strong history & physical, the decision to initiate post-exposure prophylaxis can be made. The algorithms below provide a useful approach to handling an animal bite.

Rabies postexposure prophylaxis algorithm



https://www-uptodate-com.ezproxylocal.library.nova.edu/contents/image?imageKey=ID%2F71322&topicKey=ID%2F8328&source=see_link

Rabies postexposure prophylaxis

Vaccination category	Biologic	Schedule
Not previously vaccinated	RIG	Total dose is 20 units/kg body weight. As much of the full dose as feasible should be infiltrated around the wound(s) and any remaining given IM.
	Vaccine	Human diploid cell vaccine (HDCV) or purified chick embryo cell vaccine (PCECV) 1 mL, IM (deltoid area), 1 each on days 0, 3, 7 and 14*
Previously vaccinated	RIG	Not indicated
	Vaccine	HDCV or PCECV 1 mL, IM (deltoid area), 1 each on days 0 and 3

https://www-uptodate-com.ezproxylocal.library.nova.edu/contents/image?imageKey=ID%2F70600&topicKey=ID%2F8303&source=see_link

Take Home Points

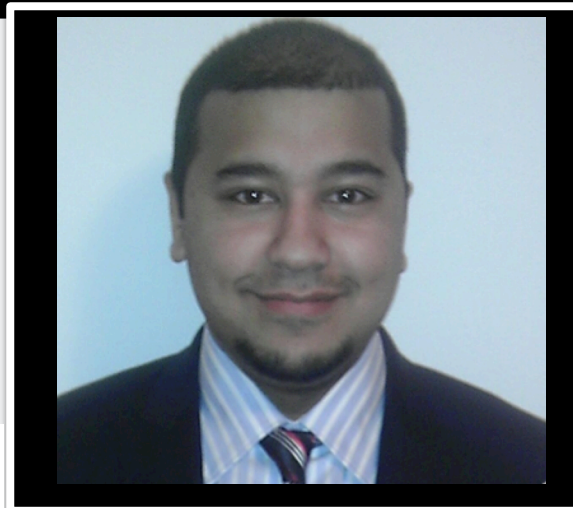
Prognosis of patients with animal bite wounds is generally excellent.

Inspection, debridement, irrigation and closure are essential for infection prevention.

Be mindful of foreign bodies such as teeth and remove them along with non-viable tissues to prevent infection.

Always consider rabies and tetanus post-exposure prophylaxis when the patient's (and dog's) history is unknown.

Culture the wound, obtain a finger series, and consult hand surgeon if patient requires admission and intervention.



ABOUT THE AUTHOR

Mahmudur Rahman is a 4th year medical student from NSU-COM. He did his emergency medicine rotation at NBMC in March of 2018. Mahmudur plans on pursuing a career in Radiology after graduation.

REFERENCES

1. Chambers GH, Payne JF. Treatment of Dog bite wounds. *Minn Med.* 1969 Mar. 52 (3); 427-30
2. Abrahamian, F. M., & Goldstein, E. J. (2011). Microbiology of Animal Bite Wound Infections. *Clinical Microbiology Reviews*, 24(2), 231-246. doi:10.1128/cmr.00041-10
3. <https://emedicine.medscape.com/article/768875-clinical#b3>
4. Moscati RM, Mayrose J, Reardon RF, Janicke DM, Jehle DV. A multicenter comparison of tap water versus sterile saline for wound irrigation. *Acad Emerg Med.* 2007 May. 14 (5):404-9.