

# EM CASE OF THE WEEK

BROWARD HEALTH MEDICAL CENTER DEPARTMENT OF EMERGENCY MEDICINE



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## EM CASE OF THE WEEK

EM Case of the Month is a monthly “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.



## Animal Bites

A 3 year-old male presents to the pediatric emergency department immediately after being attacked at home by the family pit bull. On arrival, the child is unconsolably crying and bleeding from a large, gaping head wound. His vital signs are T 98.6°F, HR 165, RR 32, BP 143/80, SaO<sub>2</sub> 97% on room air. Physical exam reveals a 10cm x 3cm laceration to the left parietal region. CT scan of the head shows a left parietal comminuted skull fracture with a small foci of subdural/intraaxial air in the left temporal lobe. While in the ED, the child becomes febrile and the facial wound begins to swell. Oral and maxillofacial surgery is consulted to irrigate and repair the laceration, the child started on Unasyn and admitted to the ICU.

Which of the following statements about animal bites in the emergency room is true?

- A. Dog bites are frequently caused by animals known to the victim
- B. The majority of mammalian bite wounds encountered in the emergency department are caused by cats
- C. The extremities are the most frequent site of injury in canine attacks of children below the age of five years
- D. Most dog bites to the face are left open to heal by secondary intention
- E. Routine antibiotic prophylaxis is recommended for all animal bites



Broward Health Medical Center  
 Department of Emergency Medicine  
 1625 SE 3<sup>rd</sup> Ave  
 Fort Lauderdale, FL 33316



## Take Home Points

- The majority of animal bites are the result of attacks by dogs. Frequently, the dog is known to the victim and occurs on the pet owner's property.
- Victims should seek immediate medical attention. Pre-hospital irrigation of wounds with tap water and compression of sites of active bleeding should be encouraged to reduce infection.
- Proper wound care reduces infection more than antibiotics.
- Amoxicillin-clavulanate is the first-line oral antibiotic therapy. Prophylactic antibiotic therapy should be given for 3-5 days; infected wounds require a 10-day or longer course of treatment.

## Animal Bites

**The correct answer is A.** An estimated 3-6 million animal bites occur each year in the United States, accounting for approximately 1% of all visits to the emergency department. The majority of mammalian bites are inflicted by dogs (80-90%), with the remainder caused by cats (5-15%), rodents (2-3%), humans (2-3%) and other animals. Male dogs and certain breeds (e.g. German Shepherds, Pit Bulls, Rottweilers) are more commonly associated with bites. Frequently, the victim is familiar with the biting animal and the attack occurs on the pet owner's property.

Dog bites commonly cause crushing-type wounds because of the animal's rounded teeth and large jaws. Some larger adult dog can exert such extreme pressure that may damage deeper structures, such as bone, vessels, tendons, muscles and nerves. In children, especially those under the age of five years, injuries usually involve the face, head and neck. In older children and adults, bite wounds more commonly involve the extremities, particularly the dominant hand. The peak incidence of dog bites occurs among children age 5-9 years.

Cat bites more commonly cause puncture wounds and lacerations located to the face and upper extremities. Because of their long, slender, sharp teeth, feline wounds inoculate bacteria into deeper tissues and infection may develop more rapidly than those of other animal bites.

Cellulitis and local soft tissue infections are the leading cause of morbidity in animal bite wounds. Infections are polymicrobial; the predominant pathogens being of the oral flora of the biting animal and human skin flora. Common bacteria infecting non-human bite wounds include *staphylococci*, *streptococci*, and *pasteurella* species. Cat bites may also transmit *bartonella henselae*, causing cat scratch disease. Human bite wound pathogens include *staphylococci*, *streptococci*, *eikenella* species and anaerobic bacteria and viral pathogens, such as human immunodeficiency virus, herpes simplex virus and hepatitis.

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and click on the "Conference" link. All are welcome to attend!

Bite wounds may also be complicated by sepsis, particularly *capnocytophaga canimorsus* infections in immunocompromised individuals, asplenic patients and chronic alcoholics. Meningitis, osteomyelitis, tenosynovitis, abscesses, pneumonia, endocarditis, and septic arthritis may also occur. Bites from wild animals raises concern for rabies exposure; rabies infection, when it occurs, is almost uniformly fatal.

**Workup.** Fresh bite wounds without signs of infection do not need to be cultured. If clinical signs of infection are present, including fever, erythema, swelling, tenderness, purulent drainage and lymphadenopathy, gram stain, aerobic and anaerobic cultures should be obtained prior to starting antibiotic therapy.

Deep bite wounds near joints should be evaluated with AP and lateral plain radiographs to look for disruption of bones and joints, embedded foreign bodies (such as teeth), and bony and soft tissue injury and subcutaneous gas characteristic of osteomyelitis. Deep dog bites to the scalp, particularly in young patients, warrant CT head. Radiographic findings indicating a penetrating injury include: fracture, puncture through the outer plate of the skull, and free air in the cranial vault.

Ultrasound may be useful in identifying abscess formation.

**Initial Management.** Stabilize the wound with direct pressure to any areas of active bleeding. Perform neurovascular assessment of areas distal to the wound.

Carefully inspect wounds, examining joint wounds through a range of motions. Remove devitalized tissue, particulate matter and foreign bodies. Clean, surgical wound edges result in smaller scars and promote wound healing.

Clean wound surface with 1% providone-iodine or 1% benzalkonium chloride solution.

Irrigate the depths of the wound with copious amounts of sterile saline using pressure irrigation. (Pre-hospital rinse with tap water has proven to be just as effective for irrigation as sterile saline.) In general, irrigate with 100-200 mL of solution per inch of wound. If rabies exposure is a concern, the CDC recommends irrigating the wound with providone-iodine solution. Additionally, take care to prevent irrigating solution from reentering the wound.

Primary closure should only be considered in bite wounds that can be effectively cleaned. The infection risk of non-high risk bite wounds when closed is 6-8%. Facial wounds are at a low risk of infection due to the increased blood supply and primary closure is advisable due to the cosmetic implications. Bite wounds to the hands or lower extremities, especially those presenting 8-12 hours after injury or those affecting immunocompromised hosts, should be left open.

Tetanus and rabies prophylaxis should be considered for all wounds. Anti-rabies treatment is indicated for bites by animals whose rabies status is unknown or in foxes, bats, raccoons, or skunks.

In general, low-risk wounds do not require prophylactic antibiotics. High-risk wounds—for example, true puncture-type cat bites, bites to the hand, massive crush injuries, late presentation (>8-12 injury after animal bite), or patients of poor general health—however, should be treated with antibiotics.

Amoxicillin-clavulanate is the first-line oral antibiotic therapy. Prophylactic antibiotic therapy should be given for 3-5 days; infected wounds require a 10-day or longer course of treatment. Higher risk infections may require a first dose of intravenous antibiotic therapy (e.g. ampicillin-sulbactam). Close follow-up with reevaluation within 24-48 hours is essential.

## ABOUT THE AUTHOR:

This week's case was prepared by Ashley Abramowski, who rotated at BHMC emergency department in March 2015. After graduating from NSU in May 2015, she is moving to Oklahoma City, OK to pursue a career in Obstetrics and Gynecology. Ashley has a pet Yorkshire Terrier named Louie.