BRIEF REPORT

Increased Incidence of Domestic Animal Bites following a Disaster Due to Natural Hazards

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Abbreviations:
DMAT = Disaster Medical Assistance Team
NDMS = National Disaster Medical System

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Abstract

Introduction: During deployment following Hurricane Ike in September 2008, bites from domestic animals were among the top three trauma complaints seen at the National Disaster Medical System (NDMS) Disaster Medical Assistance Team (DMAT) base of operations.

Problem: Unlike previous reports of frightened, misplaced dogs and cats biting strangers and rescue workers, there was an increase in bites associated with presumed non-rabid pets who were known to the bite victim.

Methods: This was an observational sampling of all patients presenting for medical care during deployment to the AL-3 DMAT base of operations in Webster, Texas, following Hurricane Ike. Findings were compared with unofficial local norms and observations from the literature.

Results: Of the people with animal bites presenting to the field hospital, dog bites accounted for 55%, cat bites, 40%, and snake bites, 5%. Most of the wounds required suturing and were not simple punctures. Most bites (70%) involved the hand(s). Some patients presented >24 hours after the bite, and already had developed cellulitis. One patient required transfer and inpatient admission for intravenous antibiotics and debridement of a hand injury with spread into the metacarpophalangeal space.

Conclusions: Most of the bites were severe and occurred within the first 72 hours after the hurricane, and waned steadily over the following weeks to baseline levels. No animal bites caused by misplaced dogs and cats biting strangers were seen. There was an increase in bites associated with domesticated pets known to the bite victim. The current NDMS cache is stocked adequately to care for most wounds caused by animal bites. However post-exposure rabies treatment is not part of the routine medications offered. For future disaster preparedness training, pet owners should be aware of the increased potential for dog and cat bites.

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Introduction

Animal bites after disasters due to natural hazards have been recognized in the disaster and epidemiologic literature for some time. Previous work has shown an increase in snake bites associated with naturally-occurring disasters.[1] These snakes typically are pit viper types, including rattlesnakes, copperheads, cottonmouth water moccasins, and coral snakes. North Carolina epidemiologists tracked a major increase spike in dog bites following Hurricane Floyd in 1999, noting that during the first week after the hurricane, there was a 246% increase. During the second week, dog bites still increased by 169%. There were no concurrent reports of animal rabies cases. They concluded that increased dog bites probably were a result of displaced, frightened pets.[2] After Hurricane Katrina in 2005, misplaced dogs and cats bit many rescue workers. Most theories attribute the increase in bites to fear. Other work has suggested that animal bites also are triggered by meteorolog-

1. Never leave a baby or small child alone with a dog.
2. Be on the lookout for potentially dangerous situations.
3. Teach young children to be careful around pets.
4. Children must be taught NOT to approach strange dogs. Children should be taught to ask permission from a dog's owner before petting the dog.
5. Don't run past a dog. Dogs naturally love to chase and catch things. Don't give them a reason to become excited or aggressive.
6. Never disturb a dog that's caring for puppies, sleeping, or eating.
7. If a dog approaches to sniff you—stay still. In most cases, the dog will go away when it determines you're not a threat.
8. If you are threatened by a dog, remain calm. Do not scream. If you say anything, speak calmly and firmly. Avoid eye contact. Try to stay still until the dog leaves, or back away slowly until the dog is out of sight. Don't turn and run.
9. If you fall or are knocked to the ground, curl into a ball with your hands over your head and neck. Protect your face.

Table 1—Avoiding dog bites[9]

ical phenomena. A retrospective emergency department study performed in England by Bhattacharjee *et al* indicates that animal bites increase significantly during a full moon.[3]

Methods

An observational sampling of all patients presenting for medical care during deployment to the AL-3 Disaster Medical Assistance Team (DMAT) base of operations in Webster, Texas, following Hurricane Ike was performed. Bites from domestic animals were among the top three trauma complaints seen at the National Disaster Medical System (NDMS) facility. The DMAT was deployed on the third day post-impact. A mobile hospital with 24-hour coverage was set up. Three physicians and one physician extender provided care at the field hospital. The author of the study served as medical officer during this deployment.

Results

The top three trauma chief complaints included: (1) nail puncture wounds, (2) lacerations; and (3) dog/cat bites. The overall incidence of animal bites was 22% of all the trauma complaints. Of the animal bites seen, dog bites accounted for 55%, cat bites, 40%, and snake bites, 5%. A discussion with the local emergency department and emergency medical services providers indicated that the usual incidence of animal bites was approximately 1% of the trauma complaints. Upon questioning the victims, it was clear that most (80%) of the victims were bitten by their own dog or cat. All (100%) of the victims knew the dog or cat that bit them. Most describe the bite as being unprovoked and unanticipated from a pet that typically was non-aggressive. Only one patient had known the animal to have previously bitten another human. All of the pet owners described the pet's behavior as returning to baseline levels after the biting, and no patient described the animal attempting to bite the victim more than once. Most of the wounds required suturing. Most (70%) involved the hand(s). Several patients presented >24 hours after the bite, and already had developed cellulitis. After irrigation and dressing, all patients were given tetanus toxoid and oral antibiotics. One was given parenteral antibiotics. One patient required transfer and inpatient admission for intravenous antibiotics and debridement of a hand injury with spread into the metacarpophalangeal space. Most of the bites occurred within the first 72 hours after the hurricane and waned steadily over the following weeks before returning to baseline levels.

Discussion

Literature Review

During baseline, non-disaster reporting, animal bites are common, with >4.7 million people in the United States affected each year. Typically, these are dog or cat bites.[4] University of Pittsburgh data show the median age of persons who sustain dog bites is 15 years, with a significant increase in the number of bites of boys 5–9 years of age.[5]

Certain breeds of dogs tend to be more dangerous. On this list are akitas, boxers, chow chows, Doberman pinschers, pit bulls, American Staffordshire bull terriers, Rottweilers, and wolf hybrids.[6]

The anatomical site the dog bites occur varies with the age of the victim; however, the hand is most frequently involved in cat bites.

Dog bites may cause infections by *Staphylococcus, Streptococcus, Eikenella, Pasteurella, Proteus, Klebsiella, Haemophilus, Enterobacter, Capnocytophaga* (formerly CDC group DF-2), and *Bacteroides* species. Cat bites may cause infections by *Pasteurella, Actinomyces, Propionibacterium, Bacteroides, Fusobacterium, Clostridium, Wolinella, Peptostreptococcus, Staphylococcus*, and *Streptococcus* species. Each year in the US, 10–20 people receive fatal bites. Sepsis can occur in immunocompromised persons with infections caused by *Capnocytophaga* organisms.[7]

General Bite Treatment Guidelines

Guidelines for healthcare providers treating animal bites are listed.[10]

1. Look for disruption of the integrity of the skin. Prescribe antibiotics if disruption of the skin is noted. Foreign bodies may be observed in the wound. Irrigation of the wound is paramount.
2. Amoxicillin and clavulanate (Augmentin) are the drugs of choice for the treatment of dog and cat bites. Tetracycline and ampicillin are second-choice drugs. Cephalosporins provide fewer benefits than amoxicillin-clavulanate, ampicillin, and tetracycline.[4]
3. If the bite is deep, neurovascular events may have occurred, and injury to tendons and bones must be excluded. Hand injuries pose a special concern for infection, which may spread into the metacarpophalangeal space and may need surgical consultation.
4. Victims with dog bite injuries to the face, especially children, should be examined for nerve damage and facial fractures. To rule out facial fractures, victims should undergo a computed tomography in cases with a high degree of suspicion, such as when large breed dogs capable of crush-type injuries are involved.[8]

5. Assess the potential for rabies, noting that unprovoked bites may indicate that the biting animal is rabid. Administer both rabies vaccine and rabies immune globulin (RIG) in separate syringes to previously unvaccinated individuals with high-risk dog or cat bites involving animals with known or suspected rabies. Administer only rabies vaccine to previously vaccinated individuals with high-risk dog or cat bites involving animals with known or suspected rabies.
6. Consider immediate administration of rabies vaccination to individuals with head and neck bite wounds inflicted by a dog or cat with an unknown vaccination status.
7. Consider vaccinating patients with bite wounds inflicted by animals that have escaped, and consult public health officials to assess the local risk of rabies transmission. Most jurisdictions require a police report of such wounds, but this may be impossible or of low priority during a disaster. Local hospital or health department authorities should be contacted to help obtain and administer RIG. If the dog or cat inflicting the bite is healthy and available for observation, the local veterinary health authorities, depending on the local infrastructure post-disaster, should observe the animal for 10 days and administer rabies vaccine and immune globulin if signs of rabies develop. It may be more expeditious to euthanize dogs or cats that develop signs of rabies immediately, and arrange for evaluation of their brain for rabies virus by a qualified laboratory. National Veterinary Response Teams (NVRT) (formerly VMATs) provide additional resources for US disaster providers by offering medical treatment of animals, animal disease surveillance, zoonotic disease surveillance, and public health assessments.

Other general recommendations that apply equally in disaster are noted in Table 1.

Conclusions

Emergency medical and DMAT personnel should be familiar with animal bite evaluation and treatment. The current NDMS cache is stocked adequately with wound care supplies, including irrigation, suturing, and dressings. The pharmacy cache contains appropriate antibiotics to treat animal bites as well as tetanus immunizations. Rabies and snake bite antivenin are not part of the routine NDMS pharmacy cache but should be reconsidered. As part of disaster preparedness training pet owners should be made aware of the increased potential for dog and cat bites. Pet owners should not assume that their own previously docile animal is not capable of "biting the hand that feeds them". For the first 72 hours after a disaster, pets should be monitored for aggressive behavior and kept away from other animals and humans if their behavior is erratic or atypical. All pets should be up-to-date on rabies immunization. Further research as to the cause and warning signs of these bites should be performed. Rescue workers should be aware of the potential of becoming a victim of an animal bite during a disaster. One should be cautious around strange dogs and treat pets with respect, especially after a disaster.

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