

When Pets Attack Wildlife—Part 2: What to Do

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Abstract: Many wild animals are admitted to rehabilitation as a result of capture and injury by cats and dogs. Review of published literature, as well as discussions with veterinarians and wildlife rehabilitators, often focuses on use of antibiotics to address potential infections resulting from exposure to bacteria in the pet's mouth. This paper offers some reminders to identify the full suite of possible conditions, to assess if the wild animal is able to survive and be released, and to consider then a range of possible treatment options—rather than automatically turning to antibiotics as a solution when antibiotics may not be appropriate nor the only option.

Key words: injuries from pets, wildlife injuries, pet attacks on wildlife, use of antibiotics with wild animals, cat bites, dog bites, cats and birds, pet attacks, antibiotic resistance, wildlife mortality, wildlife wounds

INTRODUCTION

Wildlife rehabilitators commonly admit wild birds, mammals, and herpetiles captured and/or harmed by domestic pets. Since the mouths and claws of cats and dogs are known to harbor bacteria that can cause infections, veterinarians often direct the rehabilitator to immediately clean the wound(s) and initiate treatment with antibiotics as a prophylaxis to prevent infection or destroy bacteria that already may have invaded the wound or animal's system. However, the standard practice of administering antibiotics to guard against infection may not be necessary or appropriate in all cases. This paper describes considerations for such decisions.

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SPECIFIC CONDITIONS AND CAUSES

Pets can cause a variety of health problems in wild animals, such as fractures, crushed chests, punctured abdomens, nerve damage, and internal hemorrhage (Casey and Goldthwait 2013). Many of these more severe conditions, such as severed spines or open skull wounds with obvious neurologic symptoms, can be assessed quickly as non-recoverable and do not require treatment considerations, other than euthanasia. It is not appropriate to initiate antibiotic therapy if the animal will be euthanized immediately. Other conditions, such as closed head trauma or simple fractures, may require stabilization but not necessarily antibiotics.

A physical examination is absolutely essential. The initial examination identifies life-threatening conditions like severe shock, respiratory difficulty, and hemorrhage. These issues are addressed immediately. A more complete and thorough examination is conducted a short while later when the animal is more stable. The more thorough and detailed examination may identify additional conditions and the need for evaluation of their seriousness, including dehydration, bruising, swelling, fractures, difficult urination or defecation, mobility or range of motion problems, weakness, pain, and so forth. All conditions should be documented.

It also is important to remember that some of the animal's health conditions, perhaps related to falling from a tree, exposure to toxins or disease, being hit by a vehicle, being orphaned due to the mother's death, or being dropped by a wild predator, may have occurred before the wild animal was captured by the pet, and even may have been the reason the pet caught the animal. Gathering as much information from the rescuer about the situation in which the animal was found, possible reason the pet found the wild animal, and any contact with or care by the rescuer (i.e., feeding)

is crucial. Learning where the wild animal was found (source location) gives further clues, such as disease outbreaks in an area, as well as helpful information for ultimate release.

Look closely for any possible puncture wounds from teeth or claws since entry wounds from cat teeth or claws can be very small on the surface and might close quickly, making them difficult to find. Gently and carefully separate the animal's fur or feathers to closely examine skin on the whole body. If one puncture is found, look for others since a pet's four canine teeth may have penetrated the skin. It is more common for multiple puncture wounds from teeth and claws to be present than just a single wound. Matted, sticky fur or feathers is an indication of blood or saliva and can direct the observer to location of a puncture even if the wound is no longer visible.

Canine teeth in cats and small dogs tend to be smaller, narrower, and sharper and thus cause punctures more difficult to find than those of a large dog. Sharp and narrow cat claws also tear the skin and can cause deep punctures. Remember, such punctures may be deep—such as 0.5 to 1.5 in (1.3–3.8 cm)—not just a tiny scratch on the surface. If the pet's teeth or claws damaged vital organs, serious injuries can threaten or take the animal's life before an infection can develop.

While dogs cause lacerations and puncture wounds, they also cause damage by crushing muscles, organs, and bones with their jaws, and by pawing the animal. Dogs cause serious injury by shaking, which can cause fractures, dislocations and sprains, concussions, and hemorrhage (similar to shaken baby syndrome, traumatic brain injury, or whiplash), and nerve and organ damage.

An examination should not stop when a single problem is identified unless that condition by itself is so severe as to be fatal (e.g., open skull wound with neurological signs, fractured ribs penetrating the lungs), or would prevent the animal's release to the wild (e.g., amputated wing, eye injuries causing vision impairment). Radiographs may be necessary to identify and assess fractures and organ and body cavity damage.

While a few wild animals can have only a single wound or injury as a result of a pet attack, multiple health problems are much more common. These can include shock, dehydration, multiple wounds, bruising, hemorrhage, fractures, head trauma, neurologic damage, and more. A greater number and/or severity of health problems makes a patient more precarious and complicated to treat. Treating a single, minor health problem, such as a scratched toe or mild bruising, is much simpler when compared to injuries like a skull

fracture, chest trauma with hemorrhage, or punctures to the neck or abdomen.

Assess Survival/Release Probability. In some cases, the wild animal is admitted with conditions so critical the patient has very little to no chance of survival, whether due to types and severity of wounds, injuries, or to other considerations that prevent the animal's release back to the wild (e.g., amputated wing). In such cases, when the animal is going to die shortly, whether on its own or as a result of euthanasia, administering antibiotics with the intent to prevent infection is unnecessary. Cost of the medication, potential stress to the animal during administration, possible risk to the person administering the antibiotic, and development of antibiotic resistance are further reasons not to initiate antibiotic treatment if the animal's death is imminent.

While the animal's condition may be serious, at times the veterinarian or rehabilitator believe there is a reasonable chance for recovery and treatment is initiated. There may be situations when the wild patient's condition is more critical than expected, it does not respond to treatment and declines further, or original injuries cause further damage that prevents recovery such that euthanasia should be re-assessed.

The rehabilitator and veterinarian may decide the prognosis is extremely poor and attempting treatment would prolong physical suffering and create captivity stress for a wild animal highly unlikely to recover or be released. At that time, a decision of immediate euthanasia is the most humane and appropriate option. While a decision to euthanize a wild animal patient is not easy, especially when the health problem was directly or indirectly caused by people and their pets, it is made with respect for the animal and the caregivers and is an act of compassion for the animal.

TREATMENT

Treat for shock. This includes placing the animal in a secure cage with appropriate bedding in a quiet, warm, and somewhat darkened location to allow it to calm. Animals in shock generally have subnormal body temperatures. Isotonic fluids can be administered to help reduce shock. The isotonic fluids should be at the approximate normal body temperature of the animal, which means warming the fluids. Administering cool or room temperature fluids to an animal in shock may cause it to go into more profound shock.

Rehydrate with isotonic fluids. Since wild animals admitted to rehabilitation may be starving and dehydrated, administration of isotonic fluids is vital. Rehydration therapy should follow standard

protocols. Administration of the appropriate amount of isotonic fluids, such as lactated Ringers solution or Normosol™-R (Hospira, Lake Forest, IL), may be provided over a 4- to 24-hour time period depending on the severity of dehydration and type of fluid administration (e.g., oral, subcutaneous). While some people believe a single administration of a larger volume of isotonic fluids may accelerate the rehydration process and reduce handling of a wild animal, administering a single larger volume can result in the animal not absorbing the fluids properly and experiencing further health problems, such as cardiac and respiratory depression and decrease in core body temperature. Rehydration over several hours allows the body to more fully absorb the fluids. Also, providing water without electrolytes to a dehydrated animal could complicate the dehydration by causing metabolic imbalance.

If there is a reasonable probability the wild animal can survive and it has open wounds (breaks in the skin) or signs of infection (such as abscess or purulent discharge), thorough wound cleaning and continuing management are necessary. Veterinarians are more likely to prescribe antibiotics if the animal's overall recovery and prognosis is positive, the wound is more than 12 hours old, and has been contaminated by bacteria, including from pet teeth or claws (Whittington 2007). In some cases, veterinarians prescribe antibiotics if punctures are suspected, but are not found. Veterinarians also prescribe antibiotics for wild patients showing signs of abscess or sepsis. Veterinarians often prescribe supplemental heat, restricted movement, continued cleaning of wounds, medications, and possibly surgery and physical therapy. Holistic veterinarians may prescribe additional or different treatments, such as botanical or homeopathic medicines, or acupuncture.

While some people believe that administering antibiotics is enough to prevent and resolve infections, effective wound management such as thorough cleansing and providing moisture to dry wounds or removing moisture from exudative wounds is essential to reduce bacteria, remove necrotic tissue, support healthy granulation tissue, and improve the animal's chance of full recovery (Whittington 2007). Depending on the wound severity, a veterinarian may clean and treat the wound, which may include debriding and leaving the wound open or surgery to close with sutures and a drain, and continue the management or direct the rehabilitator to perform basic first aid, topical wound cleaning, and basic wound management.

Antibiotics are selected based on the expected type of bacteria and location of wounds, as antibiotics vary in their ability to penetrate into different tissues.

In order to reduce chances of development of multi-drug resistant bacteria, it is not appropriate to turn immediately to 'big gun' antibiotics, which should be saved to use in case a first antibiotic fails.

The patient needs to be stable (not in shock), warm, and hydrated before starting any antibiotic. Side-effects of antibiotic administration are less severe if the patient is stable. In addition, the antibiotic selected must be appropriate for the species and age of animal; some antibiotics are contraindicated in certain species and can cause serious problems if used. Amoxicillin and amoxicillin trihydrate/clavulanate potassium (Clavamox[®], Pfizer Animal Health, New York, NY) are acceptable in birds. There is conflicting information and experience regarding the use of penicillin derivatives in rodents and lagomorphs, including concerns that serious complications may develop, such as gastroenteritis. Enrofloxacin (Baytril[®], Bayer Animal Health, Montville, NJ) may be used for most species, but there are concerns about using it in very young animals due to the possible suppression of cartilage and bone growth.

Appropriate antibiotic therapy includes giving the correct dose for the correct duration. Reducing the development of drug resistant bacteria depends on appropriate dose and duration of antibiotic therapy. Using a dosage too low or stopping the antibiotic too soon causes development of drug resistant bacteria. Appropriate therapy also includes proper storage and not using expired drugs. There is increasing interest in the potential for using long-acting antibiotics in wildlife (e.g., Convenia[®] [fourth group cefovecin sodium, Zoetis, Florham Park, NJ] and Excede[®] [ceftiofur, Zoetis, Florham Park, NJ]). While not enough research has been done to endorse the use of such drugs in wildlife, more information is expected soon.

Since antibiotics often destroy all bacteria, including healthy and essential bacteria in the gastrointestinal tract, consider using a probiotic until several days after the antibiotic treatment is complete. A good rule of thumb is to give a probiotic for the length of the antibiotic therapy and then at least as long after the antibiotic course is complete. Very small amounts of probiotics, such as *Saccharomyces boulardii* (Surawicz 1989), are administered twice a day. While probiotics can be very beneficial in allowing effective and diverse gut flora to flourish, it is possible to overdo the probiotics and reduce the diversity of gut flora.

Pain Management. Wild animals captured and injured by domestic pets are highly likely to be in pain. While wild animals hide pain, the caregiver may recognize or observe conditions that cause pain, such

as fractures, crushing injuries, or deep wounds. Other conditions, such as limited mobility and reduced or no appetite could be additional signs of pain, or these could be the animal's reaction to stress and captivity.

Since it is likely the wild animal injured by a dog or cat is in pain, the veterinarian and rehabilitator want pain treatments administered promptly. In addition to reducing an animal's suffering, a decrease in pain reduces immunosuppression, allows more comfortable movement, and can help reduce stress caused by captivity. The animal also may be willing to eat if it is not experiencing pain.

That said, different species and individual animals react differently to pain. It is absolutely critical that the caregiver be familiar with what is normal for the species in order to better assess what signs may suggest or confirm pain.

There are many conventional medications that veterinarians prescribe for pain management depending on the condition, species, age, and overall health of the wild animal (Tseng 2007). While pain medications can be prescribed for specific cases and species, there are some that are more common. Most conventional pain medications cannot be obtained without a veterinary prescription for the specific animal and problem.

Nonsteroidal anti-inflammatory drugs—

- Meloxicam (Metacam[®], Boehringer Ingelheim, Ridgefield, CT). Animals must be hydrated and not in shock. While the manufacturer discourages use with young animals, some veterinarians use it with caution. Generally given 0.5 to 2 mg/kg once or twice per day in birds and mammals.
- Carprofen (Rimadyl[®], Zoetis, Florham Park, NJ). Animals must be hydrated and not in shock. Carprofen is used in birds and mammals at doses from 1 to 10 mg/kg once or twice a day.

Authors' Note: Dosage range varies widely for these non-steroidal anti-inflammatory (NSAIDS) drugs both between published references and between individual species. Consult with your veterinarian and use caution with these medications.

Opioids—

- Opioid pain control drugs, such as tramadol, butorphanol, and buprenorphine, are controlled drugs and are only available through a veterinarian.
- These drugs may have cardiovascular or respiratory depressive effects, so must be used with caution. The animal must be hydrated and not in shock before use and must have a strong, healthy respiratory system since these drugs are known to suppress respiration.

Local anesthetics—

- Topical anesthetics, like sterile lidocaine, can be used in dilute cleaning agents to flush abscesses or clean open wounds.
- Lidocaine also comes in a prescription gel or cream that can be used to reduce pain sensation while cleaning open wounds. Lidocaine should be used in very low doses and with caution since it can cause adverse cardiac effects.
- While topical Aspercreme[®] (Chattem, Chattanooga, TN) may be used for reducing pain and muscle soreness, it should *not* be used on any damaged skin or open wounds. Other conventional external muscle pain salves should *not* be used on animals, such as Icy Hot[®] (capzasin, Sanofi US, Bridgewater, NJ) or Bengay[®] (Johnson & Johnson Services, Inc., New Brunswick, NJ).

There are pain treatments available in addition to conventional drugs. Some examples are mentioned as part of other treatment options.

Surgery. Surgery may be required to treat some injuries, such as pinning a fracture or closing a wound. Only licensed veterinary professionals can perform such surgeries. It should be noted, some conditions for which surgery might be considered for pets, while perhaps technically possible for wildlife, will not be appropriate for an animal that must survive independently in the wild. Long or uncertain recoveries after surgery also may not be practical for wildlife, depending on the level of post-operative care available.

Many wild animals admitted to rehabilitation with cat or dog bites are very small and surgery could be extremely difficult and survival questionable on such tiny creatures. More technically difficult procedures on extremely small patients are less likely to succeed. Also, federal and some state rehabilitation regulations prohibit treatment that makes an animal non-releasable, such as wing amputation.

Mechanical Treatment. A variety of treatments prescribed by veterinarians are husbandry related rather than medical; for example, providing supplemental heat and a small, confined cage to reduce movement, allowing the animal to rest and its injuries to heal. For some species, veterinarians recommend soaking the wound in warm water with a small amount of Epsom salts to help reduce swelling, increase circulation, reduce pain, help flush out bacteria, and bring infection/abscess to the surface.

Wrapping a wound or stabilizing an injured limb also falls under the category of mechanical treatments. Similarly, setting fractures and bandaging wounds are mechanical treatments that reduce pain and may help healing and recovery for release.

Physical therapy is another treatment that may be helpful once the animal has recovered from the initial injury. Physical therapy can help the wild animal regain mobility and rebuild muscle strength and stamina after injury and recuperation time. Physical therapy must be performed properly to achieve the desired result, ensure safety of the animal and caregiver, and minimize the wild animal's stress.

Acupuncture. Acupuncture has been used for thousands of years to treat a wide range of conditions, in both humans and animals. Some veterinarians have successfully used acupuncture to treat pain, infections, and injuries in wild animals. The need to handle and restrain a wild animal during acupuncture treatment is likely to be stressful for many species and may offset the benefits. Acupuncture only should be performed by a veterinarian familiar with the anatomy and acupuncture meridians for the type of wildlife being treated, as well as safe and effective handling.

Natural Medicine. Natural medicines may be considered in some cases to support other basic treatments, such as treatment of shock, wound cleaning and management, surgery, and stabilization of fractures. There are a wide variety of natural medicines used around the world. Some examples are listed below.

Grapefruit seed extract (GSE) is an oily substance that some veterinarians recommend be diluted with water and used as a disinfectant topically to clean wounds. Veterinarians also recommend diluting GSE in water and administering it orally to help combat the growth of pathogenic bacteria. However, antimicrobial properties of GSE have come under scrutiny and the belief is the preservatives in many commercial preparations of GSE have the actual disinfectant/antimicrobial properties. GSE in and of itself can help trap oxygen free radicals that cause tissue damage.

Honey and granulated sugar have antimicrobial properties and can enhance wound healing when applied topically to lacerations and abrasions (Moore 2001). Aloe may accelerate wound healing when applied topically to abrasions and lacerations (Swaim 1992). Herbal calendula in liquid or gel form applied topically to lacerations and abrasions has helped reduce bleeding, reduce bacteria growth, and has mild anti-inflammatory benefits. Herbal calendula

has been a popular treatment for centuries. Since honey, sugar, aloe, and calendula can accelerate healing of wounds, they should not be used on punctures or deep penetrating wounds because they may cause the small surface wound to close prematurely, before deeper tissue has healed, which can cause further problems.

Holistic veterinarians prescribe botanical substances to build immune response and kill bacteria, including such products as oil of oregano and tea tree oil. While botanical medicines may not require a prescription, they should be used according to veterinary instruction since they still are considered medical treatments.

Homeopathic Medicine. Some veterinarians use homeopathic medicine for wildlife according to homeopathic principles (e.g., minimum dose, single medicine), case-taking, and administration methods (Casey and Black 2002). Since remedy selection, dosing, and administration is different from conventional and botanical medicine, it is helpful for the rehabilitator to learn about this modality in advance and consult with a homeopathic veterinarian about types of cases and health conditions expected, such as wounds and fractures (Facinelli 1997; Casey 2002b).

Homeopathic *Arnica montana* has been used effectively to treat traumatic injuries in people and animals for over 200 years. Homeopaths may prescribe several doses of *Arnica montana* 30c, 200c, or 1m to be given orally to substantially reduce pain from trauma, reduce swelling, and minimize tissue damage in cases where injury has caused bruising, swelling, passive hemorrhage, fractures, and pain. Accelerated healing of tissues helps to minimize the development of abscesses due to trauma. It should be noted that the *Arnica montana* is not applied topically to open wounds.

Homeopathic *Hypericum* 30c or 200c can be given orally to reduce pain from crushing injuries, lacerations, and damage to areas rich in nerves, such as tails, toes, and face. Homeopaths administer a couple of doses of oral homeopathic *Ledum* 30c to assist with opening and healing punctures in soft tissues (not lacerations).

Oral administration of 1 to 3 doses of homeopathic *Gunpowder* 30c or 200c can be used to help stimulate the patient's healing response to bacteria-laden wounds, including punctures (Casey 2007; Clarke 1915). Homeopaths have used homeopathic *Gunpowder* successfully as both a prophylactic and with wounds already showing signs of infection since the 1860s. In other cases, veterinarians prescribe a couple of oral doses of *Hepar sulphuris* 30c

to encourage suppuration of abscesses resulting from cat bites, especially when the patient also shows signs of irritability. Oral administration of homeopathic *Myristica sevirifera* 30c or 200c is used with wounds that have intense inflammation, as well as used to encourage suppuration and discharge of foreign materials, including infection (Hamilton 2010). There are many more homeopathic remedies that may be considered and have been effective with wounds and infections in wild animals.

After a patient with fractures has had several doses of *Arnica montana* and the bone is set, homeopathic veterinarians may follow the *Arnica montana* with a few doses of homeopathic *Symphytum* 30c or 200c to help accelerate the healing of long bone fractures (e.g., tibia, femur) and reduce pain of these fractures. It is essential that the fracture be set *prior* to administering *Symphytum*. Homeopathic *Ruta graveolens* is another remedy that may be administered after *Arnica montana* for fractures, especially with shorter bones that have been set (such as elbows, wrist and ankle joints with fractures, and digits). *Ruta graveolens* 30c or 200c also is effective with reducing pain of joint injuries, dislocations, and sprains.

A wild animal chased by a domestic pet is likely to experience stress—which then can become more intense when it is captured and in pain. Fear and extreme stress can accelerate respiration and heart rate, exacerbate shock, and even reduce immune response. Rehabilitators work to reduce the animal's stress by standard practices, such as placing it in a quiet, warm, dark, secure location and minimizing handling or other stressors. Some homeopathic veterinarians recommend that a wild animal exposed to a very frightening situation be given a single dose of *Aconitum napellus* 30c, 200c or 1m. Only one oral dose of the *Aconitum napellus* is administered.

Flower Essences. *Rescue Remedy*[®] (Bach Flower Remedies Ltd., Wilmington, MA) is a flower essence used with people and animals to help reduce stress. Some rehabilitators administer the *Rescue Remedy*[®] to help reduce stress and fear as soon as a wild animal is admitted to rehabilitation. *Rescue Remedy*[®] may be diluted in water and administered to the animal several times in the first couple of hours after a pet attack. *Rescue Remedy*[®] does not stop all fear or stress, but rather seems to help reduce the intensity. The rehabilitator still works to minimize the animal's stress and fear. Neither the *Rescue Remedy*[®] nor homeopathic remedies dull or remove fear to the extent to allow the animal to be easily habituated.

Veterinarians. Rehabilitators should work closely with veterinarians regarding decisions and treatments for wild animals with medical conditions. Veterinarians have essential knowledge, skill, and licenses and most rehabilitation permits require a veterinarian to provide or oversee medical care. Veterinarians can provide useful information for the rehabilitator while considering and evaluating options for treatment.

Some rehabilitators work with multiple veterinarians to tap into a veterinarian's special interests, knowledge, skills, and time available, such as surgery, emergency medicine, acupuncture, homeopathy, and so forth. Working with multiple veterinarians also may help balance the workload and not overuse a single veterinarian. Tips on finding and working with veterinarians are available in rehabilitation publications (Moore and Joosten 2002; Facinelli 1997).

In addition, there are many publications, websites and training opportunities provided by rehabilitation and veterinary associations, including National Wildlife Rehabilitators Association, International Wildlife Rehabilitation Council, American Veterinary Medical Association, American Holistic Veterinary Medical Association, and Academy of Veterinary Homeopathy.

It should be remembered that while some holistic and natural medical treatments are 'over the counter,' knowing when and how to use them is crucial for safety of the patient and the optimal efficacy of the treatment. So while such treatments may be available easily, working with a veterinarian is still essential!

CONCLUSION

As always, the rehabilitator should work closely with a veterinarian on diagnostics and treatment, especially for cases that are complicated, severe, or require surgery. It is essential to be familiar with each species' behavior, common injuries, and conditions from which the wild animal can recover. Equally important is to assess what conditions each species is unlikely or impossible to survive. As always, follow effective rehabilitation practices, diet, caging, quarantine, etc. Even though there are times when antibiotics can be extremely valuable and life-saving in preventing and treating infections in wild animals, there are conditions when antibiotics may be inappropriate and ineffective in helping the animal's recovery and release. It is essential to realistically assess the wild animal's chances of recovery and recognize that while medical technology might be available and an option for pets that are provided daily care, heroic measures, such as amputating a wing, does not allow the wild animal

to be released back for independent life in the wild. This paper provides examples of health conditions and treatment options for wild animals injured by pets. It also encourages rehabilitators and veterinarians to thoroughly evaluate each case, evaluate options, and select responses and treatments from a variety of possibilities.

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