CASE REPORTS

Human North American River Otter (*Lontra canadensis*) Attack

Tiffany M. Potter, MEM; Jill A. Hanna, MD; Luanne Freer, MD

From the Yale School of Forestry and Environmental Studies, New Haven, CT (Ms Potter); the Plumas District Hospital, Quincy, CA (Dr Hanna); and the Medcor at Yellowstone, Yellowstone National Park, WY and Bozeman, MT (Dr Freer).

As a result of the successful restoration and conservation programs deployed by state and federal agencies, populations of the North American river otter (*Lontra canadensis*) are increasing in many states. Recreational activities such as swimming, boating, and fishing increase the likelihood of human interactions with this charismatic, nonendangered mustelid. Otters tend to avoid areas of high human activity, occur at low population densities, and in some habitats in the United States have not recovered from population declines. Therefore, interactions with humans are rare, and aggressive encounters by otters are even less frequent. We report a recent, aggressive, and unprovoked attack that was followed by immediate medical treatment, including postexposure rabies prophylaxis, extensive suturing, and subsequent reconstructive surgery. We discuss river otter biology, the prevalence of diseases in wild populations of river otter, and otter attacks on humans and their treatment.

Key words: attack, rabies, mustelidae, river otter, *Lontra canadensis*, human interactions

Introduction

Otters are an aquatic carnivore found on every continent except Australia and Antarctica. One of 13 subspecies of otter, the North American river otter is found from the edge of the arctic tundra to the Gulf of Mexico.^{1,2} Most mustelids, including otters, have specialized teeth, including sharp canines and carnassials that inflict lethal bites to prey and large crushing molars. Scent-gland secretions mark territories and aid in expressing hostility.³ Mustelids will exhibit aggressive behavior and can hiss and attack when threatened. Because they are intelligent, most mustelids are quite curious and, in the case of the otter, occasionally exhibit play behavior.¹

Otters naturally tend to avoid areas of high human activity, occur at low population densities, and in some habitats in the United States have not recovered from population declines. Interactions with humans are rare, and aggressive encounters by otters are very infrequent. Here we report a recent aggressive and unprovoked attack that was followed by immediate medical treatment, including postexposure rabies prophylaxis, extensive suturing, and

subsequent reconstructive surgery. In this article we will present a case report, review river otter biology, and discuss the prevalence of diseases in wild otter populations and otter attacks on humans.

Case report: Belden, CA

On July 31, 2004, a family of 4 stopped for an afternoon swim in the Feather River, approximately 1 mile west of Belden, CA. The ambient temperature was 83°F and the river was wide, with a slow current and no rapids. Three of the family members swam in the river. Patient 1, an 11-year-old male, swam across the river and walked along the opposite bank exploring the area; he then got into the water and started heading back across the river. While holding onto an overhanging branch of a tree, patient 1 saw an otter surface about 10 feet away. The otter then quickly swam toward him, biting and scratching the victim. The otter attacked from the surface, submerged, and then attacked the patient's lower extremities and trunk. The patient recalls kicking at and hitting the otter.

Patient 2, the mother of patient 1, swam quickly over to patient 1, attempting to push the otter away. The otter then began attacking patient 2, scratching and biting both from the water's surface and underwater. Patient 3, the father, arrived next and was able to push patient 1

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Corresponding author: Tiffany M. Potter, MEM, Yale School of Forestry & Environmental Studies, 205 Prospect St, New Haven, CT 06511 (e-mail: Tiffany.Potter@yale.edu).

Figure 1. Patient 1: Multiple lacerations and bite wounds.

Figure 2. Patient 1: Lower extremity lacerations.

away from the otter and toward the shore, where he eventually made an escape. Meanwhile, the otter turned its attack toward patient 3 as he and patient 2 swam to shore, kicking at the otter as they swam. The otter continued to swim offshore for several minutes but finally swam away after the victims threw rocks in its direction.

The family drove to an emergency department for treatment. Patient 1 sustained the most significant injuries, with numerous superficial abrasions and bites over his chest wall, forehead, cheek, and bilateral upper and lower extremities. Full-thickness lacerations were present on his foot, thigh, arm, and forehead (Figures 1 and 2). Patient 2 sustained 2 full-thickness bites to her thigh, and Patient 3 sustained a superficial bite to his foot.

Initial treatment involved a thorough cleansing and irrigation of all wounds with povidone-iodine sponges. Patient 1, with 6 bite wounds on the extremities, required 25 sutures. Three lacerations on his face required repair by a plastic surgeon later that evening. Patient 2 required 8 sutures to repair her thigh wound, and patient 3's wounds did not require suture repair and were cleansed and bandaged. Patients 1 and 2 were treated with amoxicillin/clavulanate for wound infection prophylaxis. Because of the otter's bizarre and aggressive behavior, all patients received rabies postexposure prophylaxis with vaccine and immune globulin. Arrangements were made for the family to receive subsequent rabies vaccine on days 3, 7, 14, and 28 to complete the vaccination series.

On follow-up, all patient wounds had healed well and without infection, and all patients had completed their rabies vaccine series. The otter could not be captured and no further otter attacks were reported that summer.

Biology of the North American river otter

Adult river otters weigh between 15 and 30 pounds and measure 84.34 cm (2.8 feet) to 137.16 cm (4.5 feet).^{1,2} Otters have adapted to their aquatic environment by developing dense fur, large lungs, and webbed hind feet.

Webbing is greatly reduced on the front feet. Unlike sea otters, river otters are capable of covering great distances on land. Den sites are usually inconspicuous and are in close proximity to water.¹ Otters rely on the burrows of other animals (eg, beaver lodges and bank dens), hollowed logs, or rocky ledges for dens and resting sites.² Like many successful carnivores, otters forage on a wide variety of prey, including fish, crayfish and other crustaceans, reptiles, birds, amphibians, large aquatic insects, and small mammals.^{1,3} Otters have been used to capture prey for human consumption. They have reportedly attacked and drowned domestic dogs.^{4,5} Emboldened by the safety of water, otters will approach people within a few feet of a boat or a person on shore^{5,6} but this behavior is not routine.

HOME RANGE SIZE

Females have adjacent ranges that can overlap. Males have larger home ranges that partially overlap with males and females. Actual range size is dependent on many factors, including topography, habitat type, group size, season, and food availability. Melquist and Hornocker³ found the annual home range size can vary between 32 and 48 km (19–30 miles).

LIFE CYCLE

Otter pups weigh about 4.5 ounces (128 g) when born. Pups nurse for 3 to 4 months and begin to swim 2 months after birth. Young otters swim naturally, but the mother must coax them into the water for their first swim. During the first days of swimming, a pup often climbs onto its mother's back. Pups leave their mother when they are 1 year old and ready to look for their own territory.¹

SPECIES STATUS

Having suffered population declines due to unregulated trapping and habitat loss, river otter numbers declined

in most of their historical range. In response, state and federal agencies have initiated reintroduction projects to restore them to native habitats in 17 US states.⁷ In many states, river otter populations have recovered to historical levels, allowing for experimental and regulated fur trapping and hunting seasons.⁸

Because otters occur at low population densities and tend to avoid areas of high human activity, interactions with humans are infrequent.⁵ Recreational enthusiasts, including swimmers, fishermen, and boaters, are most likely to interrupt otter activity or unintentionally disturb den sites. Adverse interactions are uncommon but do occur.^{9–12} Attacks deserve reference because many appear to be unprovoked and warrant immediate medical attention and prompt treatment for possible rabies exposure.¹³ In Florida, otters are considered to be highly susceptible to, and capable of, transmitting mid-Atlantic raccoon (*Procyon lotor*) rabies if infected.¹⁹ Infrequent but aggressive attacks by otters on people either singly or in groups have been documented in every region of the United States except for Hawaii; these reports have been documented by the Centers for Disease Control and Prevention (CDC), state and federal agencies, or by newspapers.^{5,8,14–17} There are no reports of human fatalities from otter attacks.

Little is known about the prevalence of diseases in wild otter populations.⁶ Clinical infectious diseases confirmed in captive otters include canine distemper, canine adenovirus type 2, feline parvovirus, tuberculosis, and Aleutian disease.^{6,7,18} A few cases involving death from canine hepatitis or leptospirosis have also been reported.¹⁸ Fortunately, rabies confirmation in otters is infrequent. According to the CDC, 91% of rabies infections reported in 2003 were from wild animals. Out of 100% of rabies cases (7,170 total) involving humans, dogs, and wild animals only 3 cases were identified in river otters.¹⁵ From 1960 to 2003, the CDC confirmed 54 cases of rabies in otters.^{14–16}

Recommended medical treatment

If the victim is more than 1 hour from a treatment facility, the wounds should be cleansed at the scene, as early cleansing reduces the chance of bacterial infection and is effective in killing rabies and other viruses. Potable water, preferably boiled or treated with germicidal agents, is adequate for wound irrigation, and ordinary hand soap adds some bactericidal, virucidal, and cleansing properties. Thoroughly irrigate the wound with at least a pint of soapy water and then gently debride it of dirt and foreign objects by swabbing with a soft, clean cloth or sterile gauze. After cleansing, cover the wound

with sterile dressings or a clean, dry cloth and immobilize.²¹

Definitive care should include a thorough cleansing and debriding of all devitalized tissue. The decision to close otter bite wounds should be made on the basis of cosmesis, function, and infection risk factors, as is the case with other wild animal bites.²⁰ Certain high-risk wounds (eg, hand wounds) may best be treated in consultation with a hand surgeon.

There is no medical literature reporting care of an infected otter bite; antibiotic choice for prophylaxis should be based on the most likely pathogen, and for established infection, choice can be guided by wound culture results. Bites and wounds incurred in a freshwater environment can be at increased risk for infection, and practitioners need to consider selecting prophylactic or therapeutic antibiotics active against *Aeromonas hydrophila* (gentamycin, trimethoprim-sulfamethoxazole, or fluoroquinolone) and antibiotics to cover routine bite pathogens.^{21,22} Rabies postexposure prophylaxis should be prescribed in any wild carnivore bite or scratch regardless of the nature of the event, in accordance with CDC and local health department recommendations. Though the risk of rabies may be higher from an animal that attacks in an unprovoked manner, a provoked injury also requires treatment.

In addition to treating the bite victim, authorities should be alerted to attempt to capture the offending animal for examination. Unusual behavior, such as an unprovoked attack by a wild animal in broad daylight or a complete absence of fear of humans, should raise the suspicion for rabies. Live capture is optimal, but freshly killed animals are usually satisfactory for fluorescent rabies antibody testing. Avoid damaging the animal's head and brain, because brain tissue is needed for analysis. Availability of the animal for testing can eliminate the need for costly and uncomfortable rabies prophylaxis of the patient. If more than 1 hour will elapse before the animal can be transported to a hospital or public health department, refrigerate the body. Do not use preservatives.¹⁹

River otters display antagonistic behavior, but not necessarily predatory aggression, toward humans. Antagonistic behavior is expressed via attack (offensive) and escape (defensive) responses that include threats, submission, pursuit, and physical confrontation.^{22,23} Motives for this behavior may include 1) parental (attacks on intruders when young are nearby), 2) territorial (exclusion of individuals from a physical space), or 3) dominance (control as a result of a previous encounter with an adversary).^{23,24} The motivating factor may be competition for limited resources such as food, water, haven from predators, and den sites for rearing young.^{23,25} In-

fection, such as rabies, may be the cause of unprovoked otter attacks, and some attacks have no obvious cause.

If confronted by an otter that appears unusually aggressive, attempt to move away from the animal (for example, if you are in a boat, move away from the animal and be prepared to defend yourself if the otter attempts to enter the boat). If in the water, exit the water as quickly as possible. To minimize a physical encounter with an otter or otters, never attempt to approach otters (or any other wild animal). They may look cute (and captive otters have resulted in overemphasis on the role of "play" in their daily lives), but when it comes down to it, otters are predators and can potentially be dangerous.

Conclusion

There are no published guidelines for the management of otter bites because of the paucity of documented cases. Management practices can be derived from guidelines for domestic animal bites and for wounds sustained in freshwater. Meticulous wound care, use of prophylactic antibiotics in high-risk cases, and attention to tetanus and rabies prophylaxis should be included in the management of otter attack victims.

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