CASE REPORT

Cougar Attacks on Humans: A Case Report

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Cougar attacks on humans are increasing. Presented is a case report of a nonfatal 2-year-old male cougar attack on an 8-year-old girl in British Columbia. Discussions of wound management, rabies postexposure prophylaxis (RPEP), and the possible psychologic ramifications of such an attack are presented. Also reviewed are recommendations on actions that may be helpful in preventing an attack following a sudden encounter with a cougar. Humans must learn to coexist with cougars, which present a small but real threat to people.

Key words: cougar attacks, humans, wild animal mauling

Introduction

The mountain lion, *Felis concolor*, also known as the cougar, puma, panther, painter, American lion, Indian devil, mountain screamer, deer tiger, purple panther, silver lion, red tiger, brown lion, and Mexican lion,^{1,2} is an animal that is the subject of increasingly passionate debate and has become a vivid symbol of the conflicts between humans and nature. The increase in cougar attacks on humans since 1970 may reflect increasing cougar populations, encroachments of humans on cougar territory, and better methods of incident reporting.³ Presented is a case report of a nonfatal cougar attack on an 8-year-old American girl in British Columbia, July 2002, and a review of cougar habits and the medical management of cougar bites as well as a discussion of wound closure and rabies postexposure prophylaxis (RPEP).

Case report

On Compton Island (Figure 1), a part of the chain of islands on the Inside Passage in British Columbia, a 2-year-old male cougar silently pounced from the cover of the forest onto an 8-year-old girl while she was bending over on the beach to look at a hermit crab late in the afternoon. Two other children were nearby (both boys, ages 11 and 14 years). The 100-pound cat (Figure 2) sank his teeth into the posterior aspect of the girl's neck,

hauling her off for an estimated 20 seconds down the beach as her posture went limp: she did not attempt to fight. The cougar was spooked as the adult group members screamed, chased him, and threw stones. The girl's father, a large man, headed the cougar off from entering the forest, bellowing loudly at him and raising his arms above his head. The cat reversed course momentarily and then released the 65-pound girl and climbed a tree.

A family physician member of the party examined the 9 deep puncture wounds to the posterior skull, upper arm, posterior and lateral neck, and upper back and the scratch marks to the face and back (Figure 3A and B). Her light blue, blood-stained sweatshirt was removed as direct pressure was administered to the largest and deepest of the wounds on her lateral neck. Hemostasis was quickly achieved with no vital structures damaged, specifically no apparent carotid or internal jugular lacerations, no cervical spine fractures or instability, no pneumothorax, and no skull fractures. Estimated blood loss was 200 mL. The child never lost consciousness and remained in a recumbent position. She was wrapped in a blanket and sleeping bag and remained in the family physician's arms to prevent hypothermia. Minineurologic and mental status examinations were normal. She remained frightened but alert.

One of the kayak guides assisted in the medical care of the girl as the other guide radioed for assistance. After approximately 15 minutes, the girl was sea evacuated by a small boat, enduring a 20-minute bumpy boat ride in the physician's arms with her carotid pulse being digitally monitored. The boat was met by an ambulance, where she was placed on a spine board, and an antecur-

Photographs courtesy of Denise McKee.

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Figure 1. Site of cougar attack, Compton Island, British Columbia.

bital fossa intravenous access was obtained. She had to endure another 20-minute bumpy dirt road ride to the nearest 10-bed hospital. She remained lucid and calm during evacuation.

At the hospital, cervical spine, head, and chest radiographs were obtained and were normal. All puncture wounds and lacerations were extensively irrigated with normal saline, explored, and debrided. A small portion of devitalized trapezius muscle was excised. All lacerations and puncture wounds received loose primary simple suture closure with both infection risk and cosmetic outcome in mind. Intravenous antibiotics included cefuroxime and clindamycin, which were later changed to oral ceftin and clindamycin on discharge from the hospital. One dose of rabies immune globulin was given, and RPEP was considered. However, upon further discussion with veterinarians and infectious disease experts in Vancouver, the decision was made to hold off on further RPEP until the cougar's head had been inspected for rabies. The cougar was shot, and his head was sent for necropsy. Within 48 hours, the report was received that the cougar was negative for rabies; therefore, no RPEP shots were given.

The girl's physical recovery was uneventful, and she followed up with her pediatrician and a plastic surgeon in her hometown. She suffered some expected nightmares and exclaimed that the cougar was a "naughty kitty." She had an "I'm happy to be alive party" within 1 week of returning home. Eight months later, she is afraid to go back to the island where the incident occurred and has been reluctant to go on any wilderness camping trips.

Discussion

Cougars are well adapted to most environments ranging from Alaska and Canada in the north to Tierra del Fue-

Figure 2. Attacking cougar.

go at the tip of South America and are the most widely distributed large mammal on the American continents, with 11 western states verifiably having cougars and a remnant population existing in Florida.⁴ In North America, deer are the primary prey; in South America, the guanaco (*Lama guanicoe*) is the primary prey species. Other prey species that are not noted to be present on Vancouver Island but that are present in the Americas include porcupines, Virginia opossums, rabbits, coyotes, bobcats, badgers, and skunks.⁵ Cougars are usually tan with black-tipped ears, although they may be reddish brown in Canada. Adult males range from 130 to 225 pounds and can be 8 feet long, and adult

Figure 3. A, Attack victim's puncture wounds. B, Attack victim's posterior and lateral neck wounds.

females range from 90 to 120 pounds and can be 7 feet long from nose to tip of tail.^{1,6} Females usually bear 3 kittens, only 1 of which survives to adulthood (life span in the wild is approximately 12 years).^{1,6} Cougars are powerful. They can kill a full-grown deer or elk. Their attacks are swift; most of the attacks occur as quickly as an automobile crash. Cougars can drop silently 60 feet; running on land, they can leap more than 15 feet straight up, and on flat ground, they can spring forward almost 45 feet.

Cougars are elusive, secretive, solitary, shy, and difficult-to-study animals that are not often seen by humans in the wild, giving a perception of scarcity. An adult male has a range of up to 100 square miles; the territory of females is 20 to 60 square miles.^{3,5} There is often intense competition for territory with individual ranges overlapping. Because of their elusive nature, radio telemetry equipment is necessary to study this wild animal.

Rising from near extinction after being bounty hunted, this protected game species has made a huge comeback. A 1990 initiative in California restricted the Department of Fish and Game management of the cougar, designating it a "specially protected mammal." Because of increasing cougar populations and increasing human activities encroaching on cougar territory, more frequent sightings and cougar-human interactions have been reported.³ Other reasons for more frequent sightings may include decreasing deer and wild sheep populations. From 1986 until 1995, 10 verified attacks by cougars on humans occurred. From 1890 to 1990, 53 cougar attacks on humans resulted in 10 human deaths in the United States and Canada.⁷

Cougar attacks on humans are unusual, partly because cougars do not perceive humans as prey, and cougar prey recognition is a learned behavior.⁸ Their increasing proximity to humans, however, may have the effect of habituating cougars to humans by sight and smell, possibly identifying them as prey.³ Others have suggested that cougar sickness or starvation also plays a role in human attacks.⁴ Overlapping habitats and increasing cougar populations are also suggested for the increase in human-cougar interaction. Data indicate that children are at a higher risk than adults because of their small size, quick movements, excited conversation, and vigorous play movements, all of which may stimulate cougar attack behavior.^{7,8} It does not appear to make a difference whether children are alone or with a group of other children or adults. Cougars have attacked them under all of the listed scenarios.^{3,5,7}

A study of cougar attacks on children in British Columbia documented 50 attacks with a 25% mortality rate. Most of the children were not alone when the attack

occurred. Common injuries included neck lacerations, internal carotid artery injury, fatal cervical spine injury, and phrenic nerve injury. The cougar was rabid in 2 of these cases. *Pasteurella* was a late infectious complication in 2 cases.⁷ In another case, a bite mark analysis of the cougar's teeth imprint on the victim's chin was used to profile the animal's age and gender and to establish which cougar was actually responsible for the attack so that it could be removed.⁹ Cougar attacks can produce significant morbidity and mortality in children as well as adults.¹⁰

Cougars may display various behaviors before an attack. Stalking, crouching, sweeping tail movements, extended eye contact, laid-back ears, snarling, growling, body low to the ground, pumping rear legs, and treading up and down all connote the extreme danger of an attack.³ Many victims do not see the cougar prior to an attack, as in the case presented. The favorite site of the cougar's attack on its prey is the nape of the neck, with the cat often maneuvering its teeth between the prey's vertebrae and into the spinal cord.¹¹ There are proprioceptors in the cougar's jaw that enable it to determine when its teeth encounter bone.¹¹ Often, a forcible neck hyperextension occurs, causing cervical vertebral fracture, and claws are embedded in the back of the victim with the intent of killing on a first-pass basis. The prey may be shaken and dragged a distance from the kill site. The sternum and ribs are then characteristically opened, with evisceration of the heart and lungs and abdominal organs. Feeding on the extremities and other carcass material continues for several days.³

Beier⁵ has outlined human behaviors that have had various outcomes in preventing or averting attacks. In all near attacks, aggressive human movements (eg, shouting, swinging sticks, throwing rocks, waving arms) deterred the cougar. It was clear from the cases studied by Beier that attempting to run away or play dead was of no help and probably aggravated the attack by stimulating the cougar. Human behavior that seemed to repel an attack in progress included fighting back (bare hands, a knife, a jacket, or a rock), shouting, and blowing a whistle.⁵ Clearly, one should never turn one's back on a cougar, whether observing a sighting or involved in an attack.

The medical management for a victim of cougar attack is fraught with controversy regarding several issues, including RPEP, wound closure, and prophylactic antibiotics. Cougar bites are typically punctures or lacerations that are sharp, deep, and clean slashes.³

In all patients with cougar bites to the head and neck, radiographs of the cervical spine, chest, and skull should be obtained to determine whether frac-

tures, pneumothorax, and deep structure damage are present.¹²⁻¹⁴

Pasteurella multocida should be considered a pathogen in cougar bites.⁴ *Pasteurella* is a pleomorphic, gram-negative, nonmotile, bipolar-staining coccobacillus that often presents as a rapidly developing cellulitis at the site of a cat bite or scratch. *Pasteurella* is opportunistic in nature and has the potential to cause chronic infection of deep tissues, septicemia, septic arthritis, meningitis, pneumonia, lung abscesses, and osteomyelitis. Streptococci, staphylococci, *Moraxella*, *Corynebacterium*, and *Neisseria* are common isolates from cat bites.¹²⁻¹⁴ Anaerobic isolates include *Fusobacterium*, *Bacteroides*, *Porphyromonas*, and *Prevotella*.¹²⁻¹⁴

Cougar bite victims should be considered for empiric antibiotic therapy directed against *Pasteurella*, streptococci, staphylococci, and anaerobes. Such therapy could include a combination of a β -lactam antibiotic plus a β -lactamase inhibitor, a second-generation cephalosporin with anaerobic activity, or combination therapy with either penicillin and a first-generation cephalosporin or clindamycin and a fluoroquinolone.¹²⁻¹⁴ Penicillin is the drug of choice to cover *P. multocida* in nonpenicillin-allergic patients. Alternative treatments include tetracycline, chloramphenicol, cephalosporins, and sulfamethoxazole.¹²⁻¹⁴ Immunocompromised patients are predisposed to disseminated infection with *P. multocida*. Sensitivity testing is necessary in all established *Pasteurella* infections.

Empiric recommendations about the primary closure of cougar bites are difficult to make. High-pressure irrigation with saline, debridement, and exploration of all wounds are necessary. Recent data suggest that carefully selected mammalian bite wounds can be sutured with approximately a 6% rate of infection.¹⁵ Primary closure of cougar-inflicted lacerations may be necessary for cosmesis or hemostasis. In general, it is contraindicated to suture puncture wounds, as they are at high risk for infection. Bites on the hands should be left open to heal by secondary intention.³

Cougar attacks on humans are fortunately rare, and those by rabid cougars are even rarer. Guidelines published by the Advisory Committee on Immunization Practices indicate that unvaccinated persons exposed to rabies should be treated with rabies immune globulin and begin a 5-dose series of rabies vaccine.¹⁶ One prospective study on the appropriateness of RPEP treatment discovered that it is often given inappropriately.¹⁶ Given the expense of RPEP, the authors suggest closer adherence to the guidelines outlined by the public health department and the Advisory Committee on Immunization Practices as well as other available guidelines. In the case described in this paper, the animal was killed and

sent for necropsy and brain testing, and the results were available within 48 hours—a safe time to wait prior to initiating RPEP. Test results ruled out the need to proceed with RPEP in this case.

The psychologic impact of cougar attacks on victims and witnesses should also be considered. The victim in this case has experienced a few nightmares and remains reluctant to go wilderness camping. In some cases, the diagnosis of posttraumatic stress disorder may be made.

Conclusion

Humans must learn to coexist with cougars. Attacks by cougars are a rare but dramatic component of wilderness medicine. Cougar attacks are increasing as humans encroach on cougar habitats and as cougar populations rebound. Treating physicians must be knowledgeable about the appropriate evaluation and management of these cases.

References

1. Young SP, Goldman EA. *The Puma, Mysterious Animal Cat*. Washington, DC: The American Wildlife Institute; 1946.
2. Clarke J. *Man Is the Prey*. New York, NY: Stein and Day; 1969.
3. Conrad L. Cougar attack: case report of a fatality. *J Wilderness Med*. 1992;3:387-396.
4. Kizer KW. *Pasteurella multocida* infection from a cougar bite. *West J Med*. 1989;150:87-90.
5. Beier P. Cougar attacks on humans in the United States and Canada. *Wilderness Soc Bull*. 1991;19:403-412.
6. McLean DD. Mountain lions in California. *Calif Fish Game*. 1954;40:147-166.
7. Kadesky K, Manarey C, Blair GK, Murphy JJ III, Verchere C, Atkinson K. Cougar attacks on children: injury patterns and treatment. *J Pediatr Surg*. 1998;33:863-865.
8. Fitzhugh EL. Managing with potential for lion attacks against humans. *Proceedings of the Third Mountain Lion Workshop December 5-8, 1988*. Prescott, AZ: Arizona Fish and Game Department; 1989.
9. Rollins CE, Spencer DE. A fatality and the American mountain lion: bite mark analysis and profile of the offending lion. *J Forensic Sci*. 1995;40:486-489.
10. Conrad L. The maul of the wild animal attacks can produce significant trauma. *Emerg Med Serv*. 1994;25:71-72, 76.
11. Cohle SD, Harlan CW, Harlan G. Fatal big cat attacks. *Am J Forensic Med Pathol*. 1990;11:208-212.
12. Talan DA, Citron DM, Abrahamian FM, Moran GJ, Goldstein EJ. Bacteriologic analysis of infected dog and cat bites. *N Engl J Med*. 1999;340:85-92.
13. Layton CT. *Pasteurella multocida* meningitis and septic

- arthritis secondary to a cat bite. *J Emerg Med.* 1999;17:445–448.
14. Burdge DR, Scheifele D, Speert DP. Serious *Pasteurella multocida* infection from lion and tiger bites. *JAMA.* 1985;253:3296–3297.
15. Chen EJ, Hornig S, Shepherd SM, Hollander JE. Primary closure of mammalian bites. *Acad Emerg Med.* 2000;7:157–161.
16. Moran GJ, Talan DA, Mower W, Newdow M, Ong S, Nakase NY. Appropriateness of rabies postexposure prophylaxis treatment for animal exposures. *JAMA.* 2000;284:1001–1007.