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CASE REPORT
PATHOLOGY AND BIOLOGY

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A Fatal Leopard Attack

ABSTRACT: A rare case of a big cat fatal attack is presented. A male leopard that had escaped from its unlocked cage attacked a 26-year-old male zoo worker. The man sustained penetrating injuries to the neck with consequent external bleeding. The man died while being transported to the hospital as a result of the injuries sustained. The wounds discovered on the victim's body corresponded with the known methods of leopard attacks and with findings on the carcasses of animals killed by leopards in the wild. The conclusion of the medicolegal investigation was that the underlying cause of death was a bite wound to the neck which lacerated the left internal jugular vein, the two main branches of the left external carotid artery, and the cervical spine. The cause of death was massive external bleeding. Special attention is paid to the general pattern of injuries sustained from big cat attacks.

KEYWORDS: forensic science, leopard attack, bite injury, injury pattern, big cat, *Panthera pardus*

A fatal attack by a large feline is an extremely rare cause of death in the world (1–8). Most often the attacks occur in zoos, circuses, on private breeders' grounds, and on the grounds of the owners of big felines. Today, the medicolegal literature talks about one case of a fatal leopard attack in Europe (2) and two more cases of leopard attacks in the rest of the world (1,5). Even in the wild, there are very few observed attacks of leopards on chimpanzees, bonobos (9), and gorillas (10) (primates). This rare case provides very valuable and instructive study material concerning the method of leopard attacks on humans, and it also gives us important information about the mechanism behind the occurrence of fatal wounds during a feline attack on humans.

Case Report

Forensic Circumstances and Observation

A 26-year-old male was found dead in the wee hours of the morning in a leopard cage in the African feline pavilion in a zoo that specializes in breeding African fauna. The man was employed in the zoo as a feline caretaker. During the investigation, it was discovered that the man entered the opened area of the leopard pavilion immediately before the feline's regular feeding time, without checking if the animal was properly enclosed or if the area of the pavilion was safe. The man was attacked on the neck immediately after he entered the pavilion by a male Persian leopard. The man died while being transported to the hospital as a result of the injuries sustained. The investigation also showed that the leopard escaped from the closed inner part of the pavilion through an unlocked and unsecured connecting corridor.

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Examination of the Body

An external body examination showed the following wounds: in the nape area four puncture wounds were found in two pairs of two wounds situated sideways parallel to each other (Fig. 1). The maximum diameter of the wounds was up to 2 cm, and the depth was up to 3 cm in the soft tissue of the nape. The wounds in each pair were 5.5 cm from each other. On the left side of the neck and under the left auricle, there was a group of four puncture wounds situated sideways parallel to each other (Fig. 2). The maximum diameter of each individual wound was 1.8 cm, and the depth was up to 3 cm in the soft tissue of the neck. The wounds in one plane were 7 cm away from the second parallel plane. On the left side of the neck, in the front, under the auricle, there were two parallel lacerations with a length of 7 cm and 3.5 cm, respectively, with a maximum depth of 2.5 cm. The bones of the base of the skull could be touched in the depth of the larger wound. On the chin, there was a deep lacerated wound with a maximum length of 4 cm and a maximum depth of 2.5 cm. In the area of the left shoulder and the left frontal area of the victim's chest, there were many scratches and abrasions (Fig. 3). The skin on the victim's back had many scratches and abrasions, mainly oriented from the upper left side down to the lower right side (Fig. 4).

The internal examination of the victim's body showed coalescing hemorrhages in the soft pericranial tissue in the right forehead area. There was a compound fracture of the left mandibular ramus and a complete luxation of the left mandibular articular process. A detailed autopsy of the neck revealed a complete laceration of the left internal jugular vein at the level of the lower end of the body of the mandible. Approximately 3 cm above the bifurcation of the left common carotid artery, two main branches of the external carotid arteries were completely disconnected. In the front wall of the left internal carotid artery, small communicating ruptures were found. The left nervus vagus was intact. The soft tissues around the left nerve-vessel bundle were hemorrhaged. The external part of the atlantooccipital junction was disconnected. In the spine, the

FIG. 1—*The nape of the neck with puncture wounds from the leopard's lower canines.*

FIG. 2—*The left side of the neck showing incised and puncture wounds from the leopard's upper canines.*

FIG. 3—*Multiple puncture wounds and scratches on the front part of chest and the left upper extremity from the leopard's claws.*

prevertebral muscles were hemorrhagic, with a compound fracture of the body of the fourth cervical vertebra. The spinal cord at this level was lacerated with multiple foci of hemorrhages.

FIG. 4—*Multiple puncture wounds and superficial scratches on the back of the victim made by the leopard's claws.*

The result of the air embolism exam was negative. The victim's skin was almost absent of postmortem lividity, and the internal organs were pale. The only disease changes that were found during the autopsy were fatty streaks in the intima of the abdominal aorta and adhesions around the cecum (the post-appendectomy state).

The blood and urine alcohol concentrations were zero. Other toxicological investigations of blood, urine, and vitreous fluid, applying routine methods, were negative.

The conclusion of the medicolegal investigation was that the underlying cause of death was a bite wound to the neck which lacerated the left internal jugular vein, the two main branches of the left external carotid artery, and the cervical spine. The immediate cause of death was massive external bleeding. The death was classified as accidental.

Examination of the Leopard

External investigation of the animal revealed that the male leopard, a Persian leopard (*Panthera pardus saxicolor*), weighed 72 kg, the distance from the top of the muzzle to the end of the tail was 174 cm, and the shoulder height was 75 cm. Examination of the leopard while it was under anesthesia revealed an upper intercanine diameter of 6.8 cm and a lower intercanine diameter of 5.5 cm. The punctured wounds of the nape region (upper canine teeth) and the left side of the neck (lower canine teeth) of the victim corresponded to the intercanine diameters of the leopard (Figs. 1 and 2).

The upper canine teeth measured 4.5 cm, and the right and left canine teeth measured 4.2 cm and 4.0 cm, respectively. The diameter of the upper canines was 9.4 mm, and the diameter of the lower canines was 5.8 mm. The condition of the feline was checked by a veterinarian; the feline was not killed.

Discussion

The leopard is the fourth largest big cat in the world, with only the jaguar, lion, and tiger being larger. For its size, the leopard is the most powerful feline in the world next to the jaguar (11). A leopard can pull its victim up on a tree, even if the victim is heavier than the leopard itself. A leopard's hunting abilities are some of the finest in the animal kingdom. It is a more skillful hunter than the lion or cheetah (11). The leopard, living in the wild, often kills more than it needs to satisfy its hunger and thus is marked as a killer among the animals (11,12). It kills its victims very quickly,

most often it strikes its victims at the nape and the side parts of the neck. The canines of the leopard are very sturdy and they allow deep penetration of the victim's tissue, including osseous tissue. The proprioceptors in the area of its teeth and jaws can inform the leopard about the contact of its canines with the osseous tissue (12). Based on the proprioceptors' perceptions from the oral cavity, the leopard can adjust the position and the intensity of its grip in the most optimal way (12). Its attacks are often aimed at injuring the jugular veins and carotid arteries, with subsequent exsanguination, and crushing the spine with a possible lesion to the spinal cord. On rare occasions, the attacks can lead to an open cranial injury with injury to the brain (11).

In our case, most probably the victim was struck to the ground from behind by the leopard (scratches on the back and the left shoulder) and was simultaneously bitten on the left side of the neck. From the character and the location of the bite wounds on the victim's body, it can be stated that the jaws of the leopard intensively bit twice into the left part of the victim's neck. The bite wounds led to heavy injury of the vessels on the left part of the victim's neck and spine. Other wounds on the victim's face, left shoulder, and left front part of the chest can be explained by the violent manipulation of the victim's body by the leopard (holding of the victim's head and body on the ground during the attack). The wounds discovered on the victim's body corresponded with the known methods of leopard attacks (1,2,13) and with findings on the carcasses of animals killed by leopards in the wild (11,12,14).

Cheetahs prefer to kill their prey with a quick bite to the frontal area of the neck. Prey that has strong neck muscles or shells protecting the backside of the neck is attacked by the cheetah on the side of the neck. These attacks most often lead to injuries to the neck vessels and air passages (11).

Lions prefer to bite the throat and use their muscled forelimbs to hold onto prey, bringing it to the ground. With small prey, lions bite the nape, often breaking the spinal cord, piercing the windpipe, or severing the jugular vein or the common carotid artery. Though rarely observed, some lions have been recorded to kill their prey by sweeping their paws, which are powerful enough to smash the victim's skull (12). The method of tiger attacks is very similar to that of a lion (1,11).

On the other hand, jaguars prefer a different killing method, which is unique among cats. They pierce directly through the temporal bones of the skull between the ears of the prey (especially the Capybara) with their canine teeth, piercing the brain. Less frequently jaguars attack their prey in the same manner as leopards (14).

The case presented here is unique in that it is a fatal leopard attack, which, as stated earlier, occurs very rarely throughout the world. It is the second reported fatal case in Europe, and it is an attack by one of the most dangerous subspecies of leopard.

References

1. Cohle SD, Harlan CW, Harlan G. Fatal big cat attacks. Am J Forensic Med Pathol 1990;11:208–12.
2. Delahaye JF, Mylonas J, Causeret M, Penneau M. Blessures mortelles par panthère. J Méd Lég Droit Méd 1994;37:575–8.
3. Rollins CE, Spencer DE. A fatality and the American mountain lion: bite mark analysis and the profile of the offending lion. J Forensic Sci 1995;40:486–9.
4. Wiens MB, Harrison PB. Big cat attack. J Trauma 1996;40:829–31.
5. Vogel JS, Parker JC, Jordan FB, Coury TL, Vernino AR. Persian leopard (*Panthera pardus*) attack in Oklahoma. Am J Forensic Med Pathol 2000;21:264–9.
6. Bock H, Ronnenberger DL, Betz P. Suicide in a lions' den. Int J Legal Med 2000;114:101–2.
7. Chapenoire S, Camiade B, Legros M. Basic instinct in a feline. Am J Forensic Med Patol 2001;22:46–50.
8. Schiller HJ, Cullinane DC, Sawyer MD, Zietlow SP. Captive tiger attack: case report and review of the literature. Am Surg 2007;73:516–9.
9. D'Amour DE, Hohmann G, Fruth B. Evidence of leopard predation on bonobos (Pan paniscus). Folia Primatol 2006;77:212–7.
10. Zuberbuhler K, Jenny D. Leopard predation and primate evolution. J Hum Evol 2002;43:873–86.
11. Bailey TN. The African leopard: ecology and behaviour of a solitary felid. New York, NY: Columbia University Press, 2005.
12. Leyhausen P. Cat behavior. New York, NY: Garland STM, 1979.
13. Bahram R, Burke JE, Lanzi GL. Head and neck injury from a leopard attack: case report and review of the literature. J Oral Maxillofac Surg 2004;62:247–9.
14. Schaller GB, Vasconcelos JMC. Jaguar predation on capybara. Z Saugetierkd 1978;43:296–301.

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