

CASE REPORT**PATHOLOGY/BIOLOGY**

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A Case of a Fatal Himalayan Black Bear Attack in the Zoo

ABSTRACT: We present a case of a 22-year-old male, who was found inside the cage of Himalayan black bears in the Belgrade Zoo. The victim attended the Belgrade Beer festival the previous night, drinking a lot of beer and acting aggressively. A medico-legal autopsy was performed at the Institute of Forensic Medicine in Belgrade. Autopsy findings showed numerous excoriations all over the body surrounded by bruises, as well as spindle-shaped, oval, and partly irregular wounds of variable size, large defects of skin and subcutaneous soft tissue, fractures of the thyroid and cricoid cartilage, and fracture of ribs. Postmortem toxicological analysis revealed the presence of ethanol in vitreous humor and urine and 11-nor Δ^9 tetrahydrocannabinolic acid found in the urine. We discussed similar cases from the available literature in different regions of the world. In conclusion, we pointed out that the presented case does not follow the general pattern of Himalayan bear attacks.

KEYWORDS: forensic science, Himalayan black bear, attack, zoo, autopsy, vitality

Case Report

On August 19, 2007, the naked dead body of a 22-year-old male was found inside the cage of Himalayan black bears in the Belgrade Zoo. The zoo is situated inside the Belgrade Fortress, the Kalemegdan, which lies within the central city region and close to the location of the traditional Belgrade Beer Fest. According to statements made by the deceased's friends, the victim attended the festival the previous night, drinking a lot of beer and acting aggressively. He disappeared around 2 AM and went missing until his body was discovered at 7 AM.

The cage in which the corpse was found measures 10 × 5 m, the larger part of which has no roof and a 70-cm high wall approachable from one side, which is outside the zoo area. At the bottom of the cage and in the vicinity of the wall, traces of blood were found, indicating the first contact between the body and the ground. All over the floor of the cage were numerous stripped and partly spotted traces of blood suggesting that the body had been dragged over the ground. There were also scattered parts of the victim's clothing, shoes, documents, and cell phone (Fig. 1). According to the official statement released by the zoo, there were two bears in the cage along with the severely mutilated body.

A medico-legal autopsy was performed at the Institute of Forensic Medicine in Belgrade. Autopsy findings showed numerous linear and spotty excoriations all over the body, most of them surrounded by

bruises, as well as spindle-shaped, oval, and partly irregular wounds of variable size, with ragged margins (Figs 2 and 3).

On the right side of the face, defects of skin and a large part of subcutaneous soft tissue were noticed, along with extensive hemorrhage of the preserved tissues, however without facial bones fractures. There were fractures of the thyroid and cricoid cartilage along with adjacent bruises. Fractures of I, II, and III right ribs, in the area of the spindle-shaped wounds, were discovered in the opened chest cavity.

There was a 21 × 10 cm large defect of the soft tissue of the right forearm. On the right abdominal wall, there was a 21 × 15 cm large defect of soft tissues (Fig. 4) leaving the abdominal cavity open; there were also defects of the intestines, the lower part of the left kidney, the left psoas muscle, and the left common iliac artery (Fig. 5).

There was the absence of soft tissues present in the lower part of the right thigh, exposing the femur in this area. In addition to the body, both bones of the right shin, almost stripped of soft tissues and the completely separated right foot, with irregular surface of the toes, separated calcaneus, and a bigger part of the skin were found. All these injuries of the right leg were almost without bruises of adjacent tissues, indicating their postmortem occurrence. On the other hand, injuries on the head and neck showed intensive hemorrhages.

In addition to the above mentioned, injuries not inflicted by bears were injuries likely sustained in the fall: in the right parietal region was a 4-cm-long laceration accompanied with scalp contusion. There were fractures of IV, V, and VI right ribs in the posterior axillary line, surrounded by soft tissue hematoma, as well as incomplete fractures of the anterior parts of the bodies of III and VII cervical vertebra. Furthermore, there were areas of skin abrasions corresponding to the dragging of the victim's body over the rough surface of the cage floor.

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FIG. 1—*The scene of death.*



FIG. 2—*Widespread injuries—back aspect.*



FIG. 3—*Widespread injuries—frontal aspect.*



FIG. 4—*Defect of soft tissues on left abdominal wall.*

Examination of clothing revealed traces of blood and bear hairs. Most of the cloths were found intact and without damage, with the exemption of the T-shirt, socks, and one shoe containing defects inflicted by bear claws and teeth. Such findings led to the conclusion that the clothing was removed prior to the victim's fall (or jump) into the cage.

Postmortem toxicological analysis revealed the presence of ethanol in concentration of 43.42 mM (2.00 ‰–200 mg%) in vitreous humor, and 91.18 mM (4.20 ‰–420 mg%) in urine. Furthermore, there was <50 ng/mL 11-nor Δ^9 tetrahydrocannabinolic acid found in the urine; though, the presence of opiates, amphetamines, or cocaine was not found.

In the autopsy report, we concluded that the cause of death was exsanguination because of cumulative effects of multiple external and internal injuries accompanied with severe bleeding, so we were not able to proclaim one single injury or several injuries as fatal.

On the basis of the available data concerning anatomy of the Tibetan bear, we were not able to precisely differentiate the characteristics of the injuries that can be related to the claws versus teeth.

Discussion

Bear attacks on humans are well known, although serious incidents and human injuries, including fatalities, rarely occur (1–5). Between 1993 and 2004, 63 deaths caused by animals were reported in New Mexico, and in only one case, a bear was responsible for death (6). In the Canadian and U.S. national parks, 238 deaths were reported from 1900 to 1985 (7). Between 1960 and 1998, there were 42 serious bear attacks in the province of Alberta (8). Tough and Butt (9) gave a description of eight deaths occurring in the same province between 1973 and 1988, comparing the actions of wild bears with those inflicted by bears that have become comfortable around people (wild vs. “habituated” bears).

Many different species of bears inhabit the regional distribution of the U.S., including the grizzly, polar, black, glacier phase, or blue bear (10). Grizzly bear attacks have been often reported (11). In the analysis of grizzly bear attacks resulting in human injury in

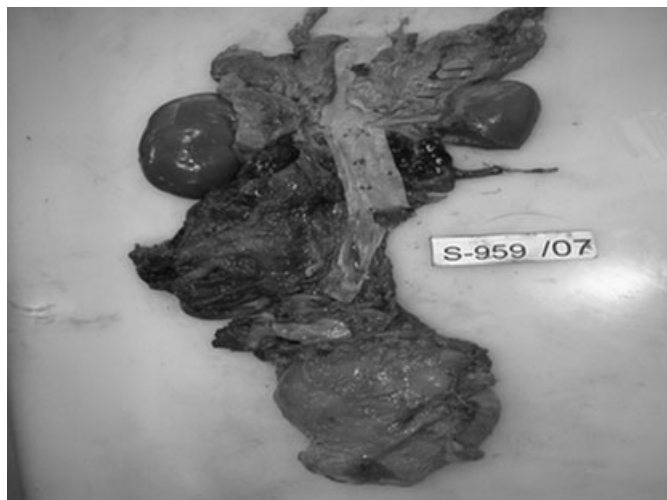


FIG. 5—Defect of intestines, lower part of the left kidney, left psoas muscle, and left common iliac artery.

the national parks of North America, it was found that 77 people had been injured, an injury rate of one person per 2 million visitors (12).

Vougiouklakis (1) described a case of human death caused by the paw of the brown bear (*Ursus arctos*), the first such documented fatality involving a brown bear in Greece in which the victim died as a direct traumatic result of the attack. De Giorgio et al. (5) presented a forensic investigation on a 42-year-old man in Finland by a fatal assault involving numerous bites caused by a European brown bear (*Ursus arctos arctos*).

According to Floyd (4), brown bear attacks tend to be severe and without provocation, while black bear attacks usually resulted in only minor injuries and tended to be predacious. Polar bear attacks are extremely rare, and the ferocity of polar bears has probably been exaggerated (4).

The Asian black bear (*Ursus thibetanus* or *Selenarctos thibetanus ussuricus*), also known as the Asiatic black bear, Tibetan black bear, the Himalayan black bear, or the Moon bear, is a medium sized, sharp-clawed, black-colored bear with a distinctive white or cream “V” marking on its chest. The Asian black bear grows to approximately 130–190 cm in length.

Males weigh between 100 and 218 kg (220–480 lb), and females weigh between 50 and 125 kg (110–275 lb). The Asian black bear is an omnivore that consumes a great variety of foods, mostly various plants, and meat only makes up a small part of its diet (13). This animal has been declared a threatened animal and rarely comes in contact with humans. Deforestation of these areas has, however, led to an increase the number of bear attacks.

Dvivedi et al. (14) described injuries caused by the black Himalayan bear in the foothills of Garhwal, Himalayas. Thakur et al. (15) presented five cases of Himalayan black bear attacks within the period of 1 year. According to the available literature, the presented case is the first reported fatal attack by Tibetan black bear, and furthermore is also the first reported case of a fatal bear attack in a zoo that happens to be in the central region of a big city.

The diagnosed injuries can be divided into two main groups: one of the injuries sustained during the fall, and the second inflicted by the two bears, which were partly intra-vital and therefore fatal, as well as partly postmortal. Other authors also described severe injuries inflicted by the bears, such as the penetrating head injury caused by

bear claws (16), which can inflict severe body mutilation (e.g., eye enucleation) and may persist in cases with survival (17), with possible development of serious local and general infection (18,19).

According to the localization of the right-sided scalp laceration and rib fractures, our assumption was that these injuries could have been sustained because of fall, which was supported by finding of blood traces on the ground in the vicinity of the cage wall. On the basis of the diagnosed injuries, we made a reconstruction of the probable course of events—the victim fell down (or maybe jumped) in a drunken state sustaining a head injury that probably caused loss of consciousness. On the other hand, according to the police report, the guardian of the zoo did not hear any noise (screaming, yelling, etc.). After the fall, the bears attacked, causing the fatal injuries and death with following postmortem mutilation. We had no logical explanation for the fact that he was found naked in the cage.

In the presented case, we found the presence of ethanol with concentration of 43.42 mM (2.00‰), probably contributing to the injury. This finding is in accordance with Lathrop’s investigation, which revealed that alcohol was present in 16% of cases among the 63 deaths caused by animals in New Mexico between 1993 and 2004 (6).

In conclusion, we can point out that the presented case does not follow the general pattern of Himalayan bear attacks, as reviewed in the paper of Thakur et al. (15). In this article, the authors state the following characteristics of Himalayan black bear mauling: (i) attacks generally occur in the day time—most likely when bears come out in search of food; (ii) the bears usually attack out of fear or in defense; (iii) the bear attacks were primarily focused upon the face because it is the most prominent and the accessible part of the human body the bear attacks; (iv) the Himalayan black bears have no intention to eat the victim, as they fled the site following the attack in all cases; and (v) one of the female bears was accompanied at the time by her cubs suggesting that female bears tend to attack in an effort to protect their cubs.

In the presented case, we found two significant departures from the above-mentioned general behavioral features of Himalayan black bear: (i) the victim’s multiple injuries were of different types and were present all over the body and were not only contained on the face; (ii) the absence of the missing abdominal soft tissue, organs, and blood vessels at the scene indicated that these structures were consumed by the bears. These indicated differences could be partly attributed to the specific circumstances of the bear attack occurring in the zoo situated in the central city area.

Regarding safety precautions, the Beer Fest was dislocated from the area near to the Belgrade Zoo to a safer location, but no further action was performed concerning protection of the available parts of wild animals’ cages.

References

1. Vougiouklakis T. Fatal brown bear (*Ursus arctos*) attack: case report and literature review. *Am J Forensic Med Pathol* 2006;27(3):266–7.
2. Freer L. North American wild mammalian injuries. *Emerg Med Clin North Am* 2004;22(2):445–73.
3. Rose SC. Bear maulings in Alaska. *Alaska Med* 1982;24(3):29–32.
4. Floyd T. Bear-inflicted human injury and fatality. *Wilderness Environ Med* 1999;10(2):75–87.
5. De Giorgio F, Rainio J, Pascali V, Lalu K. Bear attack—a unique fatality in Finland. *Forensic Sci Int* 2007;173(1):64–7.
6. Lathrop SL. Animal-caused fatalities in New Mexico, 1993–2004. *Wilderness Environ Med* 2007;18(4):288–92.
7. Middaugh JP. Human injury from bear attacks in Alaska, 1900–1985. *Alaska Med* 1987;29(4):121–6.
8. Herrero S, Higgins A. Human injuries inflicted by bears in Alberta: 1960–1998. *Ursus* 2003;14:44–54.

9. Tough SC, Butt JC. A review of fatal bear maulings in Alberta, Canada. *Am J Forensic Med Pathol* 1993;14(1):22–7.
10. Dieter RA Jr, Dieter DL, Dieter RA III, Forbes B. Bear mauling: a descriptive review. *Int J Circumpolar Health* 2001;60(4):696–704.
11. Cardall TY, Rosen P. Grizzly bear attack. *J Emerg Med* 2003;24(3):331–3.
12. Herrero S. Human injury inflicted by grizzly bears. *Science* 1970;170(958):593–8.
13. http://en.wikipedia.org/wiki/Asian_black_bear (accessed on October 10, 2009).
14. Dvivedi S, Sood S, Mehrotra V, Dvivedi J. Injuries caused by the black Himalayan bear in the foothills of Garhwal, Himalayas. *Trop Doct* 2003;33(2):115–7.
15. Thakur JS, Mohan C, Sharma DR. Himalayan black bear mauling: offense or defense? *Am J Otolaryngol* 2007;28(4):247–50.
16. Hayashi Y, Fujisawa H, Tohma Z, Yamashita J, Inaba H. Penetrating head injury caused by bear claws: case report. *J Trauma* 2003;55:1178–80.
17. Jethani J, Nagori R, Ghodadara B. An unusual case of bear bite with severe loss of tissue. *Indian J Ophthalmol* 2006;54(4):287–8.
18. Lehtinen VA, Kaukonen T, Ikäheimo I, Mähönen SM, Koskela M, Ylipalosaari P. Mycobacterium fortuitum infection after a brown bear bite. *J Clin Microbiol* 2005;43(2):1009.
19. Kunimoto D, Rennie R, Citron DM, Goldstein EJ. Bacteriology of a bear bite wound to a human: case report. *J Clin Microbiol* 2004;42(7):3374–6.

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