

Selective Behaviour of Rodents when Feeding on a Corpse: A Case Report

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Abstract

Post-mortem animal activity is an important factor to consider when investigating the death of outdoor corpses. Many predatory and scavenger animals can attack human bodies and expose them to complete destruction, and the dead person's bones and possessions can be spread around a large area because of animal involvement. This fact complicates the investigation both during the scene inspection and at the autopsy. In this case report, we present a rare phenomenon in which during an animal attack on a human corpse all of the internal thoracic organs were eaten except for one lung affected by lobar pneumonia. We report about rats that found refuge in the body of the deceased during the relatively cold spring period, which acted as their hiding place in addition to the source of food. Such selective activity by rats has left us a section of one organ in which we have found a major pathological finding, which may have had something to do with the cause of death.

Keywords: Forensic sciences • Forensic pathology • Post-mortem injuries • Animal scavenging • Depredation • Rodents

Introduction

Post-mortem animal depredation is not an uncommon occurrence in forensic autopsy practice, so it is important to differentiate between fatal animal bite injuries and post-mortem animal bites at autopsy [1]. Damage to the dead body may be done by any wild animal which is typically found in cases of sudden death from natural causes [2]. The location of the corpse, the geological circumstances, the season, the types of animals present in the region, and their behavior should be known to determine the type of animal that attacked the corpse shown in Figure 1 and Figure 2.



Figure 1: The shack in which the dead body was found.

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Figure 2: Lack of soft tissue and muscle on the head and left hand.

Dead bodies found in the outdoors can be damaged by dogs, cats, ants, and rodents during the postmortem period. In postmortem animal depredation, injury trends are typically confined to a circumscribed and usually unclothed region of the body such as head and arms, or hands [3]. When clothes are removed or missing, it can also impact the genital organs or other body locations, which may increase suspicion of murder or a sexually motivated offense. In general, any kind of devouring of the human remains by animals may create many problems regarding the pathological and anthropological forensic examination. The smells spreading from the dead body due to putrefaction draw the attention of wildlife. Hunger is the main motivation for outdoor postmortem wild animal scavenging, while domestic animals if properly fed, do not need to hunt for food [2]. Predators, like rodents, often devour tissues of the dead body quite intensely as insects. Rodent activity has been recorded more often in lower socioeconomic living environments and among homeless people. The appearance of rodent waste at the scene may indicate postmortem rodent involvement. When rodents have ample time to feed, they devour exposed, unclothed, accessible parts of the body such as face and hands, till bones, and this creates difficulties in the identification of the victim [4]. A documented case concluded that postmortem rodent injuries, identified at autopsy but not in the images captured at the scene and in the reports of the scene investigator, had taken place within a short time as approximately 45–60 minutes after the scene investigation was concluded [5]. In this case report, we describe a feature of selective rodent behavior while feeding on a corpse shown in Figure 3.



Figure 3: Parallel cutaneous lesions, and finely serrated wound contours, as well as irregular edges of the wound due to repetitive gnawing.

Case Study

The police were called in Sesvete, to the suburbs of the Croatia capital, Zagreb because a dead body was found where it is known that homeless people stay from time to time. The deceased was a homeless man found in an open shack lying surrounded by his belongings. The investigation was conducted on April 9, 2020, and after the autopsy, a day later, the determined time of death was the period around the very beginning of April. His head and left hand showed extensive soft tissue and muscle damage that exposed the bones. In his jugular notch, there was a crater-like hole measuring 10×9 cm that communicated with the thoracic cavity. The coroner and police officers at the scene stated that, while they were moving the body, rats were fleeing from it through the mentioned hole. At autopsy, the external examination showed irregular margins of wounds due to repetitive gnawing. Parallel scratches and furrows on the edges of the exposed bones, typical for rodents, spoke in favor of the testimony of the officials at the scene. Upon opening the thoracic cavity and abdomen the liver, right lung and heart were missing. Other organs within the abdomen remained untouched. Even the right side of the diaphragm was eaten where an opening was created that communicated with the abdomen. On the other hand, the left lung, together with the left side of the diaphragm was found intact and partially rotten. Upon closer examination, the residual lung was found to have lobar pneumonia. On microscopic examination, the alveolar spaces were filled up with fibrinous exudate, some heart failure cells, and scattered neutrophilic leukocytes. After such a finding we assume that the rodents bypassed the purulently altered organ showing selective behavior when eating a dead body shown in Figure 4.



Figure 4: Defect on the right side of the diaphragm. The picture also shows that the liver is missing.

Results and Discussion

Injuries to the deceased could have been caused by the action of various animals however, in our case, we have the testimony of police officers who state that they noticed rats fleeing from cavities inside the body. Further analysis of the edges of the wounds and the exposed bone tissue showed defects typical of post mortem scavenging by rodents. Postmortal animal depredation affects bodies

differently depending on the environment, climatic conditions, geolocation, and whether it is an open or closed space. While the existence of postmortem injuries attributable to animal scavenging is a known reality for forensic medical examiners, the nature of these injuries could be misinterpreted by police personnel or the coroner consulted at the scene [6-8]. Careful examination of wounds should be performed to identify characteristic features of animal behavior with typical patterns that could make it possible to identify the specific animal species involved [9]. Rodents have a total of 16 teeth, including 2 incisors and 6 molar teeth both in the upper and lower jaws so they can devour dead bodies most drastically and more rapidly than insects [2,9]. Death investigators should be wary of the above said when conducting a thorough evaluation of animal interference cases. An inquiry should be conducted regarding wild animals with possible access to the scene and particular consideration should be paid to animal feces or rodent nests [8,10,11]. Pieces of rat nest, if present on the scene, should be removed to compare if DNA typing shows matching of the band positions with the control material from the deceased's skin [6]. Given the relatively cold on-site conditions in April of this year, there were no hatched larvae and the body decayed postmortem only due to the influence of commensal bacteria. The only recorded external action on the body was by rats which did damage to the soft tissues of the head and left hand and by entering the thoracic cavity through the jugular notch began to eat the thoracic and abdominal organs. In doing so, they bypassed the left lung affected by lobar pneumonia which remained intact for macroscopic and microscopic analysis. Such selective behavior by rats has consequently left us a part of one organ in which we have found an important pathological finding that may have had something to do with the cause of death. It is interesting to conclude that rats at the site of the body's discovery, in addition to being able to undergo further analysis themselves after ingesting parts of the corpse, leave behind entire purulent organs for further forensic processing. This hypothesis should certainly be borne in mind by medical examiners who will review similar cases in the future in order to further confirm the described selectivity of rodents during the depredation of the corpse shown in Figure 5.



Figure 5: Tissue defect on the jugular notch resulting from postmortem rodent depredation.

Conclusion

This case report shows a relatively rare finding for the climate in which it took place. The forensic medical investigation began with a close on-site inspection with an experienced police inspector and coroner. Their finding warned of the possibility of post-mortem mutilation of the body by the animals at the on-site inspection itself which precluded drawing erroneous conclusions. Postmortem animal attacks on the body can mimic a wide range of specific and nonspecific bodily injuries that can raise false suspicion of events around the time of death. In our case, the field team noticed rats leaving the body during the examination in a timely manner, which facilitated further investigation.

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