

Post-mortem decapitation by domestic dogs: three case reports and review of the literature

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Accepted: 16 February 2011 / Published online: 29 April 2011
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Abstract Post-mortem animal depredation is not an uncommon phenomenon in routine forensic autopsies. We present three cases of complete post-mortem decapitation by domestic German shepherd dogs. In two cases, the head had been bitten off, defleshed and left lying near the body, while in one case it had been completely devoured by two dogs; only small skull fragments and crowned teeth could be found. Two of the three bodies were putrefied; all dog bite injuries had been inflicted after death. The cause of death was drug toxicity in two cases and fatal hemorrhage from ruptured esophageal varices in one case. These rare injuries due to post-mortem animal depredation are discussed in the light of earlier studies and case reports.

Keywords Domestic dogs · German shepherd dogs · Post-mortem injuries · Animal depredation · Decapitation · Autopsy

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Introduction

Post-mortem animal depredation, especially by dogs, is not an uncommon phenomenon in forensic autopsy practice [1], and it is obligatory to differentiate between fatal dog bite injuries and post-mortem dog bite patterns at autopsy [2]. Dog attack deaths usually result from exsanguination through opened body cavities and/or large vessels and often involve German shepherd dogs, pit bull terriers or the like [3]. Post-mortem damage may be caused by any dog breed and is usually seen in cases of sudden death from natural causes. In fatal dog attacks, no specific injury site is evident, and clothes might be rumpled, shifted or torn apart. On the other hand, damage patterns in cases of post-mortem dog depredation are generally limited to a circumscribed and usually unclothed body area such as the head and neck or the hands [4–6]. If clothes are opened or missing, the genital organs or other body sites may also be affected [7–9], which might raise suspicion of homicide or a sexually motivated crime [10–12]. Clothed body parts usually remain unaltered; post-mortem dog bites seldom involve torn dresses [9, 13]. This case report deals with the rare feature of complete post-mortem decapitation by domestic German shepherd dogs.

Case 1

Policemen were called to the apartment of a 55-year-old man on the 8th floor of a tower block because neighbors had heard his two dogs barking loudly from inside the apartment for 4 days. The tenant, allegedly an alcoholic, had last been seen 7 days earlier. When the door was unlocked, his putrefied body was found in the bedroom without the head and neck (Fig. 1). The rest of the clothed



Figs. 1, 2 Death scene, case 1: head and neck of the clothed and putrefied body are missing. Dog vomitus in the apartment containing small human skull fragments and crowned teeth

body was intact, and the hands were undamaged. There were only a few traces of blood near the headless body as the blood had probably been licked up by the man's two well-fed German shepherd dogs (8 and 1½-years-old). In the corridor and living room, investigators detected several small human skull fragments and crowned tooth remnants in piles of dog feces and puddles of vomit (Fig. 2). The apartment was in a disorganized state with garbage, empty liquor bottles and mouldy foodstuffs in every room. Large amounts of accessible dog food were also found. The two dogs were brought to an animal shelter without being examined by a veterinarian. A medicolegal autopsy on the deceased was ordered.

Autopsy showed the cause of death to be fatal bleeding from ruptured esophageal varices, possibly due to the reported chronic alcohol misuse. Further signs of possible chronic excessive alcohol consumption were liver cirrhosis and pancreatic fibrosis. There was no evidence of biliary disease. Since the cause of death was clear after autopsy, further microbiological or histological examinations were not performed. Post-mortem animal depredation injuries

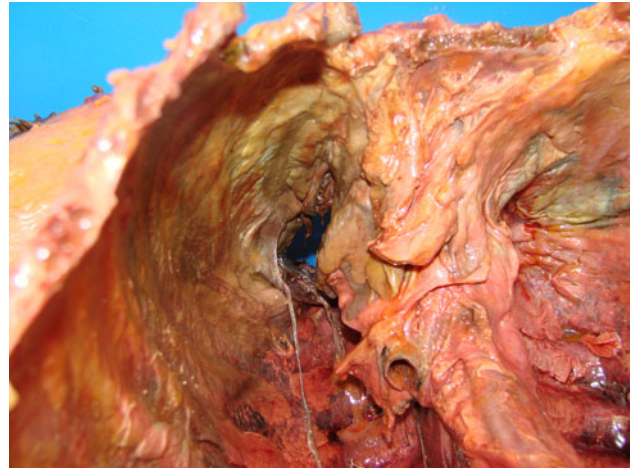
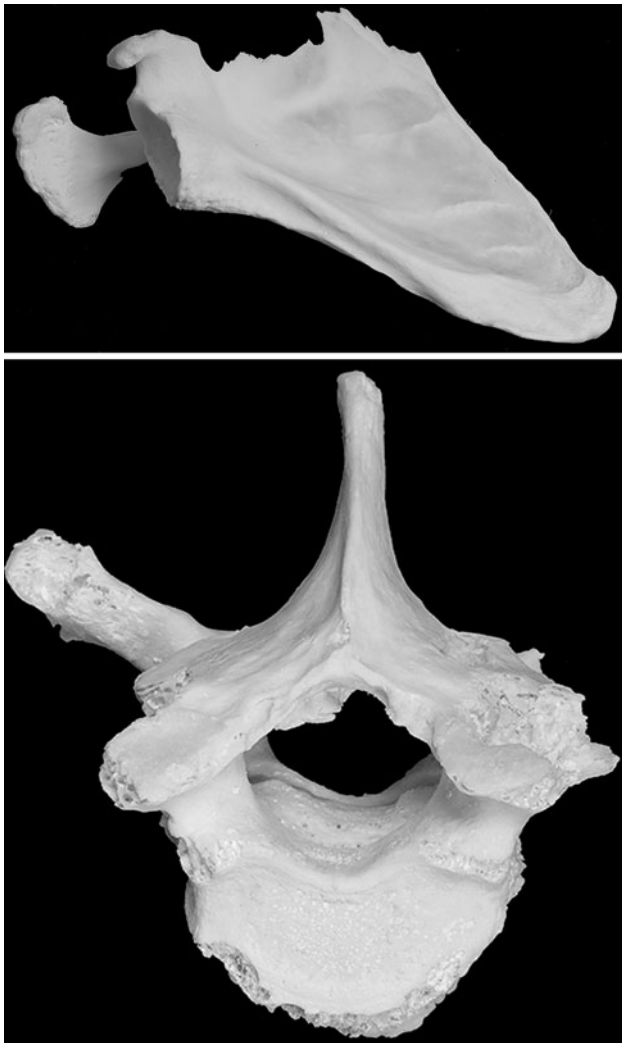


Fig. 3 Autopsy, case 1: the right chest cavity has been opened by dog bites

included curved canine bite marks and tissue defects at the wound margins in the clavicular region. Furthermore, the right pleural apex had been opened by post-mortem dog bites (Fig. 3); parts of the upper right pulmonary lobe were missing as well as the first six cervical vertebrae. No vital injuries were detected, and there were no canine tooth punctures. Toxicological examinations yielded no specific findings. After autopsy, a forensic pathologist was called to the death scene and, together with policemen, searched the apartment again for the man's head and neck, but the missing parts could not be found. From a forensic point of view, it was assumed that the two German shepherd dogs had completely devoured the head and neck of the corpse, probably attracted by hemorrhage from ruptured esophageal varices. The macerated clavicles, scapulae and 7th cervical vertebra showed extensive gnaw marks (Figs. 4, 5).

Case 2

A 54-year-old man was found dead in his apartment. The body was decapitated and putrefied; parts of the obviously gnawed and defleshed calvaria as well as the scalp were located beneath the body (Figs. 6, 7). The body was clothed, and the hands were intact. Also, the man's well-fed 4-year-old German shepherd dog was present at the death scene, and the entire apartment was soiled by animal feces and urine. As in case 1, there were only a few blood spatters near the body. The apartment had been cleared up, and dog food was readily accessible. Containers probably used to store methadone and syringes were found in the kitchen. The tenant had been enrolled in a methadone maintenance program (10 ml per day) due to long-lasting opioid misuse and had a recent criminal record of drug



Figs. 4, 5 Case 1: macerated right scapula and 7th cervical vertebra with bony defects caused by dog bites

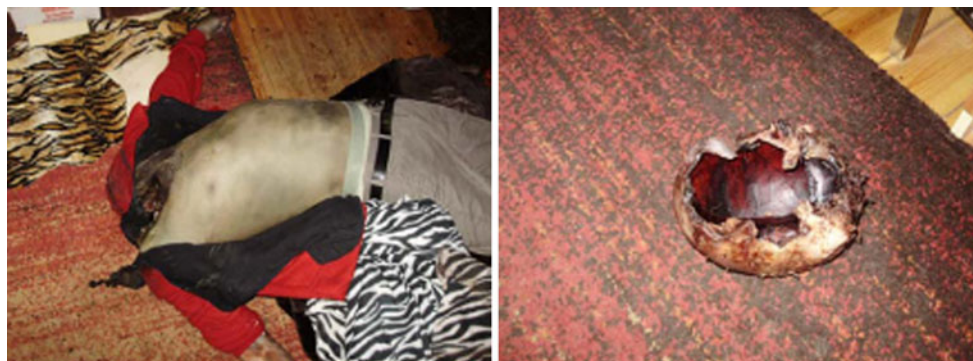
offenses. He had last been seen by a neighbor approximately 2 weeks earlier. The German shepherd dog was brought to an animal shelter without being examined by a

veterinarian. A medicolegal autopsy on the deceased was ordered.

Medicolegal autopsy of the putrefied body disclosed post-mortem animal depredation; the evidence included typical dog bite marks with decapitation and complete loss of the skull base, neck organs and neck skeleton as well as gnawed scapulae (Figs. 8, 9). The calvaria was defleshed and showed typical curved bite marks. There were no canine tooth punctures, and there was no vital subcutaneous bleeding or evidence of blood aspiration or exsanguination. Signs of chronic drug misuse included scars on the inside of both elbows and splenic enlargement, probably associated with infection. The cause of death remained unclear after autopsy, but the dog bite injuries showed no vital signs, and there were no other post- or pre-mortem injuries. Toxicological analysis revealed the cause of death to be fatal intoxication from combined methadone and cocaine. The concentration of methadone was 4.1 $\mu\text{g/ml}$ in the stomach contents and 7.1 $\mu\text{g/ml}$ in liver tissue. Since femoral or heart blood could not be obtained due to advanced putrefaction, it was not possible to determine the effective blood methadone concentration or toxicity, but a 5 ml syringe found under the body contained methadone mixed with cocaine as well as lidocaine, which was probably used to expand the volume. Toxicological hair analysis provided evidence of long-term use of cocaine and methadone with associated metabolites.

Case 3

A 50-year-old woman was found dead in her unlocked and tidy apartment. The clothed body was headless; the defleshed calvarium found in a corner of the room was situated about 100 cm away from the upper thoracic aperture. There were no further injuries, and the hands were unaltered. Traces of bloody dog paws and dog feces were found near the body (Fig. 10). The woman's German shepherd dog



Figs. 6, 7 Case 2: decapitated putrefied body and defleshed skull at the death scene; clothing has been cut open by the police for examination purposes



Figs. 8, 9 Case 2: defleshed calvaria and decapitated putrefied body at autopsy



Fig. 10 Case 3, death scene: the defleshed head is located approx. 100 cm away from the decapitated body; bloody paw marks and dog feces surround the body

was sitting at the lower end of the body; dog food was readily accessible. The woman had last been seen 2 days earlier. Several empty blisters of phenobarbital, doxepin and zopiclone were found in the apartment. The woman had often spoken of suicide in the past, and five farewell letters were found in the apartment; she had been treated for psychiatric disorders for many years. Four hours after the body was found, a veterinarian administered an emetic to the dog, and the dog's vomit was found to contain partly digested flesh and hair remnants that were still recognizable. The public prosecutor posited suicide. An autopsy was not ordered, but immunochemical screening of post-mortem venous blood for amphetamines, cocaine, barbiturates, benzodiazepine, cannabis, opiates (codeine, morphine, and heroin), tricyclic antidepressives, and methadone revealed the cause of death to be combined effects of phenobarbital, doxepin and zopiclone. These drugs were also found in the apartment.

Discussion

Injuries in decedents found outdoors can be inflicted by a variety of animal species, including insects, rodents, fish and birds [14–18]. Deceased persons—especially pet owners—found in enclosed settings like apartments often present post-mortem bite and claw injuries caused by domestic cats [19–21] or domestic dogs [4–6, 8, 9, 13, 15, 22–28]. Dog bite injuries involve typical broad soft tissue defects with irregular partially curved wound margins as well as canine tooth punctures. Parallel skin scratches may represent claw marks [5, 29, 30]. In some cases, additional evidence of animal depredation may be obtained by animal hair identification [25] or serological tests to detect animal saliva or non-human DNA in human wounds or human DNA in animal feces [18, 31]. It may also be possible to examine animal stomach contents for human tissue remnants, depending on the time after ingestion [13, 24, 30, 32]. In case of suspicious deaths involving dogs, the dogs should be examined by a veterinarian, and animal droppings or vomit should be collected immediately by investigators at the death scene for further investigation.

The head and hands are often subject to post-mortem animal depredation, since these body regions are usually unclothed and thus easily accessible; bony defects are also possible [4–6, 26]. Other injury patterns such as opened body cavities or genital tissue defects are unusual [7–9, 13, 23, 33]. In most cases, such injuries should not be difficult to identify as post-mortem animal depredation patterns at autopsy: the absence of vital signs (e.g., subcutaneous tissue bleeding, signs of exsanguination, blood aspiration) makes it easy to distinguish post-mortem dog bite injuries from fatal dog bite wounds [3, 10, 12, 22, 34]. In all three of our cases, the morphology of the wound margins corresponded to that reported in the literature, whereas puncture lesions inflicted by canine teeth or claws were only observed in case 1. The absence of general or local signs of vitality, the lack of defense injuries, and the small

amount of blood near the bodies left no doubt about the non-vital character of the injury pattern, and concurrent causes of death were diagnosed in all three cases. Due to advanced putrefaction in cases 1 and 2, post-mortem interference could not be clearly distinguished from agonal dog bite injuries in unconscious victims [3, 10, 12, 22], but the latter seemed improbable. In case 3, there was no evidence that decapitation took place during the agonal phase, but a medicolegal autopsy was not performed.

The dogs' "motivation" naturally remains unclear. Food shortage has often been discussed [5, 6, 15, 29, 35], but domestic dogs are unlike wild animals in that hunger rarely seems to be their incentive for post-mortem interference: dog food is often readily accessible at the death scene, as in the cases described above. Rothschild [24] reported a case of post-mortem animal depredation that had already occurred within 45 min after death, and witnesses testified that the dog vomited a large quantity of commercial dog food with remnants of human tissue. Dog attacks after shorter post-mortem intervals have been described in the literature [26, 36–38], suggesting that post-mortem dog depredation may be a displacement activity: the dog is confronted with unknown "behavior" of the reference person after death, and the well-known scent might be missing or changed. In this situation, the dog tries to attract the attention of its owner by bumping and licking unclothed body areas. When the well-known reactions are not evoked, the dog begins to bite [24, 26, 39]. Also, a shift in the human–dog hierarchy towards dominance of the dog over the owner as well as "mental disorders" of the dog may occur [4, 6, 10, 18, 20, 35, 39]. Furthermore, the persistent lack of exercise may increase an animal's aggression. Another factor that seems to promote post-mortem animal depredation is a chaotic environment, as in case 1, which is a typical feature of Diogenes' syndrome or compulsive hoarding syndrome [40].

Though known to occur in suicidal hangings [41], decapitation is an extremely unusual injury in dog bite cases and has rarely been described [3]. Facial soft tissue defects due to post-mortem animal activity are not uncommon and notably cause identification problems [42]. However, to our knowledge, there are only two case reports on complete post-mortem decapitation by dogs in the literature [5, 30]. Particularly remarkable is the complete post-mortem devouring of the head and neck by dogs in our first case. In the three cases reported here, it remains unclear why the post-mortem decapitation artifacts were inflicted exclusively by German shepherd dogs, although this breed is known to cause unusual injury patterns in decedents [28]. Further observations in routine forensic autopsies may reveal whether or not this is a random finding.

Key points

1. Differentiation between pre- and post-mortem dog bite injuries at autopsy is based on the presence or absence of vital signs (e.g., subcutaneous tissue bleeding, signs of exsanguination, blood aspiration).
2. Post-mortem dog bite wounds present typical morphological aspects and are mostly located on unclothed areas of the body.
3. In cases involving a decapitated body at the death scene, it must be considered that such an injury might have been inflicted by dogs (presumably domesticated).
4. A veterinarian examining these dogs may also be able to detect human tissue remnants by a stomach content analysis, depending on the time after ingestion. An additional analysis of animal saliva in the wounds or an examination of animal feces may help to clarify whether or not the injury was caused by a dog.
5. Dogs may be induced to perform displacement activity when confronted with an unknown "behavior" of the dead owner.

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