

Eternally Vulnerable: The Pathology of Abuse in Domestic Animals

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ABSTRACT

Animals are amongst the most vulnerable of all sentient beings. Animal neglect and abuse may involve a single animal and one person, or hundreds of animals and many people. Animals and people are victims of the same types of fatal injury and severe neglect; however, the anatomy and physiology of different animal species and even breeds of animals are a unique challenge for veterinary pathologists. Identifying and describing external lesions of blunt force trauma and projectile wounds requires that the entire skin be reflected from the animal because fur and feathers partially or totally mask the injuries. Because quadrupeds or birds may react differently to the same traumatic force applied to bipedal humans, extrapolating from medical forensic pathology must be done with caution. Animal abuse, however, does not occur in a vacuum. An established link exists between animal abuse, interpersonal violence, and other serious crimes. Using examples, this paper describes specific injuries in abused and neglected animals in the context of domestic violence, interpersonal violence, mental illness, and drug addiction. Medical examiners should be aware that animal abuse affects not only the animal, but individuals, families, and society as a whole. *Acad Forensic Pathol.* 2017 7(3): 353-369

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INTRODUCTION

No species of animal is immune to cruelty; however, it is domesticated animals and those in captivity that are wholly dependent upon humans for survival. Companion animals living in our homes and livestock providing people with their livelihood must live their entire lives in the social structure and conditions imposed upon them by humans. Like children, they require someone to feed, house, and care for them. Unlike children, they will never have a voice or gain independence.

A common definition of animal abuse in the literature is “*socially unacceptable behavior that intentionally causes unnecessary pain, suffering, or distress to and/or the death of an animal*” (1). Each jurisdiction, though, may have different laws on what constitutes animal abuse and what species or classes of animals are included in that definition (2–4). Regardless of the definition, animals are subjected to the same types of physical abuse, sexual abuse, cruelty, and neglect as people (5–15). Unlike people, they are also bred and trained to fight to the death in blood sports, and racing animals may be doped with illicit substances or other compounds that are perceived to give them a competitive edge (16, 17). Hundreds of animals may be kept in crowded, unsanitary, and hazardous conditions by hoarders, in puppy mills, or purported animal rescue facilities (18–20). Animals are victims of ritualistic killings and are tortured in sadomasochistic videos (2, 11, 21). They may be abandoned without food, water, or shelter or suffer from repetitive abuse. Even if rescued, they may be euthanized due to the severity of their injuries, advanced disease, or behavior acquired due to abuse.

Animal abuse does not occur in a vacuum: “*When animals are abused, people are at risk and when people are abused, animals are at risk*” (6). The link between animal abuse and concurrent or predicted interpersonal violence is established and animal abusers come from all socioeconomic, gender, race, and age groups (22, 23).

Threatened or actual cruelty to a pet is used to psychologically control a partner in domestic violence

situations. Battered women describing the occurrence of violence to their pets reported that 87% of these incidents occurred in their presence and 75% occurred in the presence of their children (24). As children, 63% of aggressive criminals deliberately inflicted harm on animals (24) and 43% of school shooters have abused animals (23). Narcotics or guns were seized in 35% of search warrants executed for investigations of animal abuse or dog fighting in Chicago (25).

Indicators of animal abuse are remarkably similar to those of child abuse (21, 26–31). Aside from injuries, multiple factors raise the suspicion of nonaccidental injury (NAI) in animals. These include the behavior of the client, other family member, or animal; a history that is vague or discordant with the clinical signs; comments from family members; history of usually young pets (<2 years) that disappeared or died; and an apparent lack of concern of the animal’s injuries or a delay in seeking treatment (29, 30, 32–35).

In a forensic context, animals may be victims, evidence, or perpetrators of a crime (18, 36, 37). The object of this paper is to inform medical examiners of some of the lesions of animal abuse and neglect and the conditions in which they arise. Beyond the individual animal, medical examiners should be aware that an abused or neglected animal at a death or crime scene may be just the tip of the iceberg. As stated by Allie Phillips of the National District Attorneys Association: When someone harms an animal, the important question to ask is, “*Who will be next?*” (22).

DISCUSSION

Blunt Force Injury

Blunt force trauma is the most frequent form of physical abuse identified by veterinarians and veterinary pathologists (12, 30, 38). Kicking, punching, throwing, or stomping an animal results in abrasions, fractures, external and internal contusions, and lacerations. Blunt force trauma can be mild, moderate, or severe, a single occurrence or repetitive incidents. Depending upon the tissue affected and the energy imparted by the force, injuries may resolve, repair, or

may kill the animal (7). Because contusions and abrasions in animals are frequently hidden by hair, fur, or feathers, the animals should be shaved (**Images 1 and 2**) and the entire skin reflected and removed from the body in order to identify these lesions in the subcutis and underlying muscles (7, 18).

Case 1: A 5.2 kg, small breed dog was admitted to a veterinary clinic with a history of lethargy and a vague, uncertain history of injury after a large potted plant fell on her. The veterinarian identified abrasions and contusions on the medial skin of all limbs and



Image 1: The fur or hair coat of an animal often prevents identification of traumatic lesions.



Image 2: The same dog as in **Image 1**. Multiple contusions and abrasions are visible after the hair was shaved. The perpetrator confessed to beating the dog during grooming.

ventral mandible, contusions and puncture wounds in the oral cavity, and unilateral hyphema. The dog was treated with intravenous fluids, antibiotics, and non-steroidal antiinflammatory drugs. Other significant lesions were not evident upon physical examination, radiographs, or an abdominal ultrasound. The following week, she was admitted to an emergency clinic with ulcers on her paw, vulva, and anus. Histology from a biopsy of the paw suggested chemical, electrical, or thermal burns and no evidence of a vasculitis, which the veterinarian had suspected. About three weeks after the initial clinical signs, the owner received a phone call from her boyfriend saying that the dog had suddenly become very ill; it died within an hour of the call. The dog was submitted for a postmortem examination because a second dog in the house had similar lesions and the veterinarian wanted to rule out infectious diseases or poisoning.

Postmortem examination and histologic findings included linear pattern contusions on the right lateral abdomen, lacerations, contusions, and puncture wounds in the oral cavity (**Image 3**). A deep excavating ulcer was on the right metatarsal paw pad (**Image 4**). There was bilateral hyphema with retinal detachment, serous uveitis, and a diffuse bilateral subdural hematoma (**Image 5**). Fourteen ribs were fractured: ten were acute fractures and there were five 5-8 mm



Image 3: Edema, contusions, lacerations, and a cruciform puncture wound in the oral cavity of a dog. The puncture wound is due to a tooth penetrating the upper lip.



Image 4: The same dog as in **Image 3**. A deep excavating ulcer on the large metatarsal pad of the hind limb.

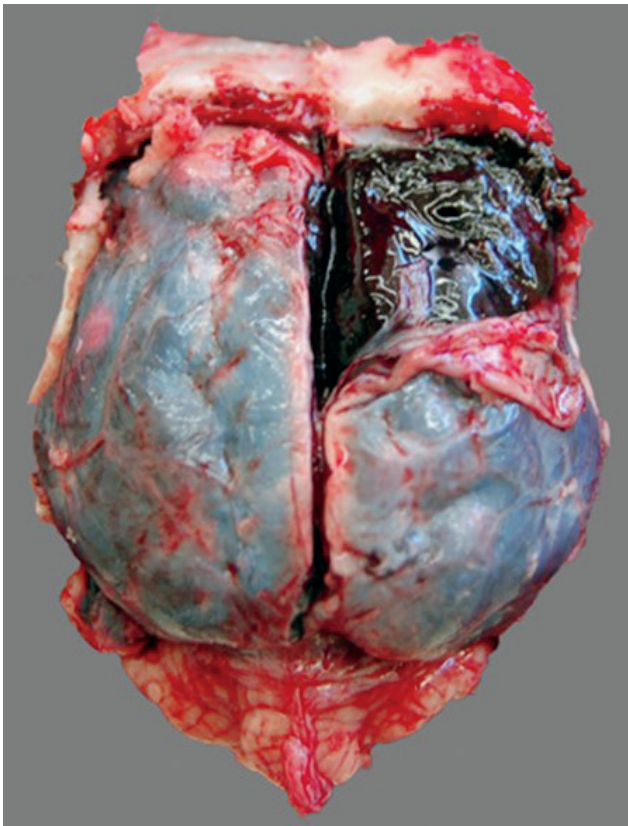


Image 5: The same dog as in **Images 3 and 4**. Brain with dura partially reflected. Cerebral cortices were covered by a thick, diffuse, subdural hematoma due to blunt force trauma.

calluses. The parietal pleura was lacerated by acutely fractured ribs and there was mild hemothorax and multifocal random pulmonary contusions. Perirenal hemorrhages and hepatic capsular hemorrhages and lacerations were also present. Acute fibrinous-hemorrhagic myodegeneration and fibrosis were in skeletal muscles. Full thickness coagulative necrosis of the dermis with adjacent keratinocyte nuclear elongation and hyperchromasia in histological sections from the paw were suggestive of thermal or electrical injury. All other lesions were consistent with repetitive blunt force trauma.

Following an investigation by animal control officers and the domestic violence unit of local police, the boyfriend was charged with animal cruelty. He had moved in with the owner shortly before the onset of the dog's clinical signs. According to the owner, he began to play roughly with the dogs, often pinning them down or pitting them against each other. Yet, neither the veterinarians nor the owner had considered the possibility of animal abuse, demonstrating that in some situations animal abuse is not suspected as a cause of death (30, 39). Although he never admitted to abusing the dogs, the accused was found guilty of killing one dog and abusing another. The judge also determined that the owner was also a victim in this case: the victim impact statement described a change in the way she viewed the world, depression, guilt, and fear.

Sharp Force Injuries and Projectile Wounds

The appearance of sharp force and projectile injuries in animals may be modified due to fur, hair, or feathers, but are mostly similar to those described in people (9, 13). Sharp force injuries are not as common as blunt force injuries, but may occur concurrently with other types of physical trauma. Distinguishing entrance and exit projectile wounds and documenting the characteristics of sharp force injuries requires that the animal be shaved. Wounds may be single or multiple, concentrated in an anatomic region, or present throughout the body.



Image 6: Multiple incision and stab wounds in the neck of a dog. The coat is matted with dried blood.

Case 2: A 5 kg small breed dog, found alive at a death scene two days after the initial investigation, was weak and taken to a veterinarian for examination. It was euthanized due to severe trauma to the neck and was submitted for postmortem as potential evidence in the crime. The dog had extensive, severe incised and stab wounds of the neck, and the coat was matted with dried blood (**Images 6 and 7**). Suppurative exudate was at the edges of the injuries. The intersecting, incised, gaping wounds were up to 11 cm long, 4-6 cm wide, and up to 7.3 cm deep, resulting in circumferential transection of the neck muscles. The trachea was exposed and a 5 mm horizontal stab wound was between the cartilaginous tracheal rings. The transected right jugular and left maxillary veins were retracted and histologically were occluded by nascent fibrinocellular thrombi. The lungs were congested, edematous, and with multifocal, generalized, random petechiae and ecchymoses.



Image 7: The same dog as in **Image 6**. A gaping sharp force injury in the ventral neck of this dog exposed the trachea. The ventral neck muscles, right jugular vein, and left maxillary vein were transected.

The accused had a history of mental illness and was found guilty of second-degree murder of the dog's owner. The victim was stabbed multiple times. Although evidence from the dog's postmortem was not requested for the trial, this case illustrates that animals may be injured or killed during crimes against people and are potential sources of evidence.

Strangulation

Species differences in the anatomic blood supply to the brain affect the physiological and behavioral responses to strangulation. The numerous intracranial and extracranial vascular anastomoses in dogs and cats makes them far less susceptible to cerebral isch-

emia than people [reviewed by Boghossian (40) and McEwen (14)]. The internal carotid artery is vestigial in cats and small in dogs: the maxillary and vertebral arteries contribute significantly to the cerebral arterial supply and consciousness is maintained for longer periods than in people during strangulation (14).

Case 3: A dead, 7.8 kg dog with a thick, plush coat (**Image 8**) found at crime scene had mild blood stains and irregular, stiff tufts of hair on the head, neck, and back. The teeth were blood stained. A distinct band of compressed fur, 1.5 cm wide, was revealed around the neck after the hair was shaved (**Image 9**). When the skin was reflected, the congested and edematous subcutaneous tissue of the head and neck cranial to the band



Image 8: Slight blood staining of the coat and clumping of the hair in tufts over the head, neck, and thorax compared to the hind limbs and pelvic region. The small dark specimen in the photograph beneath the dog's chin is a section of desiccated tongue that was submitted with the animal.

was distinct from the tissues immediately caudal to the band (**Image 10**). A focal contusion was in the right masseter muscle. There was extensive hemorrhage in the oral cavity, the tongue was absent, and the larynx was transected cranial to the epiglottis. The trachea was occluded by a fenestrated sheet of pharyngeal tissue. The caudal pharynx and medial mandibular tissues were excised with irregular, jagged margins. The lungs were congested, edematous, and emphysematous, with multifocal acute hemorrhage and the left bronchus was partially occluded with unclotted blood. Histologically, the lungs contained small fragments of skeletal muscle that were also in the stomach contents. Hemorrhage, edema, and rare aggregates of fibrin were in histological sections from the larynx and oral cavity.

The accused had impaired intellect, psychological problems since birth, and a lengthy criminal record related to severe drug addiction. He admitted to consuming over \$1000 of crystal methamphetamine and to strangling the dog while he cut out its tongue because he thought the dog was the Devil with a serpent's tongue. He was convicted of animal abuse.

Sexual Abuse

Terminology of animal-related sexual abuse is confusing as it often refers to the perpetrators motive rather than the effect on the animal: zoophilia, paraphilia, sexual sadism, and bestiality are some of the terms used (11, 41, 42). From a veterinary perspec-



Image 9: The same dog as in **Image 8**. After shaving the hair, a ligature mark of compressed hair became evident on the ventrolateral neck. The fenestrated submandibular muscle is due to sharp force injury.

tive, it is referred to as animal sexual abuse, emphasizing anogenital injury to the animal, rather than the motivation of the perpetrator (11, 33). In one study, 6% of 448 cases of NAI were due to sexual abuse (33). Sexual abuse is reported in companion animals (e.g., dogs, cats, guinea pigs, rabbits), livestock (e.g., horses, cattle, sheep, goats, llamas), and poultry (chickens) (11, 43) but it is unlikely this is a complete list. Penetration of the anogenital region often results in perforation of the reproductive tract or rectum with subsequent fatal hemorrhage or severe peritonitis (11,

33, 44). Frequently, restraint of the animal causes additional blunt force injury. A perpetrator may also be seriously injured while sexually abusing animals (41).

Case 4: A semiconscious, juvenile, 1.6 kg cat with an avulsion of the upper lip, fractured incisor, oral contusions, and cutaneous abrasions was euthanized due to a poor prognosis and the proposed cost of the required treatment. There was also a history of young cats disappearing from the household. At postmortem



Image 10: The same dog as in **Images 8 and 9**. The skin must be reflected to see traumatic injuries in animals. This dog was strangled and the congested, edematous tissues cranial to the ligature are sharply contrasted with the tissues caudal to the ligature.

examination, acute, multifocal, subcutaneous, intramuscular, meningeal, bilateral orbital, and peripharyngeal hemorrhages were present. One coxofemoral joint was subluxated, both femoral ligaments were lacerated, and blood clots were in both joints. Histologically, the distal colon was perforated. Perirectal plant fragments and bacterial colonies were surrounded by fibrin and numerous neutrophils. Small fragments of black perirectal debris were in the perirectal tissue (**Image 11**). The left pectineus muscle was focally fibrotic.

Blunt force injuries in this animal were due to attempted restraint of the cat while a black permanent marker was inserted into the rectum. The marker perforated the rectum, resulting in peritonitis and deposition of the black pigment in the perirectal tissue. The myofibrosis indicated previous trauma.

The police were alerted to this case by the mother of the perpetrator, a juvenile male. The child subsequently received psychological counseling.

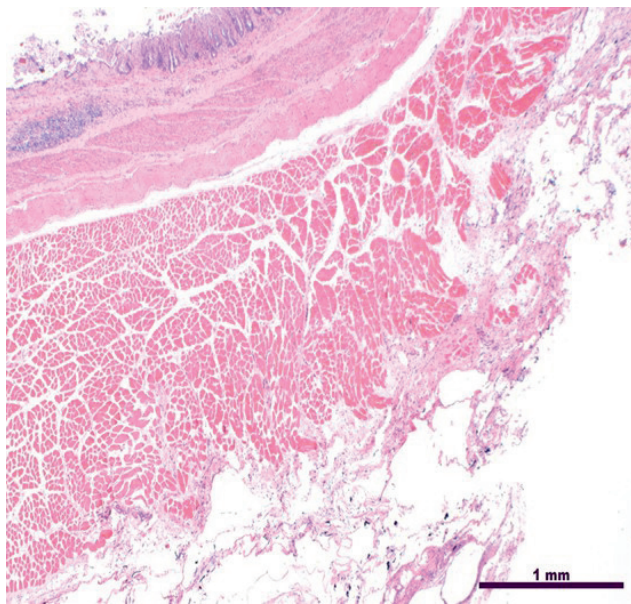


Image 11: Histological section of anorectal junction from a cat. The black pigment adjacent to the perirectal skeletal muscle is from a permanent marker that was inserted into and perforated the rectum (H&E, x20). Photograph courtesy of J. DeLay.

Neglect

Neglect of animals is failure to provide animals with the necessary food, water, shelter, and veterinary care (15, 18, 32). Cases of neglect can affect one, several, or even hundreds of animals. The large scale occurrences are usually associated with hoarders, puppy mills (2), and animal sanctuaries or rescue facilities (45). Puppies are produced for profit in puppy mills in over-crowded, poor environments. Hoarding is a distinct, recognized mental health disorder (46) included in the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (47). Cats, dogs, reptiles, birds, exotic animals, and farm animals are hoarded, although this is not likely an exclusive list. Hoarders, overwhelmed by the number of animals, fail to provide them with basic veterinary care, food, and a clean, safe environment; they fail to recognize physical signs of disease and starvation in the animals; and fail to recognize their unsanitary living environment (45).

Animals submitted for postmortem in cases of suspected neglect either died or were euthanized due to their extremely poor body condition. Emaciation is not a difficult diagnosis; however, determining the reason for the emaciated state of the animal requires a thorough postmortem examination and complete investigation by law enforcement. Poor body condition (thin or emaciated), matted or dirty hair coat, overgrown nails/claws/hooves, dental disease, parasitism, and embedded collars/halters may occur alone or in any combination in animals neglected due to poor physical care (18, 21, 48, 49). A matted hair coat and traumatic injuries were the distinguishing features identified in dogs emaciated due to starvation compared to those with intercurrent endogenous diseases (50). The general physical condition of the animal is documented, noting the condition of the hair and nails, muscle mass, adipose tissue, and teeth and oral cavity and if intercurrent disease is present that could account for emaciation. Matted hair must be shaved to examine the animal externally and may be weighed to determine the relative proportion to the animals weight (21). Constricting rings of matted hair may result in ischemic necrosis and infection of distal limbs.



Image 12: Sagittal section of porcine femur with serous atrophy of fat in a case of neglect.

Tight collars or halters may be embedded to the extent they are partially overgrown with skin (18, 51).

Internally, loss of muscle mass; serous atrophy of pericardial, perirenal, subcutaneous, and bone marrow fat (**Image 12**); and atrophy of the liver, thyroid gland, testes, and follicles are characteristic in emaciated animals (21, 50, 52, 53). Frequently, the stomach contains foreign objects, indicating that the animal was capable and willing to eat.

Case 5: An aged, 301 kg gelding (neutered male horse), estimated to be 20-25 years old, was euthanized due to poor body condition. Ribs, vertebrae, and the pelvis were prominent. The hooves were severely overgrown (**Image 13**), there were multiple



Image 13: Horse, lateral recumbency. The hooves are severely overgrown and distorted in this animal. Multiple cutaneous ulcers are on the skin of the right fetlock joint. Photograph courtesy of M. Hazlett.

decubitus ulcers on pressure points, and the coat was thin with multifocal areas of alopecia. Laminitis (separation and rotation of the third phalanx within the hoof wall) was present in both forefeet. Uneven molar and premolar teeth with sharp points on the medial and lateral surfaces were associated with multiple ulcers of the adjacent buccal mucosa and tongue. The stomach contained a small amount of grass and hay and intestinal contents were scant. The liver was atrophic. Muscle mass was markedly decreased, subcutaneous and internal adipose tissue was absent, and there was serous atrophy of the femoral bone marrow fat.

This horse has many features of neglect including emaciation with serous atrophy of fat, decubitus ulcers, dental attrition, hepatic atrophy, gastric, and oral ulcers. In many herbivores, teeth continue to grow during life and may overgrow, or wear unevenly, resulting in sharp edges (points) that lacerate the adjacent buccal mucosa and tongue. This causes difficulty with prehension and mastication of food. Hooves require regular trimming to avoid overgrowth or splitting. The pathologist was informed that the owner was found guilty of animal cruelty but was not provided with details of the investigation or sentencing.



Image 14: Emaciated dog with prominent ribs, pelvis, vertebrae, and femur. There was no evidence of intercurrent disease that would cause emaciation in this animal. Photograph courtesy of M. Stalker.

Case 6: A 17.8 kg, mature, medium sized dog was seized and euthanized due to emaciation, severe dehydration, and severe dental disease. Ribs, lumbar vertebrae, pelvic bones, scapulae, and femurs were prominent due to severe muscle atrophy (**Image 14**). Long nails, moderate dental calculi, and unevenly worn teeth were identified. Muscle mass and adipose tissue were depleted and there was serous atrophy of femoral bone marrow fat. Bilateral periarticular fibrosis of the coxofemoral joint and eburnation of the articular cartilage was present. An adult *Dirofilaria immitis* (heartworm) was in the right atrium. The stomach contained 2.5 kg of recently ingested kibble and feces were positive for *Toxocara canis* ova. There was no additional evidence of severe intercurrent disease. The dog's owner was found guilty of animal cruelty.

Blood Sports

Fighting dogs and gamecocks are pitted against their conspecifics in violent fights, sometimes lasting hours until one of the animals is dead or refuses to fight. Drug trafficking, racketeering, money laundering, illegal gambling, and firearms are associated with animal fighting (18, 54). Blood sports are viewed as social events, and children may be bystanders, raising issues of child welfare (55).

There are three types of fighting dog owners: the professional, the hobbyist, and the street fighter. Each has its own culture, level of organization, preferred locations, and differs in the amount of time, money, and effort put into breeding and training fighting animals (18, 54).

The prototypic fighting dog is the American pit bull terrier, which is a type of dog rather than a specific breed (18). They are bred to be highly aggressive to other dogs and submissive to people because human-related aggression is not tolerated by professional dog fighters (56). Phenotypically, pit bull fighting dogs are highly muscled, moderately sized dogs that weigh between 20 and 40 kg (18). Rigorous training and conditioning begins at an early age. Dogs are tethered with thick collars attached to heavy chains

to develop muscular strength. Treadmill running and training dogs to jump, grab, and hold an object with its teeth while suspended are common training methods. Stolen or stray dogs, cats, or other animals restrained or placed in a confined area with a fighting dog are used as live bait for practice (54). Fighting dogs are often given illegal performance enhancing drugs such as methamphetamines, cocaine, and anabolic steroids (54). Many dogs also have signs of neglect, parasitism, and vector-borne diseases (18, 57). Street fighters have “status” or “weapon” pit bull type dogs crossed with other breeds (55, 58) and use these dogs for fighting and personal protection, promoting human-directed aggression. Some have referred to these animals as “loaded guns” (54).

Fighting dogs have characteristic bite wounds and scars concentrated on the front legs, head, and muzzle (59). The number, severity, and presence of wounds of different ages distinguishes wounds in fighting dogs from the bite wound patterns and injuries in spontaneous fights between dogs of similar size (18). Small dogs attacked by large dogs usually have bite wounds on the head and often over the thorax, abdomen, back, and legs. Because the fighting dogs are bred and trained to grab, hold, and shake their opponent, numerous deep puncture wounds, lacerations, abrasions, and fractures occur. During a single fight, dogs repeatedly attack and a winning dog will be entered in multiple fights. Injuries of different ages from recent lacerations, contusions, and abrasions, to scars, acute fractures, and bone calluses can be present. The dogs may have distorted limbs due to lack of internal or external fixation of fractures. Ears may be lacerated or scarred from fighting. Dog fighters may also remove ears and tails, often without anesthesia or sedation, to prevent injury during a fight, or to eliminate ear postures that communicate submission (18). Teeth are often worn due to chronic chewing on abrasive objects including tethering chains.

The fight ends when a dog refuses to fight, is removed by the handler, or dies. Dogs that refuse to fight or lose a fight are often culled by shooting, or some are left to die of their injuries. Because a losing dog reflects poorly on the status, masculinity, and perceived

power of its owner (60), they are often killed by beating, hanging, drowning and/or shooting as part of the “sport” (**Image 15**) (61, 62).

There are many similarities between cockfighting and dogfighting, but in cockfighting usually only the males (roosters) are fought. Birds are usually kept tethered and the highly vascular comb, wattles, and ear lobes are removed by scissors (dubbing) without anesthesia to prevent injury during a fight (**Image 16**). A long razor sharp knife or gaff is tied to one of the legs and birds sustain severe sharp force injuries during the fight. Wounds are usually on the head, eyes may be pierced by the knives, and gashes to the thorax and legs occur. Fatal injuries are reported in people stabbed by gaffs or knives tied to the rooster (63). Transport of gamecocks increases the transmission of poultry diseases, many of which are economically devastating to commercial poultry producers.

CONCLUSION

Like children, animals are completely dependent upon those that are supposed to care for them. But unlike children, animals remain vulnerable for their entire life.

Animal neglect and abuse may involve a single animal and one person, or hundreds of animals and many people. Most of the examples of animal abuse given were not isolated occurrences, but were associated with incidents of interpersonal violence, drug abuse, or mental illness. Abused and neglected animals submitted for postmortem likely represent a small fraction of those animals that die due to abuse or neglect. At present, there is no registry of postmortem findings or statistics of abused animals (56). The number of animals submitted by law enforcement for postmortem is increasing (38), although this may be due to increased recognition by veterinarians and law enforcement, legislative changes, and increased awareness of the link between animal abuse and interpersonal violence.

Legal definitions of animal abuse often include suffering. Attorneys, judges, and juries want to know if the animal suffered and the duration of suffering. Re-

sources on animal suffering are in the realm of animal welfare and shelter medicine, not in veterinary pathology journals or texts. Peer-reviewed literature on animal welfare is beginning to address specific aspects of cruelty and the quality of life for abused animals (51, 64–67). Much more information is needed on animal suffering, particularly in the context of the type of injuries inflicted on animals; veterinary pathologists who do forensic postmortems must become familiar with the animal welfare literature.

Prior to 2008, there was scant peer-reviewed literature on veterinary forensic pathology in domestic animals, and historically most veterinary pathologists had to rely on medical forensic journals and textbooks for their information. Since then, the peer-reviewed literature on forensic veterinary medicine and pathology has increased exponentially. The American Academy of Forensic Sciences is encouraging membership for

veterinarians and the International Veterinary Forensic Sciences Association is a portal for the relatively small community of individuals and organizations involved in veterinary forensic sciences.

Lesions in cases of animal abuse are similar to those reported in people; however, detecting, documenting, and aging these lesions presents a unique challenge to veterinary pathologists because of the many anatomic and physiologic differences between humans and animals, between animal species, and even sometimes even within breeds (7, 14, 18, 32). The greatest challenge to veterinary forensic pathology, though, is the absence of an infrastructure similar to the medical examiner system. It is extremely rare for a veterinary pathologist to attend a death scene. Law enforcement agencies may not have a budget for a postmortem and ancillary testing. Often, detailed and complete documentation from the scene is either not available or not



Image 15: Dorsal aspect of medium breed dog with ligature and shotgun wound. The wadding was recovered from the wound and the rectangular tan material in the wound was a piece of plywood. Photograph courtesy of J. DeLay.

provided to the veterinary pathologist. Animals submitted for postmortem may not have died from their injuries, but were euthanized because of them. They are often frozen prior to submission, creating artifacts in addition to postmortem changes. Forensic cases must be fit in to an already busy practice of diagnostic pathology, with few resources for the additional time required. Veterinary pathologists may never be informed of the details or legal outcome of their cases. Additionally, formal training and certification programs for veterinary forensic pathologists do not currently exist (68, 69) and many postmortems are done by veterinary clinicians with no graduate training in pathology (68). Surveys of veterinary pathologists report a need for training in forensic pathology, the judicial process, how to be an expert witness, report

writing, and documentation (68, 69). This is not so different from recommendations of the Goudge inquiry into pediatric forensic pathology that followed wrongful conviction and incarceration of individuals based on the flawed testimony of a medical pathologist and a system with inadequate oversight (70). Veterinary pathologists are in the fortunate position to learn from the failings and the recent progress in forensic pathology (71). It is also encouraging that our medical colleagues recognize veterinary forensic pathology (71–73). Their interest, assistance, and expertise when requested is more than appreciated by those of us in this emerging subdiscipline.

Animals are amongst the most vulnerable of sentient beings. Animal and human health are inextricably



Image 16: A gamecock with wattles, earlobes, and comb removed to prevent injury during fighting. Photograph courtesy of N. Bradley-Siemens.

linked on many levels as evinced by “One Health” (74–77), a concept initially espoused by Rudolph Virchow and his pupil William Osler (78). The concept that abused and neglected animals are sentinels for deeper problems of interpersonal violence and serious crimes affecting individuals, families, and society (1, 19, 24, 26, 35, 79, 80), however, is not new. As the quote often attributed to Mahatma Gandhi eloquently states: “*The greatness of a nation and its moral progress can be judged by the way its animals are treated.*”

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