



Review

Analysis of cases of forensic veterinary opinions produced in a research and teaching unit



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ABSTRACT

The aim of the study was to present the results of necropsies carried out in the years 2000–2014 in the Department of Pathological Anatomy, Faculty of Veterinary Medicine, University of Life Sciences in Lublin.

The material used for the analysis consisted of expert opinions prepared on the basis of a decision by a judicial body to admit an expert opinion as evidence.

An increase was observed in the demand for the services of veterinary forensic experts, beginning in 2006 and persisting through 2014. The response to the growing popularity of veterinary forensic examinations should be systematization of knowledge and exchange of experience, which would enable the further development of this interdisciplinary science.

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1. Introduction

In veterinary medicine we can distinguish four types of dissection of animal carcasses: clinical, medico-legal (post-mortem examination and necropsy); administrative (overseen by state administrative bodies) and necropsies commissioned by private persons or various types of businesses. Among these types, medico-legal necropsies ordered by judicial bodies (the police, prosecutors and courts) are of fundamental importance.

The rationale for conducting a medico-legal necropsy is any suspicion that an animal has died of other than natural causes, and the purpose of the necropsy is to determine the cause of death. However, even the definition of death in the medico-legal context is not unambiguous. It might seem that death is simply the permanent and irreversible cessation of life functions, but the definition is often expanded and made more precise. Currently the moment of death is considered to be the cessation of brainstem function.¹ In the medico-legal context death cannot be defined as a point, but rather as a line. It is not so much a moment as a series of stages, i.e. a

gradual expiration of life functions and progressing necrotic changes.

According to Raszeja,² the first stage of dying is ‘reduced life’ (*vita reducta*), when the activity of all systems is reduced. The progressive reduction in basic functions leads to disturbances and thus to the next stage, called ‘minimal life’ (*vita minima*). The end result of *vita minima* is what is known as apparent death, a period of minimal life taking on the appearance of death. Progressive changes lead to clinical death (*mors clinica*), during which the functions of systems responsible for life cease. It is also possible to induce interlethal phenomena (stimulating muscles to work) that are characteristic of ‘intermediate life’ (*vita intermedia*). The next stage is individual death, during which brain death takes place. This is the key stage for the individual to be recognized as dead. Biological death, during which the cells of the organism begin to die, is distinguished as well.

The functioning of three systems – the circulatory, respiratory and nervous systems – is crucial to the life of the organism. Disturbances in the functioning of at least one of these have consequences for the others, which in effect lead to death.

Animal carcasses are often the main material dealt with in forensic veterinary medicine. Gerdin & McDonough³ observe that at the time of necropsy (post-mortem examination of an animal carcass) the carcass has the status of evidence, and the examination can not only reveal the cause of death but allow inferences to be made concerning the circumstances surrounding it. The purposes

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and tasks of forensic necropsy are usually the same as in the case of autopsy (post-mortem examination of a human body), i.e. determination of the circumstances, time and cause of death. It is worth emphasizing that necropsy, like autopsy, is unrepeatable. While formulation of another opinion based on existing material is certainly possible, supplementation or verification of the material is not.⁴

The first stage of a necropsy is an external examination, based on which a preliminary identification of the animal is made. The purpose of this stage is to determine the species, breed, sex, coat colour and age of the individual and to identify any distinguishing marks. Each stage of the necropsy should be documented by photographs to give the expert's opinion greater value as evidence. A detailed protocol of each examination should be prepared, which together with the photographic documentation and the results of additional tests (histological, toxicological and radiological) constitute the evidence.³

The external examination is followed by the opening of the body. At least three main body cavities must be opened: the cranium, the abdominal cavity and the chest. Then the organs in these spaces are examined.⁵ Detailed analysis of pathological changes in individual organs makes it possible to draw inferences regarding the likely events leading up to the death.

If the internal examination does not allow for determination of cause of death, additional tests may be performed as needed. These may be histopathological or toxicological tests, molecular analyses, or, for example, testing of fat content in the bone marrow in the case of starvation. Moreover, in necropsy, as in autopsy, special techniques may be required as dictated by the situation. Examples include examination of soft tissues, the spinal column and the appendicular skeleton in animals that died in road accidents, or analysis of the location of soft tissue haemorrhage together with examination of the neck organs.

Given the scarcity of literature on this issue and the growing importance of forensic dissections, there is a need to systematize knowledge and present the results of necropsies, as is done in the case of autopsies. An exchange of experiences, conclusions and results may constitute a substantial contribution to the development of this still relatively young branch of forensic medicine and benefit veterinarians, forensic experts and judicial bodies. For this reason the analysis conducted is scientifically justified. The aim of the study was to present the results of necropsies carried out in the years 2000–2014 at the Department of Pathological Anatomy, Faculty of Veterinary Medicine, University of Life Sciences in Lublin.

2. Material and methods

The material for the study consisted of veterinary expert opinions prepared by the Department of Pathological Anatomy, Faculty of Veterinary Medicine, University of Life Sciences in Lublin, in the years 2000–2014. All of the expert opinions were prepared on the basis of a decision by a judicial body to admit such an opinion as evidence. The numerical data concerning cases of animal abuse in the years 2003–2012 were obtained from police statistics.

3. Results

In the years 2000–2014, 57 forensic necropsies were conducted in the Department of Pathological Anatomy of the University of Life Sciences in Lublin (Fig. 1). The most necropsies were carried out in 2012. An increase in the number of examinations can be seen beginning in 2006 with respect to the previous years. From that year the number of necropsies has remained at constant level of about 5 per year.

The decisions to have necropsies performed came from 19 police units in the Lublin Voivodeship, in addition to one issued by the police in Zakopane. The ordering parties were most often Lublin police headquarters, which requested over 20% of the necropsies (Fig. 2), while in about 10% of cases the request was made by the Lublin public prosecutor's office. A relatively large number of decisions were issued by the police headquarters in Bychawa (about 16%). Others worth noting include police headquarters in Piaski and Bełżyce (about 9% of decisions). In the case of other towns of the Lublin Voivodeship, requests for performance of a necropsy and issuance of an opinion were mainly one-time cases.

Among the 57 forensic necropsies carried out in the years 2000–2014, the most frequently examined animals were dogs (32 cases, 57%) and cats (6 cases, 10%) (Fig. 3). The statistically most frequent necropsy subject was a mixed-breed dog 6.5 years of age. Farm animals and free-living wild animals accounted for a much smaller percentage of necropsied animals (about 11% and 23%, respectively). In the case of free-living animals, a significant factor is the fact that crimes involving them are difficult to detect and rarely reported.

In 75% of necropsies the cause of death was successfully established. In the remaining 25% of cases the factors preventing objective determination of the cause of death were insufficient material supplied for analysis or advanced decomposition of the remains.

The most frequent cause of death was mechanical injury of varying origin, accounting for 25% of necropsied individuals (Fig. 4). An almost equally common cause of death was gunshot wounds (23% of necropsied individuals), mainly affecting dogs and wild animals. Less frequent were cases of poisoning and asphyxiation (12% and 9%). It is worth emphasizing that all of the poisoning victims were dogs. In 7% of necropsied animals the cause of death was found to be natural.

4. Discussion

Forensic veterinary medicine is a relatively young science, which can be said to constitute a fusion of veterinary, biological and legal sciences. It deals with cases of animal abuse and smuggling, but also with the role of animals in court cases involving people.⁶ Veterinary forensics is a scientific discipline dealing with characteristic, strictly veterinary issues.^{3,7,8}

Examination of an animal carcass by dissection is the fundamental veterinary activity helping to establish cause of death. It makes it possible to determine the cause-and-effect sequence that led to the death of the animal.⁹ An animal may be a witness to, victim of or perpetrator of an incident. Pathological changes revealed during the examination can often significantly aid judicial bodies in answering key questions associated with the legal proceedings. It should be noted that dissection of a carcass is an unrepeatable action. Therefore proper performance of the examination and preparation of the protocol and veterinary opinion are of crucial importance. Forensic dissection in the case of animals is referred to as necropsy rather than autopsy.

Veterinary sciences include a variety of techniques and types of necropsy. A basic, common technique is the en bloc method, known as Ghon's technique. It involves examining the organs outside of the animal's body, in blocks.¹⁰

Forensic veterinary medicine is a dynamic science, and it is not possible to assign an exact date when it came into being. Its emergence and development are rather a response to demand. The last 10–15 years have seen numerous reports on this topic, due to the increasingly comprehensive approach of law enforcement agencies to investigation of the circumstances of crimes. Animals, often referred to as silent witnesses, are continually gaining in

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