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An Unexpected Explanation for a Cat's Urinary Retention

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Abstract

Like human populations, dogs' lifespans have significantly increased during the past few decades. The domestic dog has been mentioned by a number of authors as an appropriate animal model for geropathology translational research. This study's objective is to evaluate age-related morbidities and mortality in 269 senior dogs (130 males and 139 females) that underwent necropsy. The reproductive, cardiovascular, and urinary systems, as well as the mammary gland in females, were the organic systems showing the highest frequency of age-related morbidities. Males were much more likely to have cardiovascular and urinary disease than females, and breast lesions were only seen in females. Small breed dogs were more likely to have urinary disease, but larger breed dogs were much more likely to have peritoneum and male genital morbidities. These elderly dogs were commonly affected by hyperplastic and degenerative lesions. Neoplasia was the primary factor in over half of all deaths, making it the most common cause of death. Urinary and cardiovascular pathology have both become common causes of death. These results somewhat align with data collected for the human species, showing that cardiovascular pathology and cancer are the two main diseases and causes of death in the elderly. Our findings confirm the domestic dog's potential for additional gerontology translational research that satisfies the One Health principle.

Keywords: Cat's; Health principle; Urinary; Retention

Introduction

Human longevity has significantly increased in the previous 100 years, particularly in developed nations. Similar developments in pet nutrition, hygiene, health, and medical care during the past few decades have led to a significant rise in the longevity of these animals. As a result of the [1-5] development of morphofunctional alterations brought on by this prolonged life, companion animals are living longer and developing more age-related lesions and disorders. In reality, older dogs exhibit a number of phenotypical changes in addition to cognitive and behavioural changes. These include changes to the coat or integument, deterioration of the body's primary organs (renal, hepatic, cardiac, and lung function), and a rise in the occurrence of a number of illnesses, including neoplasms, eye and dental diseases, and musculoskeletal ailments.

Materials and Method

Nevertheless, ageing is a complex multifactorial process with many unknowns, leading to the beginning of extensive studies on canine ageing with the aim of elucidating the phenotypical, functional, genetic, and environmental factors underlying this biological process. Dogs and cats have evolved into "full members" of human families over the past few decades, sharing the owners' surroundings and being subjected to the same environmental stressors and pathological stimuli (such as infectious agents, inflammatory influences, carcinogenic conditions, and others) as people. Indeed, a number of spontaneously emerging disorders in pets are comparable to those seen in humans. One Health is a contemporary notion that acknowledges the importance of both human and animal health as well as the environment they share. Numerous papers [5-7] in recent years have recommended companion animals as appropriate translational models for geropathology research. According to the One Health concept, the definition of the ageing process is crucial for surveillance, early diagnosis, assessment, and formulation of preventive policies on age-related disorders, aiming to promote health in both human and canine elderly populations. A greater understanding of the spectrum of illnesses and causes of death among various canine populations was made possible by earlier studies on morbidity and mortality. However, a significant issue with most of them is that they are not supported by comprehensive necropsy exams or histological analysis and instead are based exclusively on medical records or information provided by insurance companies. This study's objective is to evaluate age-related morbidities and mortality in a cohort of senior dogs that have undergone necropsy.

Results and Discussion

269 dogs made up the cohort that was included in this retrospective survey (130 males and 139 females). The remaining 52 percent of the dogs were split among 31 different breeds, with Poodles (8.6%), Boxers and Cocker Spaniels (5.6% each), and Labrador Retrievers (4.1%) having the highest representation. 34.3% of the dogs had a body weight under 10 kg, 23.2% were between 10 and 20 kg, and 42.4% were beyond 20 kg. Due to the extensive putrefaction of the cadaver, which made it difficult to get trustworthy data during the necropsy, four cases—two males and two females—were omitted from the analysis [7-9] of the data. This study gives a useful picture of the most prevalent illnesses and fatalities in a specific old canine community. This study on canine morbidity and mortality overcomes one of the primary weaknesses of earlier ones, which relied on data gathered from medical or animal insurance firms' records. It is based on data received through necropsy investigations. The reproductive, cardiovascular, and urinary systems, as well as the mammary gland in females, were the organic systems in the study population that often displayed abnormal alterations. These findings coincide with those of Fleming and colleagues, who found a link between ageing and a higher risk of cardiovascular and genitourinary disease in dogs.

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Morbidity

The reproductive system was the organic system in our investigation with the highest number of morbidities. 72.7% of intact men (56/77) and 61.3% of intact females (19/31) both had genital lesions. Cardiovascular and urinary system lesions were both very common, occurring in 45.7% and 44.2% of the animals, respectively. 34.6% of the ladies enrolled in this study had mammary lesions. In 31.7% and 28.3% of the animals, abnormalities in the liver and digestive system, respectively, were discovered. Conversely, pancreatic and neurological lesions, which were found in 6.8 and 3.4% of the animals, respectively, were the least common in this population. As seen in the graph, the genital tract—where lesions were found in nearly 73% of non-castrated male dogs—presented the most lesions in males, followed by the cardiovascular and urinary systems, where injuries were found in 52.7 and 51.9% of males, respectively. The urinary tract, cardiovascular, and mammary gland in females were the organic systems with the greatest number of alterations, with lesions recorded in 39.7, 36, and 34.6% of the animals, respectively. Males were substantially more likely than females to have pathogenic abnormalities to their urinary and cardiovascular systems ($p = 0.006$ and $p = 0.046$, respectively). Most lesions were seen in the urinary, cardiovascular, and male reproductive systems, both in dogs under 20 kg and above 20 kg. Small breeds showed a considerably greater incidence of urinary tract lesions ($p = 0.003$), whereas large breed dogs (> 20 kg) had a higher prevalence of pathology in the male reproductive system and in the peritoneum ($p = 0.048$ and $p = 0.001$, respectively). In addition, lesions of the haematological system were more common in giant dogs than in small breed dogs, albeit these differences were not statistically significant ($p = 0.058$ and $p = 0.055$, respectively). Males with intact reproductive tracts most frequently had testicular neoplasms and prostatic hyperplasia, which together accounted for 97.4 and 89.2% of the lesions diagnosed there. Leiomyomas and cystic endometrial hyperplasia each accounted for 33.3% of the uterine/vaginal lesions in non-neutered females, while polycystic ovaries made up 91.7% of the lesions observed in intact female ovaries. All mammary lesions recorded in this canine population were neoplastic lesions, with 51.1% of them being benign neoplasms and 48.9% of them being diagnosed histologically as malignant. Chronic kidney disease, which is characterised by renal atrophy, an irregular outline, and capsular adhesions, as well as a histological picture of tubular/glomerular injury, interstitial inflammation, and fibrosis, made up the majority of lesions found in the urinary tract (72.3%), followed by cystitis (12.4%). Cardiac dilation, which mostly affects the left ventricle, made up 36.6% of cardiac lesions, valvular endocardiosis, which generally affects the mitral valve, made up 32.3%, and endocardial fibrosis/mineralization, which made up 10.4% of the morbidities reported in the cardiovascular system. The skin (86.6%), nervous system (44.4%), and digestive tract (31.7%) all had neoplasias as the most prevalent lesions, whereas the pancreas (66.7%), endocrine organs (54.1%), liver (45.6%), and hematopoietic system (37.3%) were more likely to experience hyperplastic changes. Degenerative conditions dominated the musculoskeletal system (38%).

Conclusion

It was also noted the primary pathogenic process involved in the animal mortality and the method of death (natural vs. euthanasia). Cardiovascular failure, inflammation, neoplasia, old age, trauma, and other pathologic processes were classified as six primary categories of pathologic processes connected to mortality (for a definition of the categories, see the Glossary at the end of the section). Even though some animals displayed multiple disease processes (of the same or different categories), only the one that appeared to be directly responsible for the animal's demise due to its severity or poor prognosis was taken into account when designating this category. So, for instance, a dog that was killed in a car accident but had a pathological condition of any kind was considered to have experienced trauma. Even when the reason for the animal's death was known in euthanasia cases, the underlying medical state that drove the desire for a sacrifice was thought to be the primary death-related cause. The significance of the link between categorical variables was assessed using chi-square analysis. For p values under 0.05, the results were deemed statistically significant.

Acknowledgement

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Conflict of Interest

There are no conflicts of interest, according to the authors.

Ethics Statement

This study did not need to be submitted to the local ethics and welfare council since all diagnostic studies and begun therapies were a regular component of clinical procedures.

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