TRADITION AND MODERNITY IN VETERINARY MEDICINE, 2020, vol. 5, No 2(9): 10–14

ACUTE PANCREATITIS IN DOGS – AGE, BREED AND SEX PREDISPOSITION

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ABSTRACT

Acute pancreatitis in dogs is a disease that is more common than previously thought. There is evidence of breed, sex, age and individual differentiation of the incidence in dogs. This study was performed in 83 dogs with spontaneous acute pancreatitis. Dogs of all ages and breeds were included, regardless of the presence or absence of comorbidities. The average age of all dogs was 5.7 years (range 1 to 12 years). The highest proportion of patients were dogs at 5 years of age (16.87% /14 dogs). The established gender distribution in the group was 48 to 35 in favor of female dogs (57.83%).

Key words: Pancreatitis, dog, breed predisposition, sex predisposition.

Introduction

Many authors promote the thesis of breed predisposition to acute pancreatitis, although the disease affects all breeds of dog. According to Kalli et al. (2009), the highest risk is in the Mini Schnauzer, Yorkshire terrier and Sky Terrier breeds. Other authors include in this group breeds such as Boxer, Rough Collie and Sheltie (Mushtaq et al., 2017). Burrows (2004) have also noted hereditary predisposition to pancreatitis in mini-schnauzers, while Hess et al. put the Yorkshire terrier first. According to the last cited authors, the Labrador retriever and Mini Poodle breeds have a reduced risk of developing the disease. Recent studies support the claim of a genetic mutation of the PSTI gene in mini-Schnauzers, as a reason for the high incidence in this breed (Bishop et al., 2007). PTSI (Pancreatic Secretory Trypsin Inhibitor) is a specific trypsin inhibitor that is synthesized, stored and secreted together with trypsinogen. This inhibitor inhibits the cascade auto activation of pancreatic enzymes within the pancreas (Pubols et al., 1974).

There is a lack of information in the Bulgarian and world literature about the percentage of acute pancreatitis incidence according to the size of the dog breed. Based on the above, we should assume that small breeds are at greater risk (Hess et al., 1999; Bishop et al., 2007; Kalli et al., 2009). Studies on the sex differentiation of the incidence of acute pancreatitis in dogs in Bulgaria have not been conducted, and worldwide literature data is extremely diverse. Some authors have argued that middle-aged female dogs are more susceptible to developing acute pancreatitis than the rest of the population (Cook et al., 1993; Williams, 1996). The statement of Kalli et al. (2009) and Hess et al. (1999) is quite the opposite – both male and castrated female dogs are at a higher risk of developing fatal acute pancreatitis than non-castrated female dogs.

There is complete consensus about individual sensitivity. Most researchers working in this field report dogs of middle and over middle aged, overweight dogs and dogs with erroneous diet as the most sensitive to acute pancreatitis (Cortee and Thordal-Christensen, 1953; Pubols et al., 1974; Nyland et al., 1983; Cook et al., 1993; Williams, 1996; Kalli et al., 2009; Mushtaq et al., 2017).

The lack of data and studies in our country, as well as contradictory worldwide data regarding dogs' age, breed and sex dependence on the development of acute pancreatitis, provoke the conduct of this study.

Materials and methods

The material presented covers a series of clinical studies conducted over a period of 12 years (2005-2017), in dogs of all ages and breeds. The animals included in the study were patients of the University Small Animal Clinic in Stara Zagora, and partner veterinary clinics from the cities of Ruse, Plovdiv and Burgas. The main part of the research was carried out in the Departments of General and Clinical Pathology, Internal Diseases and Veterinary Surgery at the Faculty of Veterinary Medicine. Laboratory analyses were performed at the Laboratory Diagnostic Center (LDC) at the Faculty of Veterinary Medicine.

The selection criteria for the animals were history data, clinical signs (abdominal pain, vomiting, diarrhea, lethargy, and anorexia), high amylase levels and abnormal blood glucose values. Animals meeting certain criteria were included in the study:

1. One or more of the following clinical signs are available:
   - Anorexia
   - Vomiting
   - Diarrhea
   - Dehydration
   - Icterus, and / or manifestations of abdominal pain during the initial study.
2. An autopsy was performed after the dogs had died or were euthanized.
3. The results of laboratory tests corresponding to the diagnosis of acute pancreatitis.
4. Presence of pathologic anatomical and / or histological findings corresponding to the diagnosis of acute pancreatitis.

The study also included dogs with evidence of secondary systemic complications that occurred during the course of acute pancreatitis.

Primary clinical examinations and blood sampling for haematological and biochemical analysis were performed at the time the animals were admitted to the clinic. At the same time, their age, weight, breed and gender were determined. The exact onset of the disease could not always be determined with absolute precision. In our estimation and the anamnestic data collected, the majority of spontaneous cases were submitted for primary medical examination between the 72^{nd} and the 96^{th} hour since the onset of suffering. Secondary examinations were performed daily in most of the animals.

Data were statistically processed by ANOVA (one-way analysis of variance) (Statistica for Windows, Stat Soft Inc., USA 1993). All results are presented as mean and standard error of the mean (mean ± SEM). The statistical significance of parameters according to time was determined in the LSD test at $p < 0.05$.

Results

In order to achieve this goal, clinical studies were performed and samples were obtained and processed for haematological, biochemical, pathological and/or histological examination of 120 dogs with suspected spontaneous pancreatic diseases. Of these, 83 met the criteria for a clear diagnosis of acute pancreatitis and were included in the follow-up study groups. The other 37 dogs were not included in the study because of an unconfirmed histological diagnosis, pre-treatment, diagnosis of other pathology, incomplete medical records, or the reluctance of the owners for assistance.

The average age of all dogs was 5.7 years (range 1 to 12 years). The highest percentage of dogs (16.87% / 14 dogs) were 5 years of age, followed by four years of age (12% / 10 dogs). In the course of the study, only two animals under 1 year of age and one at age 12 were enrolled. The group included representatives of 31 breeds of dog (Table 1). The highest numbers were representatives of the German shepherd dog (n = 12) – 14.5% of all purebred dogs diagnosed with AP. After them, the largest group is the Terriers group (8) – 9.6%, Doberman pinscher (6) – 7.2%, Rottweiler and Dachshund with 5 representatives each. There were 3 dogs each of the Drathaar and Pincher breeds. Two dogs of the Samoyed breed, English Cocker Spaniel, Spitz, Pekingese, Bolognese, Labrador, French bulldog and Central Asian Shepherd Dog. One representative was from the breeds of Dogo Argentino, Sharpey, English bulldog, Chihuahua, Kurtzhaar, Cane Corso, Beagle, Golden Retriever, Pointer, Rough Collie and Schnauzer. The other 14 dogs were cross or mixed breeds.

Table 1: Incidence of acute pancreatitis in dog breeds.

Breed	Clinical cases n=83	Group A (not survived) n=22	Group B (survived) n=61
Cross or mixed breeds	14	7	7
German shepherd dog	12	5	7
Doberman pinscher	6	3	3
Rottweiler	5	2	3
Dachshund	5	2	3
Drathaar	3	-	3
Pincher	3	-	3
Yorkshire terrier	3	-	3
Samoyed	2	-	2
English Cocker Spaniel	2	-	2
Spitz	2	1	1
Pekingese	2	-	2
Bolognese	2	-	2
Labrador	2	-	2
French bulldog	2	-	2
Central Asian Shepherd Dog	2	-	2
Pit Bull Terrier	1	-	1
American Hairless Terrier	1	-	1
Jagdterrier	1	-	1
Bull Terrier	1	-	1
Staffordshire Terrier	1	-	1
Dogo Argentino	1	-	1
Sharpey	1	-	1
English bulldog	1	-	1
Rough Collie	1	1	-
Chihuahua	1	-	1
Kurtzhaar	1	-	1
Cane Corso	1	-	1
Beagle	1	-	1
Golden Retriever	1	-	1
Pointer	1	-	1
Schnauzer	1	1	-

Along with breed dependence, our studies also showed a pronounced gender differentiation. The sex we found in the group was 48 to 35 in favor of female dogs (57.83%).

There was also a significant difference in the number of sick dogs, depending on their size. The distribution is respectively: large dog breeds (over 25 kg) – 40 (48%), medium dog breeds (from 11 to 25 kg) – 23 (28%) and small dog breeds (up to 11 kg) – 20 (24 %).

Of all 83 dogs selected, 61 were recovered and the remaining 22 were lethal or euthanized for medical reasons related to complications from acute pancreatitis. The distribution of deaths as a percentage of reported cases was dominated by mixed breeds and Doberman (50%), followed by German shepherd dog (41.66%) and Rottweiler and Dachshund (40%). Breeds with less than five representatives were not included in the mortality determination. The overall mortality rate in the group was 26.5%.

Discussion

Acute pancreatitis, as a disease in its own right, is a polyetiological but monopathogenetic disease, leading to a variety of functional and humoral, primary and secondary pathological effects on the patient's body, often leading to significant impairment of vital functions, creating a basis for the development of urgent and even critical conditions. (Morozov, 2006).

Most authors working on acute pancreatitis studies in dogs share the view that middle-aged and over middle -aged dogs are most commonly affected by severe (fatal) pancreatitis. (Hess et al. 1999; Kalli et al., 2009). This statement is fully supported by our research. The average age of 5.7 years of the diseased dogs of experimental groups A and B, established by us, corresponds with the understanding of the elderly for most breeds of dogs. The most likely cause of age-related predisposition to severe flowing is background age-related damage to organs and systems not directly related to the pancreas (heart, liver, kidney, etc.). (Hess et al. 1999). Considering the high levels of most organ-specific enzymes in animals included in our study, we are in solidarity with the above assertion of prior damage to these organs. Again, according to Hess et al. (1999), the risk of fatal acute pancreatitis is increased in overweight, diabetes mellitus, hyperadrenocorticism, hypothyroidism, prior gastrointestinal disease, and epilepsy, all of which are characteristic of advanced elderly individuals.

Our studies on breeds burdensome in dogs in Bulgaria do not fully match the claims of Burrows (2004) and Kalli et al. (2009), who put the Mini Schnauzer, Yorkshire Terrier and Sky Terrier breeds at the forefront. The highest incidence of acute pancreatitis (14.5% of all cases) in the German shepherd dog is probably due to the specific breed composition of the canine population in our country. However, the second largest group of terriers (9.6%) somewhat confirms the claims of the above researchers. It should be noted that in the course of our studies, pancreatitis was not diagnosed in the Poodle breed, which is in line with the assertion of Hess et al. (1999) for low risk in this breed.

The processing of our results showed a clear predominance of large breeds of dogs (over 25 kg.) – 48% of all registered cases. The percentage of small dog breeds (up to 11 kg), which are cited in the literature as the most prone breeds of mini-schnauzer, Yorkshire terrier and sky terrier, is only 24% (Hess et al.,1999; Burrows, 2004; Bishop et al., 2007; Kalli et al., 2009). Despite the lack of literature data, we suggest that this significant difference in morbidity is a consequence of significant quantitative and qualitative differences in the dietary regimen of different groups of dogs.

Our predominant percentage of female dogs diagnosed with acute pancreatitis (almost 59%) support the opinion of Cook et al. (1993) and Williams (1996) that female dogs are more likely to develop acute pancreatitis than the rest of the population. The animals included in our study were not castrated, and the results we obtained do not warrant the assertion of Kalli et al. (2009) and Hess et al. (1999) that male and spayed female dogs are at a higher risk of developing fatal acute pancreatitis than intact female dogs. Most likely, at the heart of the above statement is the tendency of

castrated animals to be obese, which is one of the recognized etiological factors for the onset of the disease. (Pápa et al., 2011).

Conclusion

Acute pancreatitis in dogs shows breed, age and sex dependence. The highest incidence of AP in our country is in the German shepherd dog and the cross or mixed breed dogs**.**

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