Research Article

Healthcare

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Types of Stones and their Frequency in Dogs

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Abstract

The purpose of this study is to determine the frequency of stone formation depending on age, breed and sex of dogs, types of stone as well as the impact of food-based diet on their formation. This study was conducted over the period from July 2013 to January 2017 where data were collected on a total 160 cases of dogs with urinary problems and distinct clinical signs in the urinary tract, which were admitted into clinics and hospitals in Tirana district. Of all the cases which were identified with urinary problems and distinct signs of the urinary tract, 14 (9%) of them tested positive for the presence of stones and 146 (91%)of them tested negative. All of the animals examined were broken down into several age groups ranging from 0-5 years old, from 5-9 years old, and those from 9 years old and above. The average age of dogs with uroliths were 5-9 years old or accounting for 55% of all the cases under observation testing positive. Determining the frequency of male dogs against female ones a higher prevalence resulted in male dogs at 9 cases otherwise 64% and in female dogs at 5 cases otherwise 36% respectively. Uroliths from crossbreed, Dalmatians, German shepherd, Yorkshire terrier was calculated in almost 40% of all canine uroliths, with the highest frequency in Dalmatians, which had a predominance of urateuroliths with a percentage of 25%.The most frequently identified materials were struvite which occupy the highest proportion of stones at about 37% of stones found. These were followed by calcium oxalate and uric acid stones standing at 27% respectively. Silicates were found in just one case at 9% of total combined. An important factor contributing to this case was a very concentrated food diet which had a prevalence of 9 case (64 %), 5 was the cases which had been subject to home-based food or (36 %).

Introduction

Uroliths are formed in all the species of domestic animals, and is one of the important lower urinary tract diseases in dogs [1]. Calculi formed in urinary tract are composed of two basic parts, crystals and matrix skeleton. For the formation of stones, urine must be supersaturated. Degree of super saturation depends on the ionic strength of urine; an increase in ionic strength reduces the level of super saturation, and subsequently crystal precipitation [3, 9].

Further binding of urinary proteins on the supporting crystals matrix is a selective process, which depends on the specific composition of the crystalline matrix [7].

The selective incorporation of urinary proteins with in crystalline structure of the calculi could be indicated by the reduction in the excretion of low molecular weight proteins in the urine during the early stages of stone formation [8, 9].

Based on mineral composition, the uroliths are classified as calcium oxalate, calcium phosphate, struvite (magnesium ammonium phosphate), purine, cysteine, and silica uroliths [1, 3, 8]. Formation of uroliths is not a disease but rather a complication of several disorders, which is pretty often a result of a combination of both pathological and physiological factors [10].

Some disorders can be identified and corrected but some can be identified but not corrected, although for others, the underlying etiopathogenesis is not known [1, 2].

The natural progression of the urine chemistry leading to stone formation is urine saturation, super saturation, crystal nucleation, aggregation and retention of crystals by urothelium and the continued growth of the stone on the retained crystals [5, 6, 9].

The kidneys are not the common sites for calculi lodgment in dog , the most of the calculi in dogs are found either in the bladder ore urethra. Urinary tract infection may predispose the urinary tract to the formation of calculi. It may affect the location of calculi. Struvite calculi associated with Staphylococcus aureus urinary tract was located most frequently in urinary blader [2].

Materials and Methods

To accomplish this study, it has been used quantitative research methodology. Sampling of the study was carried out in 10 small clinics and hospitals in Tirana. The subject of the study was all dogs who came to these clinics and hospitals with urinary problems and clinical signs for changes in the urinary tract. All the dogs has been observe for clinical signs consistent with lower urinary tract disease (stranguria, hematuria, pollakiuria). The study was conducted in the period July 2013 - January 2017. Diagnosis is based on a combination of clinical history.

Based on our study was collected a full and adequate history of the dog by the owner of the dog, this to collect as much information as possible. All the information received was transfered to a data system that was then used to calculate the impact of stones at age, race, and sex. Complete animal diagnostics was performed with methods such as urine analysis, urine culture.

Animals that resulted positive with the urinary test and confirmed the presence of the stone were subjected to further medical and diagnostic procedures to certify the type of stone and its composition. Patients with recurrent urinary tract infections should be evaluated to identify and correct underlying risk factors, such as anatomic abnormalities (urachaldiverticuli, vaginal recession, perivaginal dermatitis, neoplasia, polyps, strictures, granulomas).

From the questionnaire were also given important data on the way of feeding dogs which is very important in the impact of the formation and frequency of uroliths in the urinary tract. Finally, from the collection of all data, we carried out statistical processing and output of results.

Results and Discussions

The purpose of this study is to determine the frequency of stone formation depending on age, breed and sex of dogs, type of stones as well the impact of food-based diet on their formation. This study was conducted over the period from July 2013 to January 2017 where data were collected on a total 160 cases of dogs with urinary problems and distinct clinical signs in the urinary tract, which were admitted into clinics and hospitals in Tirana district.

Total	160	100%
Positive (+)	14	9%
Negativ (-)	146	91%

Table 1: Dogs testing positive

Of all the cases which were identified with urinary problems and distinct signs of the urinary tract, 14 (9%) of them tested positive for the presence of stones and 146 (91%)of them tested negative.

Age

All of the animals examined were broken down into several age groups ranging from 0-5 year olds, from 5-9 year olds, and those from 9 year olds and above. It is proven that the highest percentage of dogs falls under the 5-9 year olds or accounting for 64% of all the cases under observation testing positive.

Urolitihiasis has been reported in all ages of canines. Research workers have observed that different age groups in dogs were at high risk for obstructive urolithiasis.

All of the animals examined were broken down into several age groups ranging from 0-5 years old, from 5-9 years old, and those from 9 years old and above. The average age of dogs with uroliths were 5-9 years old or accounting for 64 % of all the cases under observation testing positive. The mean age of veterinary patiens is 3 to 7 years, with a wide range from 1 month to 19 years. Evidence points toward younger animals (< 5 years) having an increased relative risk. The cause for this trend is unknown.

Total	14	100%
0 – 5 old	1	14%
5 – 9 old	9	64%
9 -10 old	3	22%
Over 10 old	0	0%

Table 2: Aged of dogs testing positive

Gender

Determining the frequency of male dogs against female ones resulted in a higher prevalence in female dogs against male ones, with female dogs fixed at 9 cases otherwise 64% and in male dogs at 5 cases otherwise 36 % respectively.

Female have been overrepresented in multiple studies of struviteurolithiasis in both human and veterinary medicine. This may be explained by the increased prevalence of urinary tract infection in female patiens.

The most common urease-producing bacteria associated with struviteurolithiasis in dogs are Staphylococcus pseudintermedius and Proteus spp. Bacteria that occasionally produce urease include Pseudomonas spp, Klebsiellaspp, and Escherichia coli.

Total	14	100%
Female	9	64%
Male	5	36%

Table 3: Gender of dogs testing positive

Breed

Uroliths from crossbreed, Dalmatians, German shepherd, Yorkshire terrier was calculated in almost 79% of all canine uroliths, with the highest frequency in Dalmatians, which had a predominance of urateuroliths with a percentage of 36%. Dalmatian dogs are predisposed to urateuroliths because their ability to oxidize uric acid to allontoin is intermediate between non – Dalmatioandogs. This characteristic is due to an autosomal recessive trait.

All non – Dalmatian dogs have a serum uric acid concentration of less than 0.5 mg/dl, and excrete approximamately 10 to 60 mg of uric acid in their urine per day.

Dalmatian dogs have a serum uric acid concentration that is two to four times that of non – Dalmatian dogs and excrete more than 400 to 600 mg of uric acid in their urine per day.

Total	14	100%
Crossbreed	4	29%
German shepherd	1	7%
Yorkshire terrier	1	7%
Dalmatian	5	36%
Poodle	1	7%
Penkinese	1	7%
Labrator retriever	1	7%
Miniature schnauzer	0	0

Table 4: Breed of dogs testing positive

Stone

The most frequently identified materials were struvite which occupy the highest proportion of stones at about 50% of stones found. These were followed by calcium oxalate 22% and uric acid stones standing at 21% respectively. Silicates were found in just one case at 7% of total combined.Struvite calculi are usually associated with bacterial urease production in dogs.

Total	14	100%
Struvite	7	50%
Calcium Oxalate	3	22%
Silicate	1	7%
Uric acid	3	21%

Table 5: Type of stone

Uroliths occur in up to 25% of dogs and they can have up to 3 or more episodes during their life. Recurrence is more likely in dogs with metabolic uroliths (i.e. calcium oxalate, urate and cystineuroliths) or where there is a breed predisposition.

Conclusions

This was a partial study which was conducted over a period about four years. The purpose of this study was to determine the frequency of stone formation depending on age, breed and sex, type of stones on dogs. The data were collected on a total 160 cases of dogs with urinary problems and distinct clinical signs in the urinary tract, which were admitted into clinics and hospitals in Tirana district. There is no single cause of canine urolithiasis. Yet, there are a number of important factors. Urolithiasis may appear in your dog when it is less than two months old, but most stones occur in dogs two to ten years of age. Female have been overrepresented in multiple studies of struviteurolithiasis in both human and veterinary medicine. This may be explained by the increased prevalence of urinary tract infection in female patiens. Small breeds, including the Welsh Corgi, Miniature Schnauzer, Pug, Lhasa Apso, Pekingese and Yorkshire Terrier are more commonly affected than are large breeds. The Beagle, Dachshund, Dalmatian, Bulldog, Basset Hounds, Cairn Terrier and Scottish Terrier are also susceptible. The most frequently identified materials were struvite which occupy the highest proportion of stones. This study will carry on beyond this current scope so as provide more to determine the frequency of stone formation depending on age, breed and sex of dogs, type of stones as well the impact of food-based diet on their formation.

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