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Occurrence of renal failure in Labrador dogs at PGIVER Jaipur and its relation with age, sex and body weight

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Abstract

The present study entitled “Studies on Renal Failure in Dogs with Special Reference to Ultrasonography” was carried out to find out the occurrence; evaluate blood/serum biochemical parameters, Ultrasonographic examination was done for measurement of size of kidneys and correlation between size of kidney and serum creatinine level on renal failure dogs. 302 Labrador dogs were presented in the Department of Veterinary Clinical Complex, PGIVER, Jaipur (Rajasthan) out of these 302 Labrador dogs, 23 Labrador dogs were found positive for renal failure on basis of azotemia [creatinine concentration more than 2mg/dl and BUN more than 30mg/dl]. The occurrence of renal failure for Labrador dogs was calculated as 7.61% (23/302) in the cases presented in the Department of Veterinary Clinical Complex, PGIVER, Jaipur. Age wise occurrence of renal failure in Labrador dogs was recorded higher in >7 years of age group (61%) and followed by <7 years of age group (39%), Sex wise occurrence of renal failure in Labrador dogs was higher in male (56.53%) as compared to females (43.57%) and body weight wise occurrence of renal failure in Labrador dogs was higher in >25kg of body weight group (65.22%) and followed by < 25 kg of body weight group (34.78%).

Keywords: Renal failure, age, sex, occurrence, Labrador

Introduction

Dog, in their life span, suffer from many bacterial, viral, protozoal, nutritional deficiency and systemic diseases (Chandler *et al.* 1979) [3]. Kidney diseases are still one of the most common life disorders in adult and older dogs (Patil, 2011) [14]. Kidneys serve as the principal organ in maintenance of homeostasis, elimination of metabolic waste products of the body (such as urea, creatinine, uric acid and ammonia), regulation of extra-cellular fluid volume, blood pressure (by the rennin-angiotensin system) and systemic pH (via regulation of H⁺ and HCO₃⁻ concentration). In addition, kidneys play integral role in the excretion of phosphorus, reabsorption of calcium, renal metabolism of vitamin D as well as regulation of erythrocyte mass under influence of renal erythropoietic factor (Cortan and Kumar 1999, Sebastian *et al.* 2007) [4, 16]. Renal failure is the most common and fatal condition occurring in 2 to 5% of dogs (Lund *et al.* 1999) [11]. The mean age of diagnosing renal disorder in dogs is about 6.5 years with 45% of cases. The kidneys have a tremendous reserve capacity, but when the number of functional nephrons drops below 25% or when the damage occurs too suddenly, renal failure may occur. Renal diseases or disorders refer to presence of morphologic or functional lesions in one or both kidneys, regardless of extent (Di Bartola, 2005) [6].

Material and Methods

The present study entitled Studies on Renal Failure in Dogs with special reference to Ultrasonography was undertaken during the research period.

The work was conducted at the Department of Veterinary Medicine in collaboration with Veterinary Clinical Complex (VCC), Department of Veterinary Physiology and Biochemistry and Veterinary Clinical Diagnostic Laboratory Section of Veterinary Clinical Complex, Post Graduate Institute Veterinary Education and Research (PGIVER), Jaipur, Rajasthan.

Animals

Total 302 Labrador dogs were presented in Veterinary Clinical Complex, PGIVER Jaipur

during study period. Out of these 302 dogs, 23 dogs were found positive for renal failure on basis of azotemia [creatinine concentration more than 2mg/dl and BUN more than 30mg/dl, (Srivastava *et al.*, 2011) ^[20].

Out of these 23 dogs, 12 dogs were selected randomly [(according to sex- 6 male and 6 female), (according to age- 6 dogs between 0 to 7 years of age and 6 dogs above 7 years of age) and (according to body weight- 6 dogs between 0 to 25 kg body weight and 6 dogs above 25 kg body weight)] and included in this study and designated as group I & II according to sex, group III & IV according to age and group V & VI according to body weight respectively.

Twelve healthy dogs [(according to sex- 6 male and 6 female), (according to age- 6 dogs between 0 to 7 years of age and 6 dogs above 7 years of age) and (according to body weight- 6 dogs between 0 to 25 kg body weight and 6 dogs above 25 kg body weight)] negative for renal failure after biochemical analysis were included and designated as group A & B according to sex, group C & D according to age and group E & F according to body weight, respectively (control

group). Case record of every dog was maintained separately with serum biochemical profile and ultrasonographic findings.

Sampling

Collection of samples

Blood samples were taken in non heparinized tubes (5ml for each) for biochemical parameters. Serum from each sample was separated from vial having no anticoagulant by keeping the vial in slanting position for 1 hour at room temperature. Then centrifuged at 3000 rpm for 10 minutes and separated serum was collected in duly labelled screw cap vials and were immediately shifted and kept stored at -20 °C till analysis.

Analytical Procedure

Biochemical analysis

Biochemical parameters *viz.* Serum Creatinine, Blood Urea Nitrogen (BUN) were estimated using Automatic Blood Biochemistry Analyzer (Turbo Chem. 100), by the reagents supplied by CPC diagnostics, Chennai at the Department of Veterinary Physiology and Biochemistry, PGIVER, Jaipur.



Plate 1: Various reagent kits of analyzer



Plate 2: Blood Biochemistry Analyzer

Statistical analysis

The statistical analysis of collected observations will be done as per methods described by Snedecor and Cochran (2004) ^[19].

Result and Discussion

The occurrence of renal failure for Labrador dogs was calculated as 7.61%. Highest frequency (61%) was recorded in above 7 years of age group followed by 0 to 7 years of age group (39%) (Table No 1). The age wise occurrence of renal

disorders was in accordance with Ahmed (2011) ^[1], Girishkumar *et al.* (2011) ^[7], Kavitha *et al.* (2013) ^[9], Kandula and Karlapudi (2014) ^[8], Oburai *et al.* (2015) ^[13], Sharma *et al.* (2015) ^[17], Tufani *et al.* (2015) ^[22] and Devipriya *et al.* (2018) ^[5], who observed that renal disorders are more common in dogs of above 7 years of age. Mallela *et al.* (2006) ^[12] found that risk associated with renal disorders were more in dogs of older age (6-8 years). Polzin *et al.* (1989) ^[15] mentioned that 15% dogs of above 10 years of age were affected with renal impairment. Higher risk of renal failure associated with aged dogs could be due to loss of nephron with the advancement of age. Males were found to be more prone for the development of renal failure, constituting 56.53% of the total positive dogs, whereas females contributed for 43.57% (Table No. 2). The sex wise prevalence for renal failure in canine was in accordance with the findings of Ahmed (2011) ^[1], Tufani *et al.* (2015) ^[22], Oburai *et al.* (2015) ^[13], Sharma *et al.* (2015) ^[17] and Devipriya *et al.* (2018) ^[5]. Higher prevalence of renal failure in male dogs could be due to more risk associated with urolithiasis in male than female due to several anatomic characteristics (Bjorling, 2003) ^[2]. However this is in contrast with the findings of Kandula and Karlapudi (2014) ^[8], who observed higher prevalence in female dogs (63.16%) compared to that of male (36.84%) dogs in a study conducted on a total of 237 dogs. However, Shizuo (1995) ^[18] and Tilley

and Smith (2007) [21] did not find relation of sex with occurrence of renal failure in dogs. Highest frequency (65.22%) was recorded in above 25kg of body weight group followed by 0 to 25 kg of body weight group (34.78%) (Table No. 3). According to Kovesdy *et al.* (2017) [10] who stated that a high body mass index is one of the strongest risk factor for chronic kidney disease. It is due to increase in intraglomerular pressure can damage the kidney and raise the developing chronic kidney disease.

Table 1: Age wise occurrence of renal failure in Labrador dogs

| S. No. | Age group (years) | Number of dogs positive for renal failure | Prevalence |
|--------|-------------------|---|------------|
| 1 | 0 to 7 | 9 | 39% |
| 2 | Above 7 | 14 | 61% |
| | Total | 23 | 100 |

Table 2: Sex wise occurrence of renal failure in Labrador dogs

| S. No. | Sex group | Number of dogs positive for renal failure | Prevalence |
|--------|-----------|---|------------|
| 1 | Male | 13 | 56.53% |
| 2 | Female | 10 | 43.57% |
| | Total | 23 | 100 |

Table 3: Body weight wise occurrence of renal failure in Labrador dogs

| S. No. | Sex group | Number of dogs positive for renal failure | Prevalence |
|--------|-------------|---|------------|
| 1 | Below-25 kg | 8 | 34.78% |
| 2 | Above 25 kg | 15 | 65.22% |
| | Total | 23 | 100 |

Conclusion

Occurrence of renal failure in Labrador dogs was 7.61% (23/302) in the cases presented in the Department of Veterinary Clinical Complex, PGIVER, Jaipur. Occurrence of renal failure was highest (61%, 14/23) in age group > 7 years, sex wise (56.53%, 13/23) in male and body weight wise (65.22%, 15/23) in body weight above 25 kg.

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