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Incidence of renal disorders in canines and its relation with age breed and sex

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Abstract
Present study was conducted in the Division of Medicine, Indian Veterinary Research Institute, Izatnagar. The aim of the study was to evaluate relationship of three variables age, sex and breed with regard to incidence of renal disorder in dog. Overall incidence of renal disorders was 12.03%. The incidence increased with advancement of age as 17 (1.79%), 32 (7.58%), 42 (15.73%) and 23 (33.33%) dogs in the age groups of < 6 years, 6 -10 years, 10-14 years and >14 year, respectively were suffering from renal disorders. The breed wise distribution of renal disorders in dogs is shown in Table 2. The highest incidence was noted in Labrador dogs (21.73%), followed by Dalmatian (18.18%), Bulldog (15.9%), Bhutia (14.8%), German shepherd (13.76%), Rottweiler (13.6%), Great Dane (12%), mixed breed (11.7%), Doberman (8.57%) and Pomeranian (7.9%). Interestingly lowest incidence was recorded in mixed breed (11.7%), Doberman (8.57%) and Pomeranian (7.9%). From above study it can be concluded that age and genotype has an important role in incidence of renal diseases in canines, the present study can serve as a model for study of renal disorders in humans.

Keywords: canine, renal failure, age, breed and incidence

1. Introduction
Aging is a universal phenomenon that can be either programmed (intrinsic) or stochastic (Extrinsic). It is a complex multifactorial process that results in heterogeneous patterns of progressive morbidity and disability (Rowe *et al.,* 1983) [9]. With aging there occur metabolic derangements with decreased organ function so organ function and energy expenditure can serve more valid determinant of geriatrics (Greenberg *et al.,* 2000) [2]. Aging is routinely associated with a deterioration of insulin sensitivity, glucose tolerance (Rowe *et al,* 1983) [9] and leptin sensitivity (Scarpace *et al,* 2000) [12] which affects various vital organs (Reaven, 1992) [10]. Natural age-related renal changes are similar to those identified in chronic kidney diseases not related to ageing. It is characterized by atrophy of renal cortex (Rodrigez- Puyol, 1998), Progressive mesangial matrix enlargement and arteriolar hyalinization (Tracy *et al.,* 2002) [13]. Keeping in view the importance of renal failure in small animals and age related renal changes resembling in progression and clinical presentation of chronic renal failure in all age groups. The present study was designed to study role of age, sex and breed on incidence of renal failure to have better understanding of disease in relation to these variables. The present study has potential to serve as a model for progression and clinical presentation of chronic renal failure in animals

2. Material and Methods
Present study was conducted in the Division of Medicine, Indian Veterinary Research Institute, Izatnagar from May 2012 to July 2013. The aim of the study was to evaluate relationship of three variables age, sex and breed with regard to incidence of renal disorders in dog. For incidence study the parameters undertaken were clinical signs, biochemical changes in blood and urine, and ultrasonographic examination. The animals diagnosed for renal disorders were subsequently grouped according to age, breed and sex to find influence of these variables on the occurrence of the renal failure. Health status of canines was were defined based on history, physical examination, CBC, biochemistry and urinalysis standard values established for particular species. Dogs were included in renal failure group if they were azotaemic if anamnesis and clinical signs were consistent with renal disease (reference intervals for urea and creatinine are 3·3 to 8 mmol/L and 36 to 120 μmol/L, respectively as per International renal interest society classification of renal diseases).

3. Result and Discussion

Distribution of renal disorders according to age is given in Table 1. The overall incidence of renal disorders was 12.03%. The incidence increased with advancement of age as 17 (1.79%), 32 (7.58%), 42 (15.73%) and 23 (33.33%) dogs in the age groups of < 6 years, 6 -10 years, 10-14 years and >14 year, respectively were suffering from renal disorders. The age distribution in renal failure shows a peak level in the age (above10 years) represented by 65 (57.01%) of patients and the least was in the age group between age of (0 to 6) years represented by 17 (14%) of total animals with renal failure. Results showed that incidence of renal disorders increases with advancement of age. Increased incidence of renal failure with advancement of age is supported by earlier finding (Gobar *et al.,* 1998) [4]. Current study of incidence of renal diseases (15.73%) in dogs between ages of 10-14 years is in concurrence with study in a US university hospital where 15% of dogs more than 10 years of age were observed to suffer from renal failure (Polzin *et al.,* 1989). This might be due to decreased blood flow to the kidneys and loss of filtering cells (Polzin, 1990) [7], impaired resorption processes in the nephrons (Grauer and Lane, 1995) [3], decrease in concentrating ability and Morphological changes Polzin, (1990) [7] Finco, 1997 observations include shrinkage of nephron size with aging in dogs after 7 years of age. All these factors contribute to greater chances of renal dysfunction with the advancing age.

The breed wise distribution of renal disorders in dogs is shown in Table 2. The highest incidence was noted in Labrador dogs (21.73%), followed by Dalmatian (18.18%), Bulldog (15.9%), Bhutia (14.8%), German shepherd (13.76%), Rottweiler (13.6%), Great Dane (12%), mixed breed (11.7%), Doberman (8.57%) and Pomeranian (7.9%). Interestingly lowest incidence was recorded in mixed breed (11.7%), Doberman (8.57%) and Pomeranian (7.9%). The breed wise distribution of renal disorders showed highest incidence of renal disorders in Labrador, Dalmatian and Bulldog and lowest in mixed breed, Doberman and Pomeranian. While the sex wise occurrences of renal disorders were 42.98% in male and 57.02% in female. Out of 114 dogs, 49 male (42.98%) and 65 female (57.02%) dogs were confirmed for renal disorders indicating higher prevalence of renal diseases in females than males. However, a British survey indicated that 0.2% of dogs were presented with suspected renal disease, they found no evidence of breed or sex predisposition (Mac Dougall *et al*., 1986) [5]. In another report it was observed that no predisposition of sex in occurrence of renal disorders in canine (Polzin *et al.,* 1989). The lowest incidence of renal disorders in mixed breed, Doberman and Pomeranian might be due to their genetic makeup to sustain the aging effects on kidney and adaptation to local environmental conditions.

Table 1: Age wise incidence of renal disorders in dogs

Groups	Total No. of cases	No of cases with renal disorders	%Incidence
A1 (less than 6 years)	189	17	8.90
A2 (6 to 10 years)	422	32	7.58
A3 (10 to 14 years)	267	42	15.73
A4 (above 14 years)	69	23	33.33
Total	947	114	12.03

Table 2: Breed wise and sex wise incidence of renal disorders in dogs

Breed	Total no of cases	No of cases with renal disorder			Incidence %		
		Male	Female	Total	Male	Female	Total
German Shepherd	138	9	10	19	6.52	7.24	13.76
Great Dane	83	5	5	10	6.02	6	12
Labrador	69	9	6	15	13.04	8.6	21.73
Dalmatian	44	2	6	8	4.5	13.6	18.18
Doberman	105	2	7	9	1.9	6.66	8.57
Bhutia	27	1	3	4	3.7	11.11	14.8
Bulldog	44	4	3	7	9	6.8	15.9
Pomeranian	265	8	13	21	3	4.9	7.9
Rottweiler	44	3	3	6	6.8	6.8	13.6
Mixed Breed	128	7	9	16	5.4	7	11.7
Total	947	49	65	144	5.17	6.8	12.03

4. Conclusion

It is concluded that age and genotype and sex has an important role incidence of renal disease in canines, the present study can serve as a model for study orenal disorders in other animals. However, further investigations involving large population size is warranted to substantiate this finding.

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