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Occurrence of urinary tract infection in different breed, gender and age of dogs in and around Bangalore

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Abstract
Urinary tract infections (UTIs) typically result from normal skin and GI tract flora ascending the urinary tract and overcoming the normal urinary tract defenses that prevent colonization. Bacterial UTI is the most common infectious disease of dogs, affecting 14% of all dogs during their lifetime. The main objective of the study was to identify the agewise, breed-wise and gender-wise occurrence of urinary tract infection from the dogs that were presented to Veterinary College Hospital, Banglore during the study period from July 2022 to December 2022. A total of 2545 dogs were presented to the Veterinary College Hospital during the study period, out of these 65 dogs were considered for the study with clinical signs and history suggestive of UTI and having more than 103 cfu/ml on quantitative urine culture. Urinalysis and sonographic changes were evaluated. Maximum occurrence of urinary tract infection was found in dogs between the age of 1 - 3 years (36.92%). Most common breed of dog with urinary tract infection identified in this study was Labrador retriever (20.00%). Female dogs (55.384%) showed higher occurrence than male dogs (44.615%).

Keywords: Urinary tract infection, age, breed, gender

1. Introduction
Urinary tract infection is one of the life threatening diseases affecting dogs but with proper antibiotic treatment, it can be cured in its earlier stages. Urinary tract infection (UTI) included urolithiasis, prostatitis, septicemia and pyelonephritis with scarring and eventually kidney failure. In intact male dogs, Urinary tract infection frequently extends to the prostate gland (Yogeshpriya *et al*., 2018) [3]. Urinary tract infections are commonly seen in dogs all around the world, with an occuurence of 5–30 per cent. Urinary tract infection (UTI) occurs when there is a compromise of host defense mechanisms so that, virulent microbe adheres, multiplies, and persists in a portion of the urinary tract (Olin and Bartges, 2015) [7]. Urinary tract infection can occur at any stage in their life, but most commonly occur in adult animals (Ling *et al*, 2001) [10]. Age and sex are contributing factors to the occurrence of UTIs (Yuri *et al*, 2022) [24]. Urinary tract infection was found to be more common in female than in male dogs. Older animals are at increased risk of Urinary tract infection (Kumar and Kamran, 2016) [1]. Wong *et al.* (2015)13 studied the breed predisposition of dogs and reported the highest occurrence in Labrador Retrievers (14.4%), followed by German Shepherd breed (4.3%), Golden Retriever (4.3%), and Dachshund (4%) respectively. The most important clinical signs of urinary tract infection include stranguria, hematuria, dysuria, anuria, and pollakiuria (Westropp *et a*l., 2012) [6]. The present study was conducted to ascertain the prevalence of urinary tract infections among dogs of different breed, sex and age that were admitted to the University Veterinary College Hospitals at Hebbal, Banglore, during 6 month period from July 2022 to December 2022. Also, study urinalysis and ultrasonographic findings of dogs affected with Urinary tract infection.

2. Materials and Methods
The study was conducted in the Veterinary College Hospital, Hebbal, Bangalore during the period of July 2022 to December 2022. Dogs brought to the Veterinary College Hospital, Banglore with clinical signs suggestive of urinary tract infections and having more than 10^3 cfu/ml on quantitative urine culture were selected and utilized for the present study. A total of 2545 cases, 72 cases with clinical signs suggestive of urinary tract infections was found and among that 65 cases were confirmed as urinary tract infection based on quantitative urine culture, urinalysis and sonography were selected for the present study.

Occurrence of urinary tract infection during the time period of study is noted in breed, age and gender wise categories.

2.1 Clinical Examination
Each dog was subjected to a detailed clinical examination and thoroughly evaluated for its general condition, inspection of mucous membranes, hydration status, clinical signs suggestive of urinary tract infection and subjected through physical examination, urinalysis, ultrasonographic examination and quantitative urine culture.

2.2 Sample collection
From July 2022 to December 2022, 65 urine samples considered for the study were collected aseptically through cystocentesis from dogs that were clinically suspected with urinary tract infection in sterile test tubes. Each sample was labeled with an identification number and date of collection. The samples were immediately transported to the laboratory for analysis.

Hospital records of Veterinary College, Hebbal, Bangalore for a period of 6 months from July 2022 to December 2022 were screened for determining the age-wise, breed-wise and gender-wise occurrence of urinary tract infection in dogs Descriptive statistics such as simple frequency, percentage and mean used and data was presented by tables.

3. Result and Discussion
Out of 2545 dogs presented to the Veterinary College Hospital, Hebbal, 65 dogs were diagnosed based on clinical signs, urinalysis and quantitative urine culture were selected for the study.

3.1 Age-wise occurrence of urinary tract infection in dogs
According to the study, urinary tract infections were most common in the age group between 1 and 3 years followed by 3 to 6 year aged dogs. Maximum occurrence of urinary tract infection was found in dogs between the age of 1-3 years (36.92%), followed by dogs above 3- 6 years (30.77%). Dogs between > 6 to 9, > 9 to 12 and > 12 years of age have 16.92%, 13.84%, 1.54% of occurrence for urinary tract infection respectively. This study was supported by the previous study by Corriere *et al*. (1972) [9] who detected higher occurrence of urinary tract infection in younger dogs. In the present investigation occurrence of urinary tract infection was highest in the age group between 1 to 3 years which was contradictory to the previous finding of other studies reported more occurrence of positive urine culture in older dogs (Ling *et al*., 2001; Hall *et al*., 2013) [10, 11]. Whereas, Cetin *et al.* (2003) [4] reported that age and gender were not related to the prevalence of urinary tract infections. The high occurrence of urinary tract infection in the age range of 1-3 years in the current study may be because, these age group of dogs were presented at a higher rate to Veterinary College Hospital in Bangalore, during the study period and also may be the higher incidence of urethrovesical reflux in young dogs according to Kivisto *et al.* (1977) [12]. Immediately after micturition, urethrovesical reflux forces the urethra and bladder neck to retrogradely close, which increase the bacterial colonisation and leads to the urinary tract infection development (Corriere *et al*., 1972) [9].

3.2 Breed-wise occurrence of urinary tract infection in dogs
Out of 65 dogs with urinary tract infection, 13 were Labrador Retrievers (20.00%), 10 were Pug (15.38%), 8 were German Shepherd and ShihTzu (12.307%), 6 were Non-descript (9.230%), 5 were Golden Retriever (7.692%), 3 were Spitz (4.615%), 2 each were Boxer and Rottweiler (3.076%) and 1 each were Doberman (1.538%), Siberian Husky (1.538%), Beagle (1.538%), Cocker Spaniel (1.538%), Tibetan terrior (1.538%), Daschund (1.538%), Poodle (1.538%) and Great Dane (1.538%). The results of this study showed highest occurrence of urinary tract infection in Labrador Retriever (20.00%) followed by Pug (15.384%), German Shepherd and ShihTzu (12.307%). Similar to this study Wong *et al* (2015) [13] and Sanchez *et al*. (2019) [14] also reported the highest occurrence of urinary tract infection in Labrador Retriever and German Shepherd. The high occurrence of urinary tract infection in Labrador Retriever can be due to the highest presentation of this particular breed to the hospital and presence of more population of the breed due to owner preference for that breed in the study area. The present study is in contrast to the Macotpet *et al*. (2009) [15], Hall *et al* (2013) [11], Adamama *et al* (2017) [16] and Liebelt and Pigott (2019) [17] who reported highest prevalence of urinary tract infection in nondescript dogs. Some breeds are more likely to have positive urine cultures than others, and some breeds may be more susceptible to recurring UTIs and it depends on the variation in anatomy and disease susceptibility of a particular breed (Hall *et al*., 2013) [11].

3.3 Gender-wise occurrence of urinary tract infection in dogs
In the current investigation, the distribution of urinary tract infection recorded among female dogs (55.384%) affected with urinary tract infection was higher than that of the male dogs (44.615%). The present observations agree with the earlier findings of Ling *et al*. (2001) [10], Ball *et al*. (2008) [18] and Hall *et al*. (2013) [11]. Lippi *et al.* (2019) [2] and Wynn *et al.* (2016) [19] also reported 55.55 per cent and 66.66 per cent of female dog with urinary tract infection in their studies respectively. Kogika *et al*. (1995) [20] and Gaeta *et al*. (2012) [21], recordings contradict with the present study in that they noted a highest prevalence of UTI with positive urine culture among male dogs than female dogs. Whereas, Yuri *et al*. (1996) [22], Cetin *et al.* (2003) [4] and Burton *et al*. (2017) [23], contend that there was no gender preference related to the occurrence of UTI. Higher occurrence of urinary tract infection in females can be because of its anatomical peculiarities. Anatomical abnormalities such as hooded vulva, vagina stenosis, vestibule and ectopic ureters have been observed as predisposing factors for development of recurrent UTI in female dogs (Seguin *et al*., 2003) [5]. Several studies reported that the higher occurrence of UTI in bitches might be due to the shorter and wider urethra of female dog which cause more exposure of faecal germs to the urinary bladder (Burton *et al*., 2017) [23].

Table 1: Age wise occurrence of UTI in dogs

Age Group (Years)	No. of urine samples Examine d (n=65)	(%) Percentage
1 to 3	24	36.92
>3 to 6	20	30.77
>6 to 9	11	16.92
>9 to 12	9	13.84
>12	1	1.54
Total	65	100

Table 2: Breed wise occurrence of UTI in dogs

Breeds	No. of urine samples Examined (n=65)	(%) Percentage
Labrador Retriever	13	20
Pug	10	15.384
German Shepherd	8	12.307
Shih Tzu	8	12.307
Non descript	6	9.230
Golden Retriever	5	7.692
Spitz	3	4.615
Boxer	2	3.076
Rottweiler	2	3.076
Doberman	1	1.538
Siberian Husky	1	1.538
Beagle	1	1.538
Cocker Spaniel	1	1.538
Tibetan terrior	1	1.538
Daschund	1	1.538
Poodle	1	1.538
Great Dane	1	1.538
Total	65	100.00

Table 3: Gender wise occurrence of UTI in dogs

Sex	No. of urine samples examined	(%) Percentage
Male	29	44.615
Female	36	55.384
Total	65	100.00

4. Conclusions

The present study on the occurrence of urinary tract infection in dogs in and around Bangalore revealed the highest occurrence of urinary tract infection among younger dogs aged between 1 to 3 years of age. Maximum occurrence of urinary tract infection was seen among Labrador Retrievers in the study. Female dogs are most commonly affected with urinary tract infection than male dogs in this study.

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