International Journal of Veterinary Sciences and Animal Husbandry

**ISSN:** 2456-2912
NAAS Rating (2025): 4.61
VET 2025; 10(10): 40-44

www.veterinarypaper.com
Received: 11-08-2025
Accepted: 10-09-2025

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# Incidence of lower urogenital tract diseases in male dogs

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**DOI:** https://www.doi.org/10.22271/veterinary.2025.v10.i10a.2599

**Abstract**
A total of 915 dogs were presented to the small animal surgical ward of Department of Veterinary Clinical Complex, College of Veterinary Science, Tirupati, for a period of one year, among which 5.35% (N=49) dogs were presented with lower urogenital disorders. Among the total number of cases presented with urogenital disorders in male dogs, only cases presented with lower urinary tract and genital diseases were included in the study. Age wise, etiology wise, breed wise, organ wise incidence was recorded and analyzed.

**Keywords:** LUTD, incidence, lower urogenital disorders, male dogs

## Introduction
Several disorders of the lower urogenital tract reported in male dogs are predominantly seen due to their anatomical features as well as foetal development. Most disorders of the urinary tract are often related to prevention of emptying of the bladder due to partial or complete blockage of urethra. The anatomical proximity of the lower urinary system and genital structures contribute to a wide range of presenting symptoms, which might appear similar for different diseases and disorders of the lower urogenital tract. Diagnostics are imperative for lower urinary and genital tract infections, *viz*., urinalysis, urine culture, complete blood count, blood chemistry profile, digital rectal palpation, abdominal survey and contrast radiographs, and abdominal ultrasound (Bartges *et al*. 2004) [3].

## Material and Methods
The present study was carried out on male dogs of different age groups, different body weights and of various breeds presented with lower urogenital affections to Department of Veterinary Clinical Complex College of Veterinary Science, Tirupati from December 2022 to November 2023.
A total of 915 dogs were presented to the small animal surgical ward during a period of one year, among which 5.35 % (N=49) dogs were presented with lower urogenital disorders. Among the total number of cases presented with urogenital disorders in male dogs, only cases presented with lower urinary tract and genital diseases were included in the study. Cases suffering with concurrent disorders of the circulatory system and renal failure were not included in the study.

## Results and Discussion
A total number of 49 cases with primary complaint of lower urogenital disorders were included in this study. Penis and prepuce were the organs recorded as mostly affected in this study. The details of organ wise incidence was presented in Table 1 and Plate 1. The condition wise details of lower urogenital affections are presented in plate no. 2. Highest incidence was seen in the age group of 0-3 (30.61 %; N=15), and least in the age group of 12-15 years (4.08 %; N=2). The details of age wise incidence were presented in Table 2 and plate 3. Among various breeds, highest incidence was seen in non-descript breed of dogs (36.73 %; N=18). The details of breed wise incidence are presented in Table 3 and Plate 4.

Selected cases presented with lower urogenital affections in male dogs were grouped according to the anatomical structure affected and were treated accordingly. Absence of the scrotal sac and agenesis of penis and prepuce with hypospadias were the congenital anomalies recorded in the study (4.08%; N-2). Ectopic testis with or without concurrent abnormality was the developmental anomaly recorded in four cases (8.21 %; N=4), whereas, acquired affections included cystic calculi (14.28 %; N=7), TCC (2.04 %; N=1), cystitis (6.12 %; N=3), cystorrhexis (2.04 %; N=1), urethral calculi (2.04 %; N=1), affections of the prostate (12.24 %; N=6), affections of testis (6.12 %; N=3), affections of the scrotal sac (14.28 %; N=7), and conditions involving the penis and prepuce (28.57 %; N=14).

Mean, standard error of mean, median and standard deviation for organ, age and breed wise incidence in the study was calculated and is presented in Table 4.

Forty-nine cases were included in the study, out of which affections involving the penis and prepuce accounted to 30.61% which is the highest in organ wise incidence. It was also the highest in the age group of 0-3 years. Boothe (2003) [7] opined that the anatomical location and its exposure to environment made the penis relatively accessible to injury during mating, dog fights, fence jumping and automobile accidents, which explains the highest incidence. Viral papillomas are also commonly seen in young non-descript breed of dogs which can be attributed to indiscriminate mating habits (Cornegliani *et al*. 2007; Kwon *et al*. 2016) [10, 24]. Highest incidence seen in non-descript dogs might be attributed to the number of stray dogs in the region or to the fact that the owner owned dogs are allowed to roam around in the locality. This also explains the reason for low incidence of lower urogenital tract diseases in other breeds of dogs.

Affections of the urinary bladder was the next highest among organ wise incidence of lower urogenital affections. This was uniformly distributed among various breeds of dogs included in the study. This might be attributed to the etiology of the urinary bladder affections, which were mostly related to genetic predisposition, environmental factors or food given to the dogs (Kelly, 1973; Mutsaers *et al*. 2003, Angel-Caraza *et al*. 2010; Tasaki *et al*. 2013; Fulkerson and Knapp, 2015; Knapp, 2020 and Brooks, 2023) [20, 31, 30, 43, 15, 8]. Iatrogenic affections were also recorded by Shulz *et al*. (1996) and Gannon and Moses (2002) [16]. Traumatic injuries might also contribute to the affections of the urinary bladder (Mendoza-Lopez *et al*. 2017) [30].

The selected cases were included according to the anatomical structure involved, as the symptoms were dependent on the structure in close anatomical proximity. Among the 49 cases presented, congenital abnormality was observed only in two cases and developmental anomalies were seen in four cases. Congenital gonadal agenesis with abnormal external and internal genitalia is attributed to the lack of action of testicular developmental factors. Functional testicular tissue in early foetal life is essential for Sertoli cells to secrete anti-mullerian hormone, and for Leydig cells to produce androgens to induce differentiation of wolffian ducts, the urogenital sinus and external genitalia (Lyle, 2007; Petersen *et al*. 2008; Bader *et al*. 2011; and Rey and Grinspon, 2011) [28, 35, 2, 37]. Normal embryological closure of the genital folds over the penis does not occur resulting in a deficient prepuce and failure of preputial fusion accompanies hypospadias and underdeveloped or absence of penis (Boothe *et al*. 2003) [7].

Cryptorchidism, on the other hand, is a congenital defect known to be inherited as a sex-linked autosomal recessive polygenic trait (Romagnoli *et al*. 1991 and Boothe *et al*. 2003) [39, 7] and hence the dog should not be bred to prevent propagation of the trait and to avoid further development of undescended testis into neoplasia.

Among the acquired affections, diseases of penis prepuce were highest in incidence, followed by affections of urinary bladder, scrotal sac, prostate gland, testis and the urethra respectively. In urolithiasis, sustained alteration in urine composition promoting supersaturation of one or more substances eliminated in urine, resulted in their precipitation and subsequent growth (Lulich and Osborne, 1995; Bartges and Lane, 2003) [27, 4]. The calculi formation might be favored by changes to $P^H$ of urine into either alkalinity or acidity (Osborne *et al*. 1972 and Bojrab, 1975) [32, 6]. Formation of uroliths in dogs might be idiopathic, or related to metabolic disorders, consumption water from aquifer mantles, or absence of *Oxalobacter forgimenes* bacteria in gastrointestinal tract (Angel-Caraza *et al*. 2010; Osborne *et al*. 2010; and Gnanandarajah *et al*. 2012) [1, 33, 30]. Knapp *et al*. 2000 [22] and Mutsaers *et al*. 2003 [31] attributed appearance of TCC of urinary bladder to a genetic predisposition.

Obstructive urethrolithiasis was the only affection of the urethra recorded in the study. The other conditions affecting the urethra as reported by Polzin and Jeraj (1979) [36], Selcer (1982) [40], Rieser (2005) [38], Lee *et al*. (2010) [25], Mendoza-Lopez *et al*. (2017) [30], Kim *et al*. (2022) [21], and Lulich (2022) [26] were urethritis, traumatic lacerations, obstruction of urethra, urethrocutaneous fistula, urethral stenosis and urethral tumours.

Benign prostatic hyperplasia was the condition recorded among the prostatic affections in the study. The incidence of prostatic hyperplasia was seen in uncastrated male dogs above nine years of age in various breeds of dogs which was in accordance to Krawiec and Heflin (1992) [23], Black *et al*. (1998) [5], Cornell *et al*. (2000) [11], Dhivya *et al*. (2012) [12], Claudia *et al*. (2017) [9], Mendoza-Lopez *et al*. (2017) [30] and Golchin-Rad *et al*. (2019) [18]. Prostatic hyperplasia might be attributed to continued expansion of the gland throughout the life of animal (Parry, 2007) [34], increase in estrogen levels (Mendoza-Lopez *et al*. 2017) [30] and dihydrotestosterone (Sirinarumitr *et al*. 2001 and Golchin-Rad *et al*. 2019) [41, 18].

Seminoma, hydrocele and laceration of testicle were the conditions recorded under affections of the testicle in the study. Seminomas are the most common testicular tumours in dogs (Dow *et al*. 1962; Hayes and Pendergrass, 1976 and McEntee *et al*. 2002) [13, 19, 29]. Injuries to scrotal sac are most likely due to dog fights and vehicular accidents (Foster *et al*. 2012) [14]. Scrotal edema might be due to dilation of scrotal veins in old dogs (Boothe *et al*. 2003) [7].

**Table 1:** Organ wise incidence of lower urogenital affections in dogs

| Cases presented with affections of | The Urinary bladder | The Urethra | Penis and prepuce | The prostate gland | Testis | Scrotum | Total |
|---|---|---|---|---|---|---|---|
| Number | 12 | 1 | 15 | 6 | 6 | 9 | 49 |
| Percentage (%) | 24.49 | 2.04 | 30.61 | 12.24 | 12.24 | 18.37 | 99.99 |

**Table 2:** Age wise incidence of lower urogenital affections in dogs

| Age group | 0-3 years | 3-6 years | 6-9 years | 9-12 years | 12-15 years | Total |
|---|---|---|---|---|---|---|
| Number | 15 | 13 | 13 | 6 | 2 | 49 |
| Percentage (%) | 30.61 | 26.53 | 26.53 | 12.24 | 4.08 | 99.99 |

**Table 3:** Breed wise incidence of urogenital affections in dogs

| S. No | Breed | Number | Percentage (%) |
|---|---|---|---|
| 1. | Non-descript | 18 | 36.73 |
| 2. | Labrador Retriever | 6 | 12.24 |
| 3. | Dachshund | 5 | 10.20 |
| 4. | Spitz cross | 6 | 12.24 |
| 5. | Golden Retriever | 4 | 8.16 |
| 6. | Pomeranian | 2 | 4.08 |
| 7. | Shih-Tzu | 1 | 2.04 |
| 8. | Doberman Pinscher | 1 | 2.04 |
| 9. | Lhasa Apso | 1 | 2.04 |
| 10. | Pug | 1 | 2.04 |
| 11. | Beagle | 1 | 2.04 |
| 12. | German Shepherd dog | 2 | 4.08 |
| 13. | Rajapalayam | 1 | 2.04 |
| Total | | 49 | 99.97 |

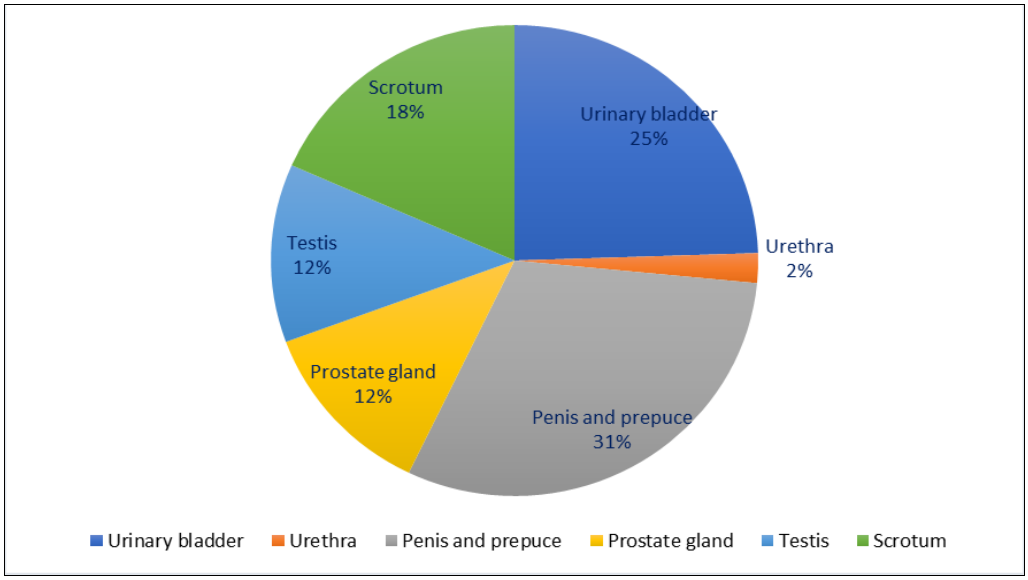


**Plate 1:** Pie diagram depicting organ wise incidence of lower urogenital affections in the study

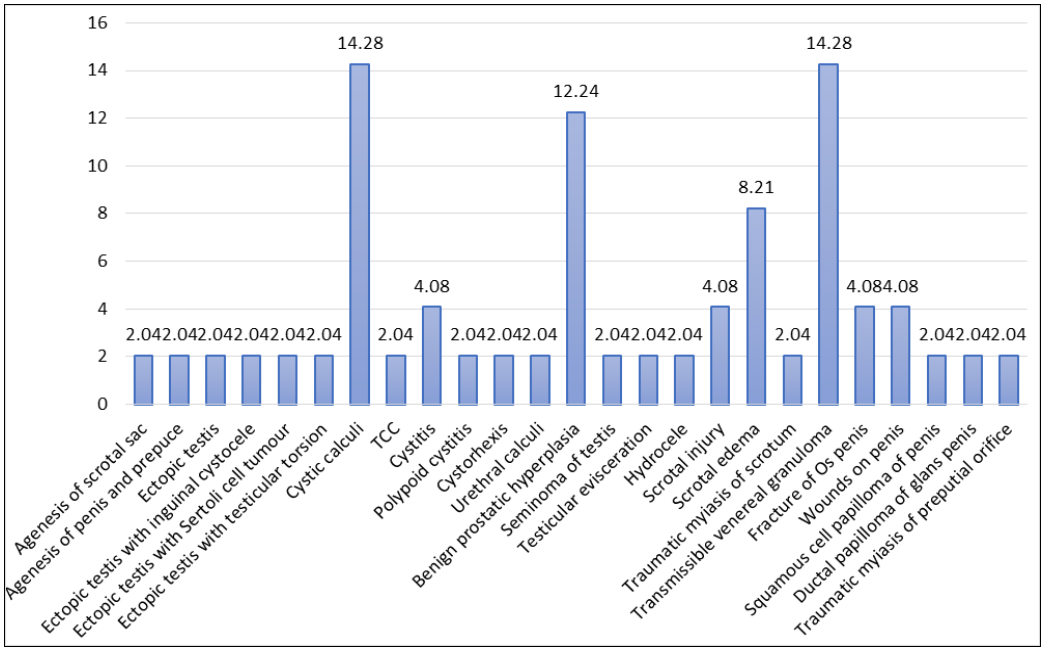


**Plate 2:** Bar diagram depicting condition wise incidence of lower urogenital affections in the study

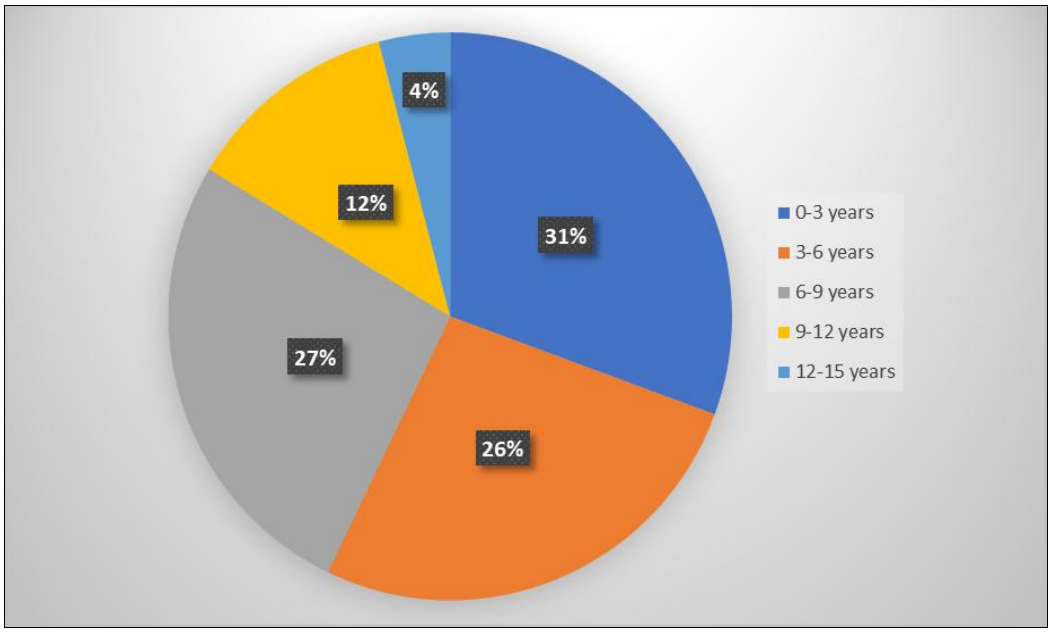


**Plate 3:** Pie diagram depicting age wise incidence of lower urogenital affections in the study

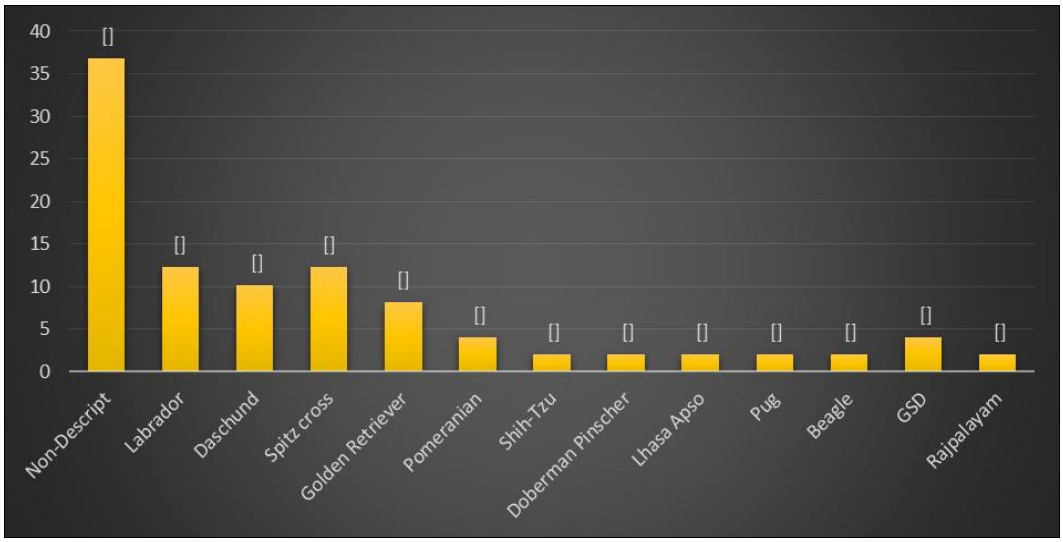


**Plate 4:** Bar diagram depicting the breed wise incidence of lower urogenital affections in the study

**Table 4:** Mean, standard error of mean, median and standard deviation for organ, age and breed wise incidence in the study

| | Organ | Age | Breeds |
|---|---|---|---|
| N | 49 | 49 | 49 |
| Mean | 3.41 | 2.29 | 3.73 |
| Std. Error of Mean | 0.254 | 0.168 | 0.481 |
| Median | 3.00 | 2.00 | 3.00 |
| Std. Deviation | 1.779 | 1.173 | 3.365 |

**Acknowledgement**
The presented work is a part of post graduate thesis submitted by the first author. The authors thank Sri Venkateswara Veterinary University, Tirupati, for providing the necessary infrastructure for conduct of this work.

**Conflict of Interest**
Not available

**Financial Support**
Not available

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**How to Cite This Article**
Prasanth KM, Bharathi S, Kumar RVS, Santhilakshmi M, Raghunath M. Incidence of lower urogenital tract diseases in male dogs. International Journal of Veterinary Sciences and Animal Husbandry. 2025;10(10):40-44.