



Ultrasonographic Features of the Prostate Gland in Dogs in Jaipur, Rajasthan

Anita Sewag¹, Jitendra Bargujar¹, Rashmi Singh¹, N.K. Jeph¹,
Amit Kumar Meena¹, Akanksha Choudhary¹, Ankita¹

10.18805/IJAR.B-5425

ABSTRACT

Background: Prostate gland ultrasonography is a diagnostic imaging technique used to assess size, shape and structure of the prostate gland in male dogs. Prostate size estimation is important in the diagnosis and monitoring of prostatic disorders such as prostatitis, benign prostatic hyperplasia (BPH), cysts, abscesses and neoplasms.

Methods: The dimensions of prostate gland in dogs, as assessed by ultrasonography, is currently not yet reported in this area. This study was aimed at reporting of standardization of prostate gland features including length, width and ultrasonographic appearance and correlation of prostate gland parameters i.e. length and width with age and body weight of healthy dogs, 2-5 years old of German shepherd (n=30) and Labrador (n=30) breeds, reported at Veterinary Clinical Complex of Post Graduate Institute of Veterinary Education and Research (PGIVER), Jaipur. B-mode transabdominal ultrasonographic examination was done at 6 MHz frequency in lateral recumbency without sedation.

Result: Prostate gland had hypoechoic homogenous parenchyma with moderately echogenic stippling appearance. The capsule appeared relatively hyperechoic. In GSD age group-I (2 to 3 years), group-II (3 to 4 years) and group-III (4 to 5 years) prostate measured 22.73±1.01 mm and 22.58±0.95 mm; 30.22±1.85 mm and 29.04±1.66 mm and 32.02±0.65 mm and 32.34±0.90 mm in length and width, respectively. In Labrador age group-I (2 to 3 years), group-II (3 to 4 years) and group III (4 to 5 years) prostate measured 20.88±0.62 mm and 22.32±0.67 mm; 26.54±0.56 mm and 27.97±0.63 mm and 37.05±0.90 mm and 37.90±1.12 mm in length and width, respectively. Prostatic parameters i.e. length and width in GSD and Labrador (in all three groups) showed positive correlation with age and body weight. Ultrasonographic features of the prostate are considered to be more precise, as gives clearly distinct demarcation of the prostate's edges with better resolution and visualization along with absence of a magnification effect.

Key words: Dogs, Prostate, Ultrasonography.

INTRODUCTION

The canine prostate gland, an integral component of the male reproductive system. In dogs, the prostate gland serves as the sole male accessory gland, playing a crucial role in the secretion of components of seminal plasma (Smith, 2008).

The prostate gland in adult dogs is bilobed (Russo *et al.*, 2012) and oval-shaped, exocrine gland, positioned dorsally adjacent to the rectum, ventrally to the pubic symphysis, laterally to the abdominal wall and cranially to the bladder. It serves as a pathway for the urethra and the vas deferens, facilitating the transport of sperm to the urethra (Leis-Filho *et al.*, 2018).

The size of the canine prostate gland can vary due to factors such as the natural aging process, breed, body weight, sexual maturity and disease (Dennis *et al.*, 2010; Gadelha *et al.*, 2009).

Various clinical procedures including history, physical and laboratory exams, rectal palpation, radiography, ultrasonography, computed tomography, magnetic resonance imaging and other diagnostic techniques are the main methods for diagnosing prostatic disorders. Radiography, ultrasonography, computed tomography, magnetic resonance imaging and history, physical and laboratory exams are the main methods for diagnosing prostatic disorders.

¹Department of Veterinary Medicine Post Graduate Institute of Veterinary Education and Research, Jaipur-302 031, Rajasthan, India.

Corresponding Author: Anita Sewag, Department of Veterinary Medicine Post Graduate Institute of Veterinary Education and Research, Jaipur-302 031, Rajasthan, India.
Email: dranitasevag@gmail.com

How to cite this article: Sewag, A., Bargujar, J., Singh, R., Jeph, N.K., Meena, A.K., Choudhary, A. and Ankita. (2025). Ultrasonographic Features of the Prostate Gland in Dogs in Jaipur, Rajasthan. Indian Journal of Animal Research. 1-4. doi: 10.18805/IJAR.B-5425.

Submitted: 13-06-2024 **Accepted:** 18-01-2025 **Online:** 24-02-2025

The normal prostate gland is typically not well-defined on radiographic imaging. However, when enlarged, it alters the anatomical position of the rectum and urinary bladder, making it more distinguishable. While radiography cannot differentiate parenchymal abnormalities of the prostate, ultrasonography can identify those abnormalities (Singh *et al.*, 2021).

Leroy *et al.* (2013) observed that transabdominal ultrasonography has become the preferred imaging method for evaluating the prostate gland in dogs.

B-mode ultrasound is frequently employed to examine the shape, size, position, margin and internal architecture

of parenchymatous organs. This technique has been adapted for the examination of prostate gland in order to diagnose and differentiate diseases, as well as to monitor response to treatment (Kawakami *et al.*, 1993).

Diagnostic ultrasonography has been widely used for examining the female reproductive tract but less frequently in males. However, ultrasonography (US) can offer valuable insights into the evaluation of male reproductive health (Ali *et al.*, 2022).

In conclusion, ultrasonography is an effective and reliable technique for evaluating the nature and severity of disease, which aids in assessing the prognosis and outcome of the condition (Kumar *et al.*, 2012).

The primary objective of the present observational study was to provide a comprehensive reference for the dimensions of the prostate gland in male dogs, devoid of any current or prior lower urogenital system diseases. A secondary aim of the study was to evaluate the impact of age and body weight on prostatic size in dogs.

MATERIALS AND METHODS

The research work was conducted at the Department of Veterinary Medicine in collaboration with Department of Veterinary Clinical Complex (VCC), Post Graduate Institute Veterinary Education and Research (PGIVER), Jaipur, Rajasthan, from October 2021 to March 2022. Selected dogs were divided into three age groups: 2-3 years, 3-4 years and 4-5 years. A minimum of 10 dogs were assigned to each age group and designated as groups I, II and III, respectively. Ultrasonographic examination was performed using a convex transducer with a frequency ranging between 1 MHz to 8 MHz. The ultrasonography machine utilized for this purpose was the MY LAB SEVEN (make-ESOTE).

Transabdominal ultrasonography was conducted on all 60 dogs using a 1-8 MHz probe operating at a frequency of 6 MHz. The transducer was positioned on the caudoventral abdomen, on one side of the penis or prepuce, cranial to

the scrotum. The urinary bladder was initially identified on the scan. Once located, the prostate gland was scanned in both longitudinal and transverse planes.

RESULTS AND DISCUSSION

The prostate gland can be effectively imaged via a trans-abdominal modality, utilizing the prepubic or parapubic areas, in both German shepherd and Labrador breeds across various age groups. The gland is situated adjacent to the trigone of the distended urinary bladder. Both sagittal and transverse planes of the prostate gland can be visualized effectively using transabdominal ultrasonography (Image 1, 2), as imagined by Atalan *et al.* (1999), Cooney *et al.* (1992) and Gadelha *et al.* (2009).

Prostatic urethra was centrally positioned within the gland, exhibiting a hypo- or anechoic area bordered by a thin hyperechogenic layer, consistent with the findings described by Freitas *et al.* (2015).

The prostate gland exhibited a characteristic appearance characterized by a hypoechoic homogeneous parenchyma with moderately echogenic stippling distributed uniformly throughout. The capsule appeared relatively echogenic (Image 1, 2) and was easily identifiable. Similar prostatic appearances were also reported by Feeney *et al.* (1987), Juniewicz *et al.* (1989), Divya *et al.* (2010) and Khanbazi *et al.* (2021), who noted that prostates were clearly differentiated sonographically.

A. The ultrasonographic features of prostate gland

The ultrasonographic features of prostate gland in German Shepherd- (Table 1)

The ultrasonographic features of prostate gland in Labrador- (Table 2)

In a similar study involving 36 male dogs, Gadelha *et al.* (2009) also observed a positive correlation between body weight and animal age. Furthermore, Ruel *et al.* (1998)

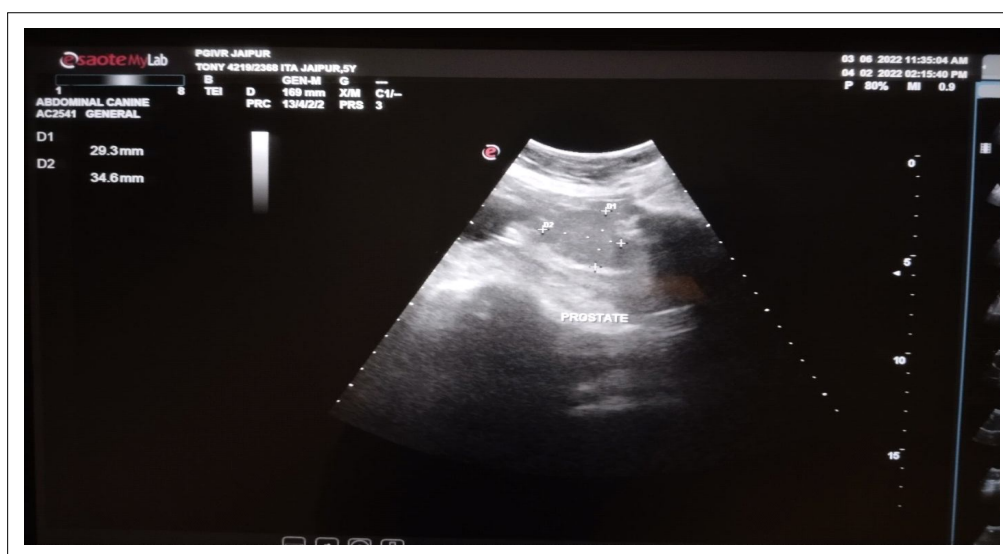


Image 1: Ultrasonographic examination of GSD male (4 to 5 year age group).

reported a significant positive correlation ($p < 0.001$) between each prostatic parameter and both body weight and age in a study including 100 healthy intact male dogs aged between 9 months and 14 years.

Moresco and Goncalves (2019) studied 21 mixed breed dogs. They found mean ultrasonographic measurements for length and width in each group as follows: G I (0-3 years, $n=11$): 2.04 ± 0.30 cm and 2.40 ± 0.46 cm, G II (3-7 years, $n=7$): 2.28 ± 0.27 cm and 2.82 ± 0.43 cm and G III (7 years and above, $n=4$): 3.02 ± 0.80 cm and 3.33 ± 0.97 cm, respectively.

Ghadiri *et al.* (2013) examined 10 intact male dogs aged 2 to 4 years, weighing between 16 and 23 kg and reported ultrasonographic measurements of prostate gland length and width as 3.35 ± 0.4 cm and 3.42 ± 0.53 cm, respectively. The slight differences observed between the present and previous studies may be attributed to variations in sample size and age groups of the dogs examined.

In a study by Ruel *et al.* (1998) involving 100 sexually mature male intact dogs with a mean age of 5.1 ± 3.4 years and body weight of 18 ± 11.8 kg, transabdominal ultrasonography showed mean length 3.4 ± 1.1 cm and width 3.3 ± 0.9 cm of prostate gland. The observed higher measurements in Ruel *et al.* study compared to the GSD and Labrador groups (21.49 ± 0.78 kg and 20.31 ± 0.89 kg) can be attributed to differences in both breed characteristics and sample size.

Analysis of ultrasonographic features with age and body weight of dogs

In all three age groups and body weight categories of German Shepherd (GSD) and Labrador retriever dogs, both prostatic parameters, length and width, exhibited a positive correlation with age and body weight (Table 1, 2). These findings are consistent with the observations made by Kadambari *et al.* (2015).

Ultrasonography of prostate gland in Labrador and German shepherd dogs in this area is done first time.

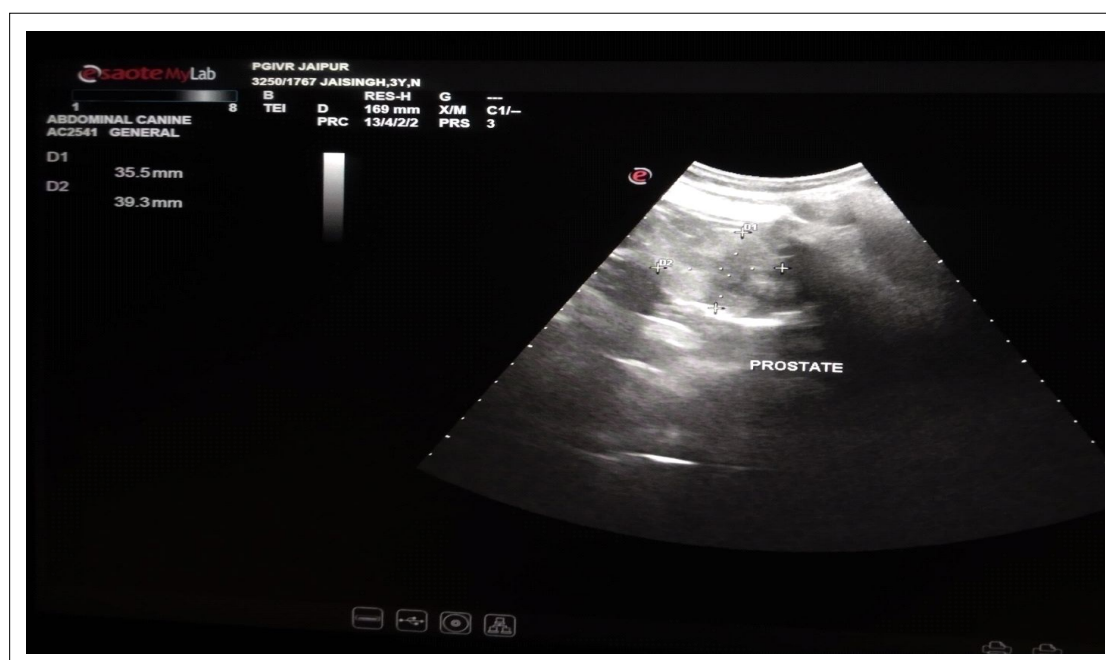


Image 2: Ultrasonographic examination of labrador male (3 to 4 year age group).

Table 1: Mean $\pm$ S.E. values of length and width of prostate gland in GSD dogs ($n = 30$) according to age group and body weight.

Age group	Body weight (kg.)	d1 (length in mm)	d2 (width in mm)
2-3 year	21.49 ± 0.78 kg	22.73 ± 1.01	22.58 ± 0.95
3-4 year	32.37 ± 2.41 kg	30.22 ± 1.85	29.04 ± 1.66
4-5 year	39.83 ± 1.37 kg	32.02 ± 0.65	32.34 ± 0.90

Table 2: Mean $\pm$ S.E values of length and width of prostate gland in Labrador dogs ($n = 30$) according to age group and body weight.

Age group	Body weight (kg.)	d1 (length in mm)	d2 (width in mm)
2-3 year	20.31 ± 0.89 kg	20.88 ± 0.62	22.32 ± 0.67
3-4 year	27.87 ± 0.76 kg	26.54 ± 0.56	27.97 ± 0.63
4-5 year	36.54 ± 1.16 kg	37.05 ± 0.90	37.90 ± 1.12

Study reveals a positive correlation between prostate gland size with age and body weight.

CONCLUSION

The prostate gland has hypoechoic homogenous parenchyma and hyperechoic capsule with moderately echogenic stippling present in a uniform pattern throughout the gland in ultrasonography. Prostate appeared bi lobbed in longitudinal plane and appeared single lobed in transverse plane. Ultrasonography proved to be a very effective diagnostic imagining tool to know about prostate gland parameters which help in clinical evaluation of prostatic diseases and in evaluation of response to therapy.

ACKNOWLEDGEMENT

Authors are thankful for the Dean, PGIVER, Jaipur for providing the facilities for this work, also thankful to dog owners for their kind cooperation during the ultrasonography examination.

Conflict of interest

The authors declare no conflict of interest.

REFERENCES

- Ali, A., Abdel-Razek, A.K. and Fahmy, S. (2022). Ultrasonographic examination and measurements of testes, epididymis and accessory glands at different growth stages of chios rams. *Agricultural Science Digest-A Research Journal*. 42(6): 768-773.
- Atalan, G., Holt, P.E. and Barr, F.J. (1999). Ultrasonographic estimation of prostate size in normal dogs and relationship to body weight and age. *Journal of Small Animal Practice*. 40(3): 119-122.
- Cooney, J.C., Cartee, R.E., Gray, B.W. and Rumph, P.F. (1992). Ultrasonography of the canine prostate with histologic correlation. *Theriogenology*. 38(5): 877-895.
- Dennis, R., Kirberger, R.M., Barr, F. and Wrigley, R.H. (2010). *Handbook of small animal radiological differential diagnosis E-book: Handbook of small animal radiological differential diagnosis E-Book*. Elsevier Health Sciences.
- Divya, Nair, R. (2010). Ultrasonographic evaluation of prostate gland in dogs (Doctoral dissertation, Department of Animal Reproduction, Gynaecology and Obstetrics, College of Veterinary and Animal Sciences, Mannuthy).
- Feeney, D.A., Johnston, G.R., Klausner, J.S., Perman, V., Leininger, J.R. and Tomlinson, M.J. (1987). Canine prostatic disease-comparison of ultrasonographic appearance with morphologic and microbiologic findings: 30 cases (1981-1985). *Journal of the American Veterinary Medical Association*. 190(8): 1027-1034.
- Freitas, L.A., Pinto, J.N., Silva, H.V.R. and da Silva, L.D.M. (2015). Two-dimensional and doppler sonographic prostatic appearance of sexually intact French Bulldogs. *Theriogenology*. 83(7): 1140-1146.
- Gadelha, C.R.F., Vicente, W.R.R., Ribeiro, A.P.C., Apparício, M.F., Covizzi, G.J. and Machado, L.D.S. (2009). Age-related ultrasonography, cytology and microbiologic exam of canine prostate. *Arquivo Brasileiro de Medicina Veterinária e Zootecnia*. 61: 1261-1267.
- Ghadiri, A., Avizeh, R., Baniadam, A. and Ranjbar, A. (2013). Comparison of transabdominal and transrectal ultrasonography of the prostate Gland in dogs. *Iranian Journal of Veterinary Surgery*. pp 43-48.
- Juniewicz, P.E., Ewing, L.L., Dahnert, W.F., Hamper, U.M., Dembeck, C., Sanders, R.C. and Coffey, D.S. (1989). Determination of canine prostatic size in situ: Comparison of direct caliper measurement with radiologic and transrectal ultrasonographic measurements. *The Prostate*. 14(1): 55-64.
- Kadambari, V., Chandrasekaran, D., Jeyaraja, K. and Thirunavukkarasu, P.S. (2015). Ultrasonographic measurement of prostatic size in intact non-descript dogs. *Indian Journal of Animal Reproduction*. 36(2): 50-52.
- Kawakami, E., Tsutsui, T., Shimizu, M., Orima, H., Makanae, Y., Yajima, K. and Ogasa, A. (1993). Effects of oral administration of chlormadinone acetate on canine prostatic hypertrophy. *The Journal of Veterinary Medical Science*. 55(4): 631- 635.
- Khanbazi, M.H., Mogheiseh, A., Khafi, M.S.A., Nazifi, S., Derakhshandeh, N. and Golchin-Rad, K. (2021). Echotexture analysis of prostate parenchyma for detection of benign prostatic hyperplasia in dogs. *Topics in Companion Animal Medicine*. 42: 100501.
- Kumar, A., Saini, N.S., Mohindroo, J. and Sood, N.K. (2012). Ultrasonographic features of normal heart and liver in relation to diagnose pericarditis in bovine. *Indian Journal of Animal Sciences*. 82(12): 1489.
- Leis-Filho, A.F. and Fonseca-Alves, C.E. (2018). Anatomy, histology and physiology of the canine prostate gland. *Veterinary Anatomy and Physiology*. pp 47-67.
- Leroy, C., Conchou, F., Layssol Lamour, C., Deviers, A., Sautet, J., Concordet, D. and Mogicato, G. (2013). Normal canine prostate gland: Repeatability, reproducibility, observer dependent variability of ultrasonographic measurements of the prostate in healthy intact beagles. *Anatomia, Histologia, Embryologia*. 42(5): 355-361.
- Moresco, B.N. and Gonçalves, G.F. (2019). Digital radiography and ultrasonography in evaluation of the canine prostate. *Semina: Ciências Agrárias*. 40(2): 677-686.
- Ruel, Y., Barthez, P.Y., Mailles, A. and Begon, D. (1998). Ultrasonographic evaluation of the prostate in healthy intact dogs. *Veterinary Radiology and Ultrasound*. 39(3): 212-216.
- Russo, M., Vignoli, M. and England, G.C.W. (2012). B mode and contrast enhanced ultrasonographic findings in canine prostatic disorders. *Reproduction in Domestic Animals*. 47: 238-242.
- Singh, R., Sangwan, V., Devi, N.U., Mohindroo, J. and Pathak, D. (2021). Ultrasonographic and radiographic assessment of prostate gland in perineal hernia dogs. *Indian Journal of Animal Research*. 55(5): 568-574.
- Smith, J. (2008). Canine prostatic disease: A review of anatomy, pathology, diagnosis and treatment. *Theriogenology*. 70(3): 375-383.