Journal of Veterinary and Animal Sciences
DOI: https://doi.org/10.24843/JVAS.2021.v04.i01.p03
pISSN 2550-1283; eISSN:2622-0571
February 2021 Vol. 4 No.1: 11 - 16

Sonogram Testicular Relationships with Semen Quality of Kintamani Dog

I Wayan Nico Fajar Gunawan[1*], Luh Made Sudimartini[2], I Wayan Wirata[3]

[1]Laboratory of Veterinary Radiology, Faculty of Veterinary Medicine, Udayana University, Bali, Indonesia
Email: nico_fajar_g@unud.ac.id
[2]Laboratory of Veterinary Pharmacy, Faculty of Veterinary Medicine, Udayana University, Bali, Indonesia
Email: md_sudimartini@unud.ac.id
[31]Laboratory of Veterinary Surgery, Faculty of Veterinary Medicine, Udayana University, Bali, Indonesia
Email: iwynwirata_dvm@unud.ac.id

Corresponding Author: nico_fajar_g@unud.ac.id

Abstract. Ultrasonography is a high-end tool whose initial use to diagnose pregnancy and now being used for fetal development monitoring, birth prediction, diagnosis, and management of reproductive diseases. The aim of this study was to evaluate the initial relationship between body weight, testicular sonogram on the quality of semen collected from the basal Kintamani dogs which is expected to be useful in reproductive management of Kintamani dogs. The study used 10 male Kintamani dogs with healthy reproductive status. The tool used is in the form of an ultrasound for livestock, namely the Veterinary Ultrasound Scanner with a 5 MHz probe transducer, the image mode in the form of B-mode which will be displayed on the LCD with a size of 10 inches. Ultrasound examination is carried out in series every once a week. The semen examination was carried out immediately after the testicular ultasonography examination was carried out. No association was found between echogenicity and heterogeneity of the prostate gland or other size of the prostate gland and semen quality. Testicular volume, prostart and age did not affect the quality of Kintamani dog spermatozoa, while the testicular sonogram had an effect on the quality of Kintamani dog spermatozoa.

.

Keywords: Ultrasonography, Sperm Quality, Kintamani Dog, Testes.

I. INTRODUCTION

Recently there has been a rapid development in the Kintamani dog breeding business [1]. For the purpose of dog breeding, breeders still use natural mating methods. To get a superior male, dog breeders often bring in males from distant places. This conventional method brings impacts and various problems that arise because the transportation of live animals over long distances has the risk of causing stress to the males in addition to using this conventional method is less practical.

One of the solutions to solve the problems mentioned above is by performing artificial insemination (IB). As a technique to increase population and livestock genetics, this technique quickly became accepted after its commercial introduction. The application of the IB will be more promising when compared to bringing in stud dogs from far away because bringing in stud dogs costs more. The use of IB is expected to be able to shift the importance of live animal transportation for the purpose of improving the genetic quality of dogs.

One of the things that determines the success of an IB is the quality of the semen itself. In the examination of semen, so far, only relying on a macroscopic or microscopic examination of semen after the sperm is removed. The use of ultrasound to determine reproductive status in dogs has been widely used [2]. Checking the reproductive status or quality of the male earlier before the sperm is collected is very important to maximize sperm quality and minimize stress on dogs due to the sperm collection process.

II. MATERIAL METHOD

Animal Sample

The study used 10 male Kintamani dogs with healthy reproductive status. Kintamani dogs with an average weight of 15 kg, aged 2-3 years. all ten dogs appeared to be clinically healthy and had no history of reproductive disorders. By being kept in individual cages with a size of 3 x 1.3 meters. The location of the cage is in Asubali Kennel, Gianyar.

Sonogram examination

The tool used is an ultrasound for livestock, namely the "Ultrasound Scanner" brand of Sonodop (China). With a 5 MHz probe transducer, the image mode is in the form of B-mode which will be displayed on the LCD with a size of 10 inches. Ultrasound examination is carried out in series every once a week.

Semen Collection

Semen collection using manual stimulation method. Hold the penis and bring it sideways to the left. When the glandular bulb is enlarged, press the prepuce backwards until the entire glandular bulb is visible. At this time, the male will usually lift one of his legs back. Next, hold the base of the glandular bulb and squeeze it rhythmically until an erection occurs. Within 20 seconds, ejaculation will begin. The semen that comes out is collected with a glass. Semen was brought to the laboratory with an ice box at 50C.

Motility and Viability Examination

Motility

Semen is taken with a glass rod, placed on a glass object and covered with a closing glass. The glass object used previously had been warmed in an incubator at 380C. The spermatozoa were examined under a light microscope with a 400 times magnification, seen the movement of the spermatozoa up to 100 spermatozoa [1].

pISSN 2550-1283; eISSN:2622-0571
February 2021 Vol. 4 No.1: 11 - 16

Total Percentage of Life

The number of live spermatozoa was evaluated using a thin smear preparation. The number of live spermatozoa is the percentage of living spermatozoa as determined by eosin nigrosin staining. Living spermatozoa are marked with a white head and those that are dead are marked with a red head. By counting the number of spermatozoa that absorb color, the ratio of the number of dead and living spermatozoa can be calculated [1].

Data Collection and Analysis

The data collected and analyzed are images from the ultrasound scanning results. The results were analyzed descriptively using SPSS. 20.

III. RESULT

Ultrasonography Examination like Doppler ultrasound or B-mode of dog's reproductive tract provide useful and important information of the testes state at the time of examination [3]. Present studies have generally evaluated heterogeneity and testicular echogenicity [3], and found an association with semen quality. The testes were examined in dorsal plane, transverse and sagittal planes. The prostate in the transverse and sagittal planes. The value of width, height, and length of each prostate lobe, testes and epididymal tail were measured using a machine electronic caliper. The testicular volume is calculated using the formula: volume = l × w × h × 0.71 where l = sagittal diameter; w = transverse diameter and h = dorsal diameter [4]. Volume of each prostatic lobe and epididymal tail volume are calculated using the formula for the ellipse: volume = l × w × h × 0.523 where l = length in the cranio-caudal (dorsal plane) w = sagittal diameter in the latero-medial direction (dorsal plane) and h = sagittal diameter (sagittal plane).

IV.DISCUSSION

No association was found between heterogeneity, echogenicity and size of the prostate gland and quality of the kintamani dog's semen. This finding is not because the prostate gland only contributes on addition of fluid in the first and third fractions of ejaculation [5], although this fluid volume was not associated with prostate measurements in this study, unlike previous observations by [6] who found that the volume of semen had correlated with the size of prostate. This may relate to the method of semen collection thus lead to mixed of first and second fractions and the limited time- of the third fraction, since ejaculation only occurred approximately 1 – 3 minutes in Kintamani dogs. Ultrasonography result of the left and right lobes of the prostate gland and the left and right testes, found no difference in ultrasound measurements, similar to the findings of other studies [5], [7] but in contrast to the report from of [8]. In this study, the ultrasound measurements of the right testis were lower than the right testis. However, a small number of dogs were used, in contrast to this study, and a large number of animals could show A was positively correlated with body weight, similar to findings previously reported in other studies [9].

Figure 1. Prostate Measurement

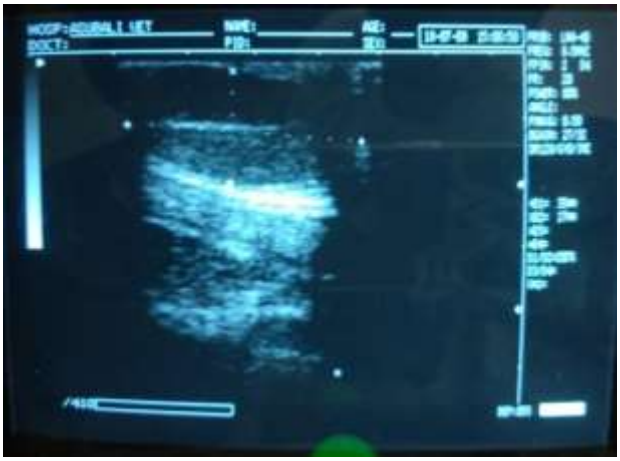

Figure 2. Testicular Volume Measurement

Table 1. Testicular Sonogram examination results, viability and motility of the Kintamani Dog

	Testicular Volume (ml)	Prostate Volume (ml)	Motility (%)	Viability (%)
Minimum	66.40	18.50	82	87
Maximum	70.10	20.30	83	90
Mean	68.02	19.34	82.52	88.20
Std. Dev	1.72	0.73	0.59	1.30

The findings may not be surprising since previous work has shown that the intensity of the testicular parenchyma pixels is histologically related. with the height of the seminiferous tubules, the proportion of tubules to the lumen and lumen size [10], and because the rate of spermatogenesis is related to the blood flow through the testicular artery. In this study, there was an association between mean of echogenicity of testes and future semen quality in the higher testicular echogenicity

pISSN 2550-1283; eISSN:2622-0571
February 2021 Vol. 4 No.1: 11 - 16

at tissue level was associated with an increase in mean progressive normal forward efficacy over the next follow-up period; The findings are similar to those seen in banteng[11]. The biological reasons for this are uncertain; However, there was no association between some of the ultrasound characteristics and the quality of future semen. In particular, there was no relationship between testicular heterogeneity, testicular volume, and appearance of testicular parenchyma. The lack of an association between future semen quality and testicular volume because even though this parameter is thought to predict the current quality of semen [12].

This study purposely included dogs of some age range and found no association between heterogeneity of the prostate or testes , echogenicity and age, suggesting that age has no contributing to the differences in observed ultrasonic performance, unlike the work of [13] who found a trend of testicular volume to increase from puppies until the age of 6 years old and got decreased after it. In particular, previous studies of the association between age and prostate size have frequently included dogs with prostate pathology [14].

V. CONCLUSION

Testicular volume, prestart does not affect the quality of Kintamani dog spermatozoa. no association between some of the ultrasound characteristics and future semen quality; in particular, there was no relationship between the parenchyma appearance of testes, testicular heterogenicity, and the total testicular volume.

REFERENCE

[1] Puja, I,K. 2007b. Aspek Reproduksi Pada pengembangan Anjing. Universitas Udayana Denpasar.

[2] Freitas, L.A., Pinto, J.N., Silva, H.V.R., Uchoa, D.C., Mota Filho, A.C., Silva, L.D.M., 2013. Doppler e ecobiometria prostática e testicular em cães da rac¸a Boxer. Acta Sci. Vet. 41, 1121–1129

[3] Moxon, R., Bright, L., Pritchard, B., Bowen, I. M., de Souza, M. B., da Silva, L. D., & England, G. C. (2015). Digital image analysis of testcular and prostatc ultrasonographic echogencity and heterogeneity in dogs and the relaton to semen quality. Animal Reproducton Science, 160, 112–119.

[4] Gouletsou, P., Galatos, A., Leontides, L., 2008. Comparison between ultrasonographic and caliper measurements of testicular volume in the dog. Anim. Reprod. Sci. 108, 1–12

[5] England GC. 1998. Ultrasonographic assessment of abnormal pregnancy. Vet Clin North Am Small Anim Pract Jul 28:849-68.

[6] Wheaton, L.G., de Klerk, D.P., Strandberg, J.D., Coffey, D.S., 1979. Relationship of seminal volume to size and disease of the prostate in the

Beagle. Am. J. Vet. Res. 40, 1325–1328.

[7] Villaverde, A.I.S.B., Fioratti, E.G., Ramos, R.S., Neves, R.C.F., Ferreira, J.C.P., Cardoso, G.S., Padilha, P.M., Lopes, M.D., 2014. Blood and seminal plasma concentration of selenium, zinc and testosterone and their relationship to sperm quality and testicular biometry in domestic cats. Anim. Reprod. Sci. 150, 50–55, http://dx.doi.org/10.1016/j.anireprosci.2014.08.004

[8] Souza, M. B., England, G. C., Mota Filho, A. C., Ackermann, C. L., Sousa, C. V., de Carvalho, G. G., … & da Silva, L. D. (2015b). Semen quality, testcular B- mode and Doppler ultrasound, and serum testosterone concentratons in dogs with established infertlity. Theriogenology, 84,805–810

[9] Amann, R.P., 1986. Reproductive physiology and endocrinology of the dog. In: Morrow, D.A. (Ed.), Current Therapy in Theriogenology II. W. B. Saunders, Philadelphia, pp. 532–538

[10] Giffin, J. L., Franks, S. E., Rodriguez-Sosa, J. R., Hahnel, A., & Bartlewski, P. M. (2009). A study of morphological and haemodynamic determinants of testicular echotexture characteristics in the ram. Experimental biology and medicine, 234(7), 794-801.

11, 261– 265.

[11] Arteaga, A., Barth, D., Brito, C. 2005. Relationship between semen quality and pixel-intensity of testicular ultrasonograms after scrotal insulation in beef bulls. Theriogenology 64: 408-415.

[12] Zelli, R., Troisi, A., Ngonput, A. E., Cardinali, L., & Polisca, A. (2013). Evaluaton of testcular artery blood flow by Doppler ultrasonography as a predictor of spermatogenesis in the dog. Research in Veterinary Science, 95, 632– 637.

[13] Mantziaras, G., Alonge, S., Luvoni, G.C., 2014. Ultrasonographic study of age-related changes on the size of prostate and testicles in healthy German Shepherd Dogs. In: Proceedings of the 17th EVSSAR Congress, Wroclaw, Poland, p. 150

[14] Nielsen, S.W., Kennedy, P.C., 1990. Tumors of the genital systems. In: Moulton, J.E. (Ed.), Tumors in Domestic Animals. University of California Press, Berkeley, pp. 479–517.