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Canine Reproductive Disorders at Veterinary Clinical Complex, College of Veterinary Science, Guwahati, India: A Retrospective Study from 2016 to 2021

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ABSTRACT

Background: Study on the reproductive health of dogs is a matter of concern since it affects the existence of future generation. There are various reproductive ailments that may affect a dog in its lifetime. The present study was aimed to find out the incidence of different reproductive disorders in canine populations reported at the Veterinary Clinical Complex (VCC), College of Veterinary Science, Guwahati, India in respect of breed, age, sex and season.

Methods: The study was conducted on canine populations reported at the VCC, College of Veterinary Science, Guwahati, India during the period from 1/03/2016 to 28/02/2021. Clinical cases were grouped based on their breed, age, sex and the season and the type of various reproductive ailments and their incidence was worked out.

Result: The overall incidence of reproductive disorders in dogs was 2.45%. Labradors had the maximum incidence of reproductive ailments (24.79%) followed by local breeds (17.52%) and the least was in Dachshund (2.56%). The animals under the age group 1.1 to 4.0 years appeared to have the highest incidence (47.86%) of reproductive ailments and the lowest (12.39%) was in 10.1 to 13.0 years of age group. The highest incidence of reproductive ailments was recorded in female dogs (96.15%). In canine population, summer resulted in higher (35.86%) incidence of reproductive disorders.

Key words: Breed, Canine, Incidence, Reproductive ailments, Season.

INTRODUCTION

Dogs were probably the first tame animals and are the most important domestic species in the world. As a result of urbanization and modernization and association of close relationships between humans and pets, there is increased demand for the maintenance of breeds appropriate for specific purposes, such as company, sport, hunting and/or guarding (Costa *et al.,* 2019), as well as aiding the disabled and the elderly persons. The demand of pet animal treatment is tremendously increasing in cities and the incidences of several reproduction related diseases are escalating. Dogs are sensitive to the deleterious effects of the various hormones, *viz.,* progesterone, estradiol and its analogues. The effect of the steroids on ovary and uterus during estrous cycle upturns a risk factor for endometrial change (Maya *et al.,* 2017). Similarly, male reproductive health is also under the influence of various endogenous and exogenous factors. Number of researches has been done in an attempt to understand the cause, the treatment and prevention of these diseases. Diseases involving the reproductive system are frequently seen in any veterinary practice (Fielding *et al.,* 2021). These diseases include vaginal disorders, uterine infections (endometritis, metritis, *etc*), pregnancy disorders (early embryonic death, foetal maceration), lactational disorders, disorders of the prostate and neoplasia of the genital system (Transmissible Venereal Tumor) and mammary glands (Gupta *et al.,* 2020). There are several reproduction related diseases which are encountered daily in the Veterinary Clinical Complexes (VCC) of the College of Veterinary Science, in the country, which is becoming a major concern of canine breeding industry and canine health sector. Therefore, the present study was planned to know the incidence of the various reproductive disorders in dogs presented to the VCC of the College in Guwahati with respect to the breed, age, sex and season.

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MATERIALS AND METHODS

A retrospective study in canine was performed at the Gynaecology Outpatient Department (GOPD) of VCC, College of Veterinary Science, Guwahati, Assam Agricultural University, Guwahati, India. Data were collected from the

database maintained in VCC. All medically treated diseased dogs diagnosed with reproductive diseases for the time period from 1st March 2016 to 28th February 2021 were taken for the study. The proposed study was ethically approved by Institutional Animal Ethical Committee.

Among the reproductive diseases in the Database system of VCC maintained, the major cases were pyometra, fetal maceration, uterine infection, dystocia, pseudopregnancy and transmissible venereal tumor (TVT). For assessment of the clinical records, data relating to the breed, age, sex and season were collected. The reproductive diseases were diagnosed based on the evaluation of the history, general physical examination, routine blood examination, blood biochemical examination, cyto-pathological study and using diagnostic imaging technique such as ultrasonography and radiography. Cases presented for suspected TVT were diagnosed with physical examination of the tumor and cyto-pathological examination of the impression smears and fine needle aspirations collected from the tumor affected area. The animals were grouped under 4 different categories based on breed, age, sex and seasonal occurrence. The age of dogs studied was grouped as 1.1-4.0 years, 3.1-7.0 years, 7.1-10.0 years and 10.1-13.0 years. The dogs less than 1 year of age and more than 13 years of age were excluded for their prepubertal age and very less numbers, respectively. The different breeds recorded in the database were Labrador (LAB), German shepherd (GSD), German Spitz (GSP), Cocker Spaniel (CSP), Golden Retriever (GRT), Local breed (LOC), Pug (PUG), Crossbred (CRS), Pomeranian (POM), Rottweiler (RTW), Saint Bernard (STB) and Dachshund (DSH). The different seasons prevailed in the northeast region of India were taken as summer (March-June), Monsoon (July-September), Autumn (October-November) and Winter (December-February) (Baruti *et al.,* 2019).

The analysis of data was done by using program SPSS (Statistical Programs for Social Scientific) version 22.0. The incidence of reproductive diseases was estimated in terms of percentage. The data were plotted for estimation of incidence in relation to breed, age, sex and season.

RESULTS AND DISCUSSION

Amongst 9543 canine cases registered at the Gynaecology Outpatient Department of VCC during the period of 5 years, the reproductive disorders were found in 243 dogs, which accounted for overall 2.45% incidence of reproductive disorders. It was in agreement with the observation of Montenegro (2010). However, higher incidences of reproductive disorders were previously reported by several other authors (Honparkhe *et al.,* 2010; Costa *et al.,* 2019).

The frequencies of occurrence of various reproductive disorders recorded in different breeds of dogs during the study period are presented in Table 1. The incidence of pyometra, fetal maceration and pseudopregnancy was found to be the highest in Labrador (35.92%, 26.92% and 23.33%, respectively), uterine infection in Labrador and German Spitz (15.38% each) and TVT in local breeds (51.51%) of dogs. The highest incidence of pyometra, uterine infection and fetal maceration found in Labrador breeds of dogs under study might be due to higher adoption of this breed in Guwahati city than the other exotic breeds. Furthermore, although the population of local breeds is higher, but due to their poor reproductive efficiency, higher disease resistance and better adaptability to the environment, the susceptibility/incidence of aforesaid diseases is comparatively lower. In the present study, incidence of pyometra in local breeds of dog was 11.65%, which was higher than previously reported in stray dogs of Chennai, India (Sathiamoorthy and Raja, 2011). The higher incidence of pyometra in dogs may be due to repeated uncontrolled estrous cycle coupled with lack of attention by the owner (Sathiamoorthy and Raja, 2011). Prolonged ovarian production of progesterone in the luteal phase of the estrous cycle plays an important role in initiating the pathogenesis of uterine infection. The importance of progesterone is attributed to its suppression of immune responses and stimulation of endometrial glands secretions which provide a suitable environment for bacterial growth and functional closure of cervix which inhibits drainage of uterine exudates (Verstegen *et al.,* 2008). The local breeds found as stray animal, which is a key factor for reporting of higher incidence of TVT due to unplanned mating in tropical and subtropical region (Cizmeci and Guler, 2018). Higher incidence of TVT in local breeds of dogs could be due to higher contacts between infected animals during breeding season as compared to the pet animals (Sobral *et al.,* 1998). The incidence of pseudopregnancy in Labrador dogs was found higher in the present study (23.33%). In Brazil, Costa *et al.* (2019) reported 11.32% pseudopregnancy cases in female dogs. The higher incidence of pseudopregnancy found in dogs in the present study might be attributed to the factors related to unplanned breeding programme, genetic and geographical variation and lack of awareness among the owners. Out of the different breeds of dogs, Labradors were reported to be more prone to reproductive problems followed by crossbreds and less common in breeds like St. Bernard and Dachshund. In Brazil, crossbred dogs were most susceptible for reproductive problems (Costa *et al*., 2019). The variation with reported and present results might be due to owner's choice for adopting exotic breeds, non-availability of cases to the clinics during the study period and variation in geoclimatic regions.

In the current study, the dogs under 1.1-4.0 years of age group had the highest incidence of reproductive problems (47.86%) and the lowest 12.39% was in 10.1 to 13.0 years of age (Table 2, Fig 1). These observations were in agreement with the findings of previous reports (Gupta *et al.,* 2020; Juneja *et al.,* 2021). In the present study the higher incidence of pyometra (28.15%) found in 4.1 to 7.0 years of dogs, was consistent with previous report of Costa *et al.* (2019). Several authors also reported that pyometra mostly occurs in more than 5 years old bitches (Kahn and Line, 2010; Costa *et al.,* 2019). This might be due to absence

Table 1: Frequency of occurrence (%) of reproductive disorders in different breeds of dogs observed at VCC of College in Guwahati.

Diseases	LAB	GSD	GSP	CSP	GRT	LOC	PUG	CRS	POM	RTW	STB	DSH	Total no. of cases
Pyometra	35.92 (37)	12.62 (13)	9.70 (10)	1.94 (2)	1.94 (2)	11.65 (12)	5.83 (6)	12.62 (13)	2.91 (3)	1.94 (2)	1.94 (2)	0.97 (1)	103
Fetal maceration	26.92 (7)	15.38 (4)	7.69 (2)	3.85 (1)	3.85 (1)	11.53 (3)	7.69 (2)	7.69 (2)	3.85 (1)	3.85 (1)	3.85 (1)	3.85 (1)	26
Uterine infection	15.38 (4)	11.53 (3)	15.38 (4)	3.85 (1)	7.69 (2)	11.53 (1)	3.85 (3)	11.53 (1)	3.85 (3)	7.69 (1)	3.85 (2)	3.85 (1)	26
Dystocia	6.25 (1)	12.50 (2)	12.50 (2)	6.25 (1)	6.25 (1)	12.50 (2)	12.50 (2)	6.25 (1)	6.25 (1)	6.25 (1)	6.25 (1)	6.25 (1)	16
Pseudopregnancy	23.3 (7)	3.33 (1)	10.00 (3)	10.00 (3)	3.33 (1)	13.33 (4)	6.67 (2)	16.67 (5)	3.33 (1)	3.33 (1)	3.33 (1)	3.33 (1)	30
TVT	6.06 (2)	3.03 (1)	6.06 (2)	3.03 (1)	3.03 (1)	51.51 (17)	3.03 (1)	12.12 (4)	3.03 (1)	3.03 (1)	3.03 (1)	3.03 (1)	33

Figure in the parenthesis indicates number of disease.

Table 2: Incidence (%) of reproductive disorders in relation to the age group of dogs.

	1.1-4.0 years	4.1-7.0 years	7.1-10.0 years	10.1-13.0 years	Total number of cases
Pyometra % (n)	22.33(23)	28.15(29)	25.24(26)	24.27(25)	103
Fetal maceration % (n)	80.77(21)	11.53(3)	7.69(2)	0.00(0)	26
Uterine infection % (n)	57.69(15)	30.76(8)	11.53(3)	0.00(0)	26
Dystocia % (n)	87.50(14)	12.50(2)	0.00(0)	0.00(0)	16
Pseudopregnancy % (n)	73.33(22)	20.00(6)	3.33(1)	3.33(1)	30
TVT % (n)	51.51(17)	30.30(10)	9.09(3)	9.09(3)	33
	47.86(112)	24.78(58)	14.95(35)	12.39(29)	234

Figures in the parentheses indicate number of cases.

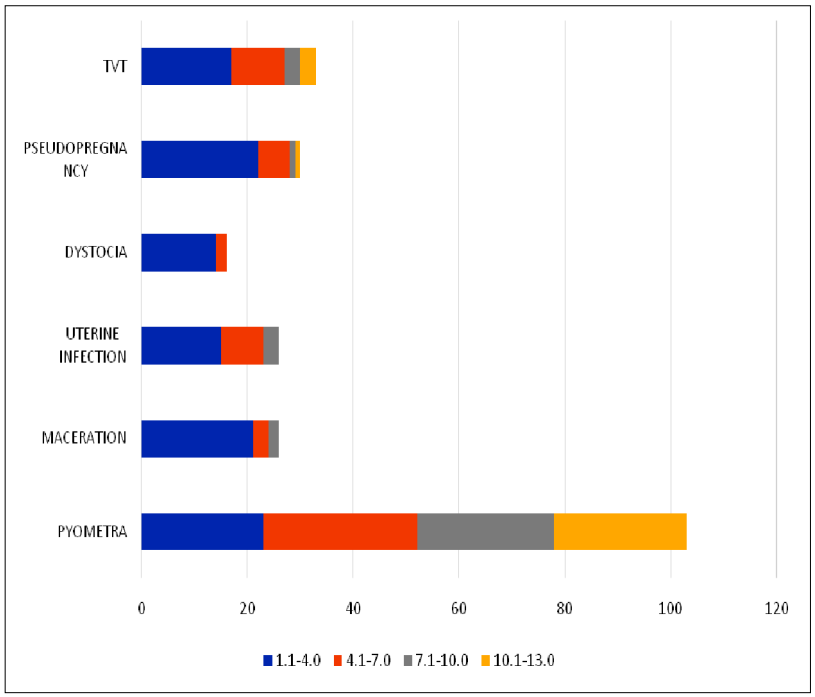

Fig 1: Age-wise cases of various reproductive disorders in dogs.

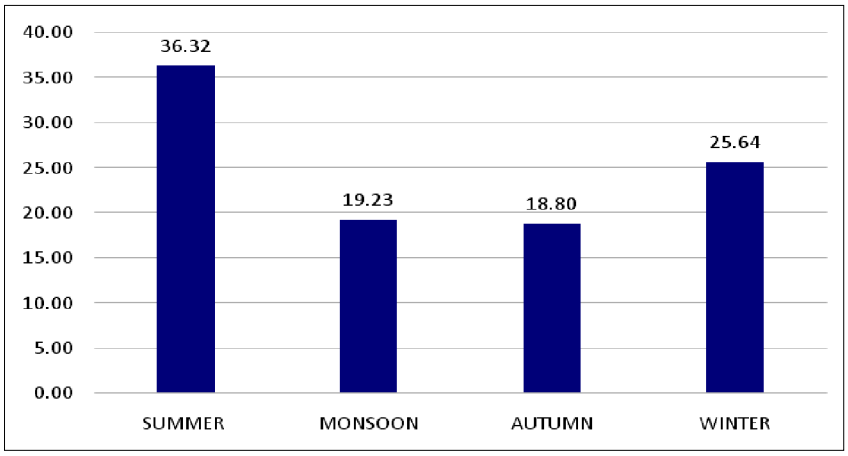

Fig 2: Season-wise incidence (%) of reproductive disorders in dogs.

of pregnancy for several consecutive estrous cycles, which leads to thickened, cystic lining of the endometrium and improper muscle contraction creating an ideal environment for bacterial growth. Perusal of available literature revealed that there was limited information regarding fetal maceration, uterine infection, dystocia and pseudopregnancy in relation to age group.

In the present study the incidence of fetal maceration, uterine infection, dystocia and pseudopregnancy was found to be higher in 1.1 to 4.0 years of dogs which is relatively similar with crossbred female dogs of Brazil (Costa *et al.*, 2019). Occurrence of dystocia in younger age of bitches might be due to feto-maternal disproportion, uterine inertia and asymmetrical sire sizes. The incidence of TVT was higher in 1.1-4.0 years of age group which is consistent with the previous report (Cizmeci and Guler, 2018). TVT occurs in the young dogs due to its higher sexual affinity and the disease is spread by carrier male dogs via copulation with many female dogs.

In the presented study, the female dogs were observed to be more prone to reproductive problems than male dogs (97 vs 3%). It may be due to shorter genital tract length of female than males. Infectious organisms can easily enter the genital tract in female during the time of proestrus and estrus periods. During this period, secretion of uterus followed by luteal phase enhances the microbial growth in the female genital tract. This may also be attributed to higher proportion of bitches presented and therefore the higher incidence of reproductive diseases seen in females than the males.

In respect to seasonal occurrence of reproductive disorders, the highest incidence was recorded in summer and the lowest in autumn (36.52 vs 18.80%, Fig 2). Environmental factors play a crucial role for affecting reproductive efficiency in dogs. During the summer season in tropical and subtropical areas the climate is likely to alter the estrous cycle in dogs. The mechanism responsible for the negative effects of summer on cyclic activity of dog is not fully understood, but it might be due to discomfort and heat stress during this period (Chatdarong *et al.,* 2007).

CONCLUSION

Labrador dogs were found to be most susceptible for reproductive disorders among various breeds of dog, however; TVT was recorded highest in local breeds of dog. Animals of 1.1 to 4.0 years of age group were more susceptible for reproductive disorders. The study demonstrated a higher incidence of reproductive disorders during summer season.

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Conflict of interset

All authors declared that there is no conflict of interest.

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