



ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2018; 7(7): 271-274
© 2018 TPI
www.thepharmajournal.com
Received: 14-05-2018
Accepted: 17-06-2018

C Nadhiya
Department of Veterinary
Pathology, Rajiv Gandhi
Institute of Veterinary
Education and Research,
Puducherry, India

MG Nair
Department of Veterinary
Pathology, Rajiv Gandhi
Institute of Veterinary
Education and Research,
Puducherry, India

R Kumar
Department of Veterinary
Pathology, Rajiv Gandhi
Institute of Veterinary
Education and Research,
Puducherry, India

AW Lakkawar
Department of Veterinary
Pathology, Rajiv Gandhi
Institute of Veterinary
Education and Research,
Puducherry, India

S Uma
Department of Veterinary
Pathology, Rajiv Gandhi
Institute of Veterinary
Education and Research,
Puducherry, India

RMD Alphonse
Department of Veterinary
Surgery and Radiology
Rajiv Gandhi Institute of
Veterinary Education and
Research, Puducherry, India

Correspondence
C Nadhiya
Department of Veterinary
Pathology, Rajiv Gandhi
Institute of Veterinary
Education and Research,
Puducherry, India

A study on the occurrence of mammary neoplasms in dogs at Puducherry, India

C Nadhiya, MG Nair, R Kumar, AW Lakkawar, S Uma and RMD Alphonse

Abstract

A retrospective study on the occurrence of mammary neoplasms in dogs presented to the Small Animal Unit-Surgery at the Teaching Veterinary Clinical Complex, RIVER, Puducherry was carried out for the period from January 2013 to December 2017. Out of 11,423 canine cases referred, 77 cases (0.67%) had mammary gland neoplasms. The occurrence of mammary neoplasms in dogs for the study period varied from 0.54% to 0.78%. Age-wise, the proportionate occurrence was highest in dogs aged above 6 years to 11 years (46/77, 59.74%) followed by those aged above 11 years to 14 years (17/77, 22.07%) and least in dogs aged 2 years to 6 years (14/77, 18.18%). Breed-wise, although the highest occurrence was recorded in the mongrels, when grouped together, the proportionate occurrence was higher in the purebreds (46/77, 59.74%) compared to the mongrels (28/77, 36.36%) and crossbreds (3/77, 3.9%). Among the purebreds, the highest number of cases were recorded in Spitz (11/46, 23.91%), followed by Labrador (8/46, 17.39%), German shepherd and Great Dane (7/46, 15.21%, each), Doberman (4/46, 8.49%), Boxer and Dachshund (3/46, 6.52% each), Pug (2/46, 4.37%) and Rottweiler (1/46, 2.17%). Of the 77 cases, 75 were recorded in females and two in males. Majority of the cases were recorded in intact dogs (69/75, 92%) compared to the spayed (6/75, 8%) animals.

Keywords: Canine, mammary neoplasms, occurrence, age, breed and sex

Introduction

Cancer is a major cause of mortality in dogs. It is estimated that in *Canis familiaris*, one out of every four dogs greater than 2 years of age, dies of cancer with certain popular breeds being over-represented in terms of cancer incidence and mortality [1-2]. Such an increased incidence of cancers in small animals is motivating further studies in the field of tumor pathology with an aim to increase the survival time and to improve the quality of cancer patients life [3]. Mammary neoplasms constitute overall second most frequent neoplasia in dogs, surpassed only by skin neoplasms and rank first among bitches especially in sexually intact ones. Based on their histological and biological features, it has been reported that approximately one third to half of the surgically removed canine mammary neoplasms are malignant [4]. Canine mammary neoplasms, like other neoplasms, are a disease entity with a multi-factorial etiology. The impact of certain endogenous factors of genetic, immunological and hormonal nature are very important in carcinogenesis [3]. Neoplasms might arise due to several exogenous factors of radiological, chemical, dietary, mechanical and viral origin. Lack of reliable cancer registries have made it difficult to ascertain the increasing or decreasing prevalence of cancer in dogs. A retrospective study aimed at understanding the occurrence of mammary neoplasms in dogs with respect to the age, breed and sex, on the cases presented to the Teaching Veterinary Clinical Complex, RIVER, Puducherry, India was carried out.

Materials and Methods

The study was based on the case records of dogs suspected for mammary neoplasms referred to the Small Animal Unit- Surgery at the Teaching Veterinary Clinical Complex, Rajiv Gandhi Institute of Veterinary Education and Research (RIVER) at Puducherry for a period of 5 years (January 2013- December 2017). Neoplasms were confirmed on biopsy samples processed at the Department of Veterinary Pathology, RIVER. For every case included in the study, the information about age, sex, breed and reproductive status was obtained. The frequency distribution of the various parameters were calculated.

Results

A total of 66,000 canine cases were registered at Teaching Veterinary Clinical Complex, Puducherry during the period from January 2013 to December 2017. Out of these, 11,423 cases were referred to the Surgery Unit and based on the biopsy reports, 77 cases were diagnosed as mammary gland neoplasms.

The year-wise occurrence of mammary neoplasms with respect to the number of surgical cases is given in Table 1 and also represented in Fig.1. The occurrence varied from 054% to 072%. The overall occurrence of mammary gland neoplasms during the study period was 0.67%.

Table 1: Year-wise occurrence of canine mammary neoplasms

Sl. No.	Year	Total cases	Surgical cases	Cases with mammary neoplasm	Year-wise Occurrence (%)
1	2013	13,200	2,220	12	0.54
2	2014	12,980	2,300	18	0.78
3	2015	13,000	2370	14	0.59
4	2016	13,470	2,360	17	0.72
5	2017	13,350	2,173	16	0.7
	Total	66,000	11,423	77	0.67

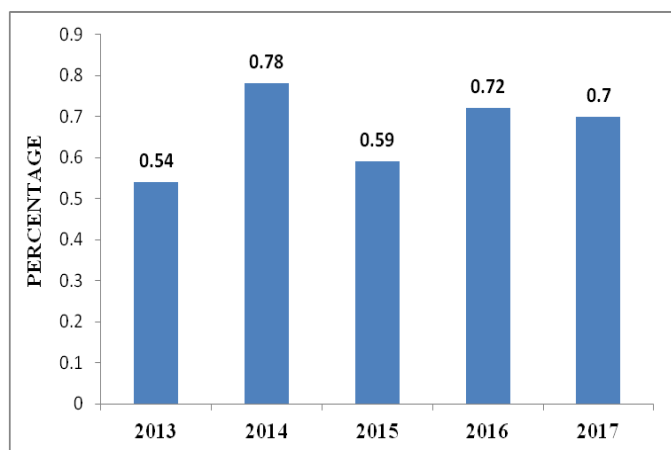


Fig 1: Year-wise occurrence of canine mammary neoplasms represented as percentage of surgical cases.

The age-wise occurrence of canine mammary neoplasms is shown in Fig. 2. The highest occurrence of canine mammary neoplasms cases was recorded in the dogs aged above 6 years to 11 years (59.74%, 46/77) followed by those aged above 11 years to 14 years (22.07%, 17/77). It was least in younger dogs in the age group of 2 to 6 years (18.18%, 14/77).

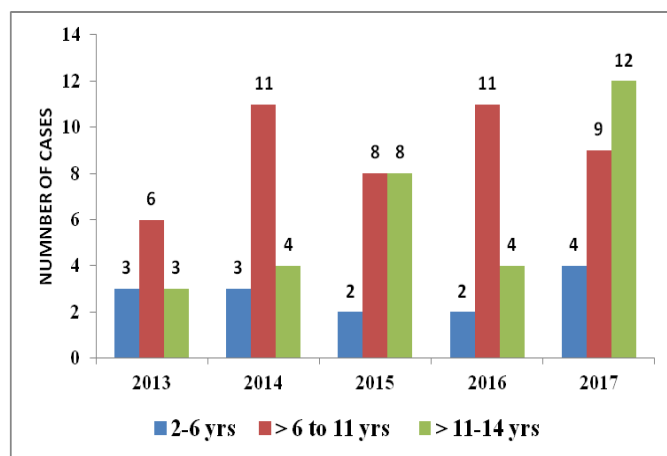


Fig 2: Age-wise occurrence of canine mammary neoplasms

The breed-wise occurrence of canine mammary neoplasms is shown in Fig. 3. The highest number of cases were recorded in mongrels. When grouped together, the proportionate occurrence was higher in the purebreds (46/77, 59.74%) compared to mongrels (28/77, 36.36%) and crossbreds (3/77, 3.9%). Among the purebreds, the highest number of cases were recorded in Spitz (11/46, 23.91%), followed by Labrador (8/46, 17.39%), German shepherd and Great Dane (7/46, 15.21%, each), Doberman (4/46, 8.49%), Boxer and Dachshund (3/46, 6.52% each), Pug (2/46, 4.37%) and Rottweiler (1/46, 2.17%). Of the 77 cases, 75 were recorded in females and two in males. Majority of the cases were recorded in intact females (69/75, 92%) than in spayed ones (6/75, 8%).

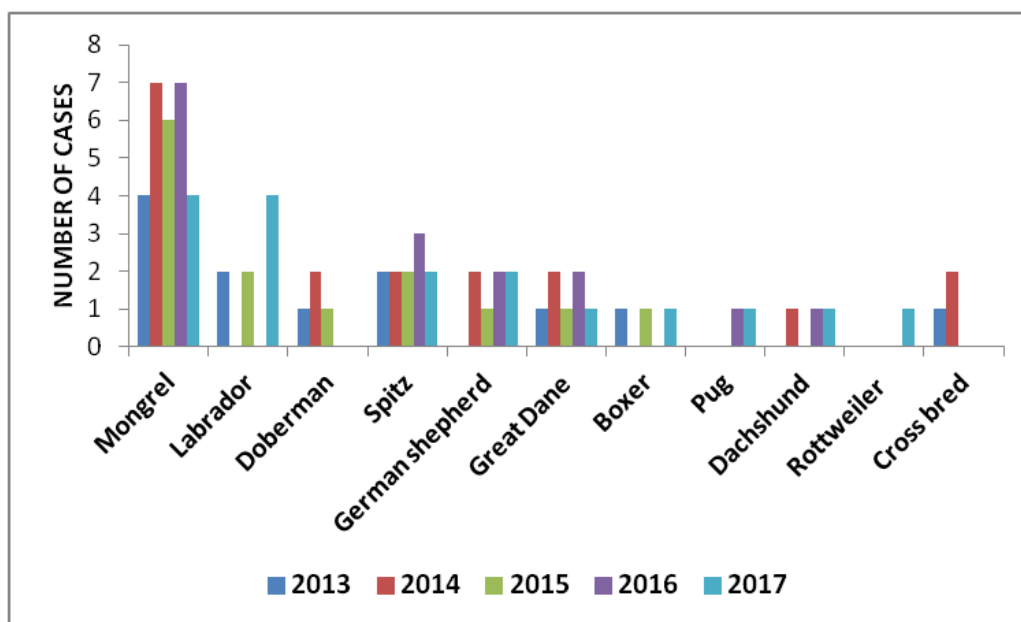


Fig 3: Breed wise occurrence of canine mammary neoplasms

Discussion

Mammary gland neoplasms are the most common type of neoplasms encountered in bitches^[5] and their incidence varies from 111 to 622.6 cases per 100 000 dogs per year^[6-8]. The frequency reported in different countries (0.11% to 0.63%) vary according to the geographical location and the study population. The occurrence of canine mammary neoplasms recorded in the present study, 0.11% (77/66,000cases) and 0.67% (77/11,423 surgical cases) is in accordance with earlier reports^[9-11]. In a retrospective study carried out based on Teaching Hospital cases records from 2006 to 2009 at Anand, Gujarat, the overall occurrence of canine mammary neoplasms was reported to be 0.76% (63/8337 cases) and 3.04% (63/2070 surgical cases)^[11]. A wide range of variation exists in the reporting of the occurrence of mammary cancers in dogs. These could be attributed to the methodology of data analysis adopted particularly the sampling of the cases with neoplasm and representing the cases as a percentage of the total or surgical or neoplastic cases.

In the present study, an increase in the occurrence of mammary neoplasms was observed after 6 years of age, so called onset of “cancer age” as pointed out in previous studies^[12]. The highest occurrence of canine mammary neoplasms cases was found in the dogs aged above 6 years to 11 years (59.74%, 46/77) followed by those aged above 11 years to 14 years (22.07%, 17/77). It was least in younger dogs in the age group of 2 to 6 years (18.18%, 14/77). These data are in agreement with the reports in the literature that the risk of developing mammary cancer in dogs increases significantly with age, affecting most frequently animals at an age from nine to eleven, with a low occurrence in female dogs with less than five and are rare in dogs less than two years of age. A higher occurrence of mammary neoplasm cases has been reported in the age group of 8–10 years (23.08%)^[13]. Similarly, the lower occurrence of mammary neoplasms observed in dogs aged above 11years to 14 years and 2-6 years of age in the present study, are also in accordance with the previous reports^[14-15].

Breed-wise occurrence of mammary neoplasms recorded in the present study indicated that mongrels were most commonly affected compared to the purebreds and crossbreds. This is due to the overrepresentation of mongrel cases to the teaching hospital. However, when grouped together, the proportionate occurrence was higher in the purebreds (46/77, 59.74%) compared to mongrels (28/77, 36.36%) and crossbreds (3/77, 3.9%). These observations are in agreement to earlier reports^[16-17] that purebred dogs were at a higher risk of developing mammary neoplasms than crossbreds and mongrels. Although, the reasons for this natural predisposition of certain breeds are not known, it can be explained to some extent that dogs do inherit abnormal genes (oncogenes) when they are selected for certain genetic traits for desirable morphological features of a particular breed over a period of time^[18]. Also, the genetic influences associated with dog breeding practices, such as inbreeding, can also explain the cancer risk in pure-breed dogs^[19]. Among the purebreds, Spitz were most affected with mammary neoplasms, 11/46, 23.91%. It could be inferred that a higher population of this breed in the sampled locations of the current study and the possible preference of the public towards rearing smaller breeds of dogs that ultimately contributed to a more number of dogs of this breed being presented to the clinics. However, actual genetic factors underlying this needs to be investigated further.

Sex-wise occurrence indicated that out of the 77 cases presented with the mammary neoplasms, 75 were recorded in females and two in males. Mammary neoplasms are rare in males, the generalized incidence being only1%^[20]. It is well established that intact dogs are at more risk of developing mammary neoplasia than spayed bitches. In the present study, a higher occurrence of mammary neoplasms was recorded in intact dogs (69/75, 92%) than in spayed ones (6/75, 8%). The occurrence of mammary neoplasms among intact dogs reported in earlier studies ranged from 79.20% to 94.73%^[21-23].

Retrospective epidemiological studies represent a helpful approach and an important source of information for analyzing neoplastic disease behavior over time. These studies are also useful for establishing risk factors and prognosticating criteria from clinical and histopathological features. Therefore, these may be translated into relevant scientific information that may be used as a basis for experimental studies.

Acknowledgement

The Dean, Rajiv Gandhi Institute of Veterinary Education and Research (RIVER), Puducherry, India for providing necessary facilities.

References

1. Khanna C, Lindblad-Toh K, Vail D, London C, Bergman P, Barber L *et al.* The dog as a cancer model. *Nature Biotechnology*. 2006; 24(9):1065-1066.
2. Olson PN. Using the canine genome to cure cancer and other diseases. *Theriogenology*. 2007; 68(3):378-381.
3. Todorova I. Prevalence and etiology of the most common malignant tumors in dogs and cats. *Bulgarian Journal of Veterinary Medicine*. 2006; 9:85-98.
4. Misdorp W. Tumors of the mammary gland. In: Meuten DJ(ed) *Tumors in Domestic Animals*. Iowa State Press, Ames, Iowa, 2002, 575-606.
5. Benjamin SA, Lee AC, Saunders WJ. Classification and behavior of canine mammary epithelial neoplasms based on life-span observations in beagles. *Veterinary Pathology*. 1999; 36:423-436.
6. Vail DM, Mac Ewen EG. Spontaneously occurring tumours of companion animals as models for human cancer. *Cancer Investigation*. 2000; 18:781-792.
7. Goldschmidt MH, Shofer FS, Smelstoy JE. Neoplastic lesions of mammary gland. In: Mohr U, Carlton WW, Dungworth DL, Benjamin SA, Capen CC, Hahn FF (eds.): *Pathobiology of Aging Dogs*. 1stEdn. ISU Press/ILSI, Ames, Iowa, 2001, 168-178.
8. Egenvall A, Bonnett BN, Ohagen P, Olson P, Hedhammar A, von Euler H. Incidence of and survival after mammary tumors in a population of over 80,000 insured female dogs in Sweden from 1995 to 2002. *Preventive Veterinary Medicine*. 2005; 69:109-127.
9. Rekha MT. Pathology of canine mammary tumours and usefulness of AgNOR in differentiating benign and malignant canine mammary tumours. M.V. Sc Thesis, Anand Agricultural University, Anand, Gujarat, India, 2005.
10. Priya S. Incidence of canine mammary tumours in Chennai, Tamil Nadu. *Indian Veterinary Journal*. 2006; 83:1054-1056.
11. Dhama MA, Tank PH, Karle AS, Vedpathak HS. Bhatia AS. Epidemiology of canine mammary gland tumours in

- Gujarat. Veterinary World. 2010; 3(6):282-285
12. Moulton JE, Taylor DON, Dorn CR, Andersen AC. Canine mammary tumours. Veterinary Pathology. 1970; 7:289-320.
 13. Khimta S, Maiti SK, Kumar N, Sharma AK Occurrence of neoplasms in canine– a retrospective study. Indian Journal of Animal Science. 2010; 80:7-11.
 14. Bostedt H, Tammer I. Prognosis of tumours of the canine mammary gland-a retrospective study. Praktische Tierarzt. 1995; 76:921-924.
 15. Mulligan RM. Mammary cancer in the dog: a study of 120 cases. American Journal of Veterinary Research. 1975; 36(9):1391-1396.
 16. Leena RPL. A study on gross, histopathology and immunohistochemistry of canine mammary tumors. M.V.Sc thesis, Pondicherry University, Puducherry, 2008.
 17. Hemanth I. Pathomorphological studies on canine mammary neoplasms with special reference to p53 gene mutations. M.V. Sc thesis, Pondicherry University, Puducherry, 2012.
 18. Sorenmo K. Canine mammary gland tumors. Veterinary Clinics of North America Small Animal Pracice. 2003; 33(3):573-596.
 19. Dorn RC. The epidemiology of cancer in animals. Journal of California Medicine. 1967; 107(6):481-489.
 20. Rutteman GR, Winthrow SJ, Mac Ewen EG. Tumors of the mammary gland. In: Small Animal Clinical Oncology. Winthrow, SJ, Mac Ewen B R (Eds.), W.B. Saunders Co., Philadelphia, 2012, 450-467.
 21. Itoh T, Uchida K, Ishikawa K, Kushima K, Kushima E, Tamada H *et al.* Clinico-pathological survey of 101 canine mammary gland tumors: Differences between small-breed dogs and others. The Journal of Veterinary Medical Science. 2005; 67(3):345-347.
 22. Jivan PS. Epidemiological studies of canine neoplasms with special reference to mutational analysis of p53 gene in canine mammary tumors by PCR-SSCP. M.V.Sc thesis, Anand Agricultural University, Anand, Gujarat, 2006.
 23. Anjan Kumar KR. Expression of stem cell lineage markers in the prognosis of canine mammary tumours. M.V. Sc thesis, Tamil Nadu Veterinary and Animal Sciences University (TANUVAS), Chennai, 2009.