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## Retrospective studies on tumor conditions in dogs over a period of four years (2014-2018)

**Senthil NR, Chakravarthi R and Vairamuthu S**

### Abstract

The present work was based on retrospective study of 386 biopsies of dogs received over a period of four years (2014 to 2018) in and around Chennai at Madras Veterinary College. The sex-wise distribution of tumor cases revealed higher incidence 226 cases (58%) in females and 162 (42%) in males. Maximum number of cases were 208 cases (53.8%) in the age group of 5-10 years followed by 90 cases (23.3%) in above 10 years and 89 cases (23.1%) in 0-5 years. The incidence rate were of Mammary gland Neoplasm (25.64%) followed by Transmissible Venereal Tumour (15.8%), Lymphoma (11.39%), Adenocarcinoma (11.39%), Perianal Adenoma (6.73%), Lipoma (6.47%), Mastocytoma (5.95%), Fibrosarcoma(3.88%), Squamous cell carcinoma (2.59%), Histiocytoma (2.33%), Melanoma (1.55%), Papilloma (1.29%), Hepatocellular Carcinoma (1.03%), Transition cell carcinoma (0.77%), Mesothelioma (0.77%), Osteosarcoma (0.77%), Sebaceous Adenoma(0.25%) and Blood Cell Carcinoma (0.25%).The incidence of neoplasms was highest in Non-descript Dogs (ND) (34.97%), Labrador retriever (25.91%), Spitz (15.28%), Doberman (7.25%) and German Shepherd (GSD) (3.89%) respectively.

**Keywords:** Tumors, dogs, retrospective study

### Introduction

Cancer is at least as common in dogs as in humans. In a necropsy series of 2,000 dogs, 23% of all dogs and 45% of dogs older than 10 years died of cancer [1, 2]. Due to lack of systematic study and absence of Animal Cancer Registry in India, the scenario of cancer incidences in India is not well documented but reports on different tumour(s) conditions in canines have been published separately from all parts of India [3, 4, 5]. Due to improvement of diagnostic tests in the veterinary community, dogs receive more accurate diagnoses than available before, which in-turn leads to more effective therapy. In addition, owners are fond in accessing the health status of companion animals. On improving the ability to track canine cancer, several aspects of canine neoplasm such as predisposition of particular type of canine neoplasm to breed, age and sex can be discovered.

### Materials and methods

The study was conducted on the biopsy reports of last four years i.e. from 2014 to 2018 available in the department for evaluating epidemiology of tumour conditions in dogs. Sex, age and anatomical location were recorded from the history of the case(s). For the confirmatory histopathological diagnosis, Fine Needle Aspiration Cytology and Fine Needle Aspiration Biopsy were done whichever possible as per the case. The cellular samples of lesions were obtained through insertion of thin needle (24 G). The aspirated cellular mass is smeared and stained as per standard protocol [6]. The case is diagnosed from which the breed-wise, age-wise and sex-wise data were collected. The collected data were entered into Excel sheets, which were imported and analyzed using Descriptive statistics (frequency and percentage) for all types of cancer separately.

### Results and Discussions

#### Breed Predisposition in Canine Neoplasm

The incidence rate were of Mammary gland Neoplasm (25.64%) followed by Transmissible Venereal Tumour (15.8%), Lymphoma (11.39%), Adenocarcinoma (11.39%), Perianal Adenoma (6.73%), Lipoma (6.47%), Mastocytoma (5.95%), Fibrosarcoma (3.88%), Squamous cell carcinoma (2.59%), Histiocytoma (2.33%), Melanoma (1.55%), Papilloma (1.29%), Hepatocellular Carcinoma (1.03%), Transition cell carcinoma (0.77%), Mesothelioma (0.77%), Osteosarcoma (0.77%), Sebaceous Adenoma(0.25%) and Blood Cell

Carcinoma (0.25%). The incidence of neoplasms was highest in Non-descript Dogs (ND) (34.97%), Labrador retriever

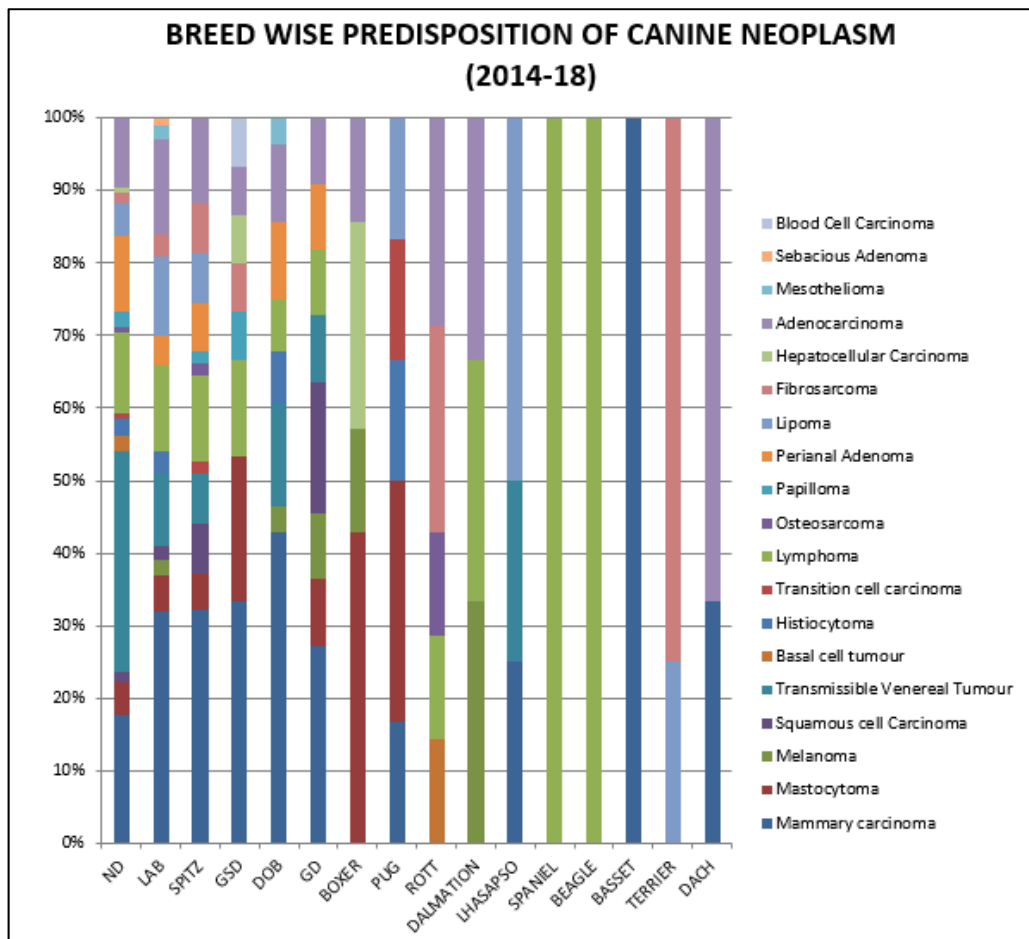
(25.91%), Spitz (15.28%), Doberman (7.25%) and German Shepherd (GSD) (3.89%) respectively.

**Table 1:** Breed-wise distribution of Canine Neoplasm

Neoplasm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Mammary carcinoma	24	32	19	5	12	3	0	1	0	0	1	0	0	1	0	1
Mastocytoma	6	5	3	3	0	1	3	2	0	0	0	0	0	0	0	0
Melanoma	0	2	0	0	1	1	1	0	0	1	0	0	0	0	0	0
Squamous cell Carcinoma	2	2	4	0	0	2	0	0	0	0	0	0	0	0	0	0
Transmissible Venereal Tumour	41	10	4	0	4	1	0	0	0	0	1	0	0	0	0	0
Basal cell tumour	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Histiocytoma	3	3	0	0	2	0	0	1	0	0	0	0	0	0	0	0
Transition cell carcinoma	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
Lymphoma	15	12	7	2	2	1	0	0	1	1	0	1	2	0	0	0
Osteosarcoma	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Papilloma	3	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Perianal Adenoma	14	4	4	0	3	1	0	0	0	0	0	0	0	0	0	0
Lipoma	6	11	4	0	0	0	0	1	0	0	2	0	0	0	1	0
Fibrosarcoma	2	3	4	1	0	0	0	0	2	0	0	0	0	0	3	0
Hepatocellular Carcinoma	1	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0
Adenocarcinoma	13	13	7	1	3	1	1	0	2	1	0	0	0	0	0	2
Mesothelioma	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Sebaceous Adenoma	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blood Cell Carcinoma	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0

Legend:

- |                       |                |               |                  |
|-----------------------|----------------|---------------|------------------|
| 1. Non-Descript       | 9. Rottweiler  | 5. Dobermann  | 13. Beagle       |
| 2. Labrador Retriever | 10. Dalmatian  | 6. Great Dane | 14. Basset Hound |
| 3. Spitz              | 11. Lhasa Apso | 7. Boxer      | 15. Terrier      |
| 4. German Shepherd    | 12. Spaniel    | 8. Pug        | 16. Dachshund    |



**Fig 1:** breed wise predisposition canine neoplasm (2014-2018)

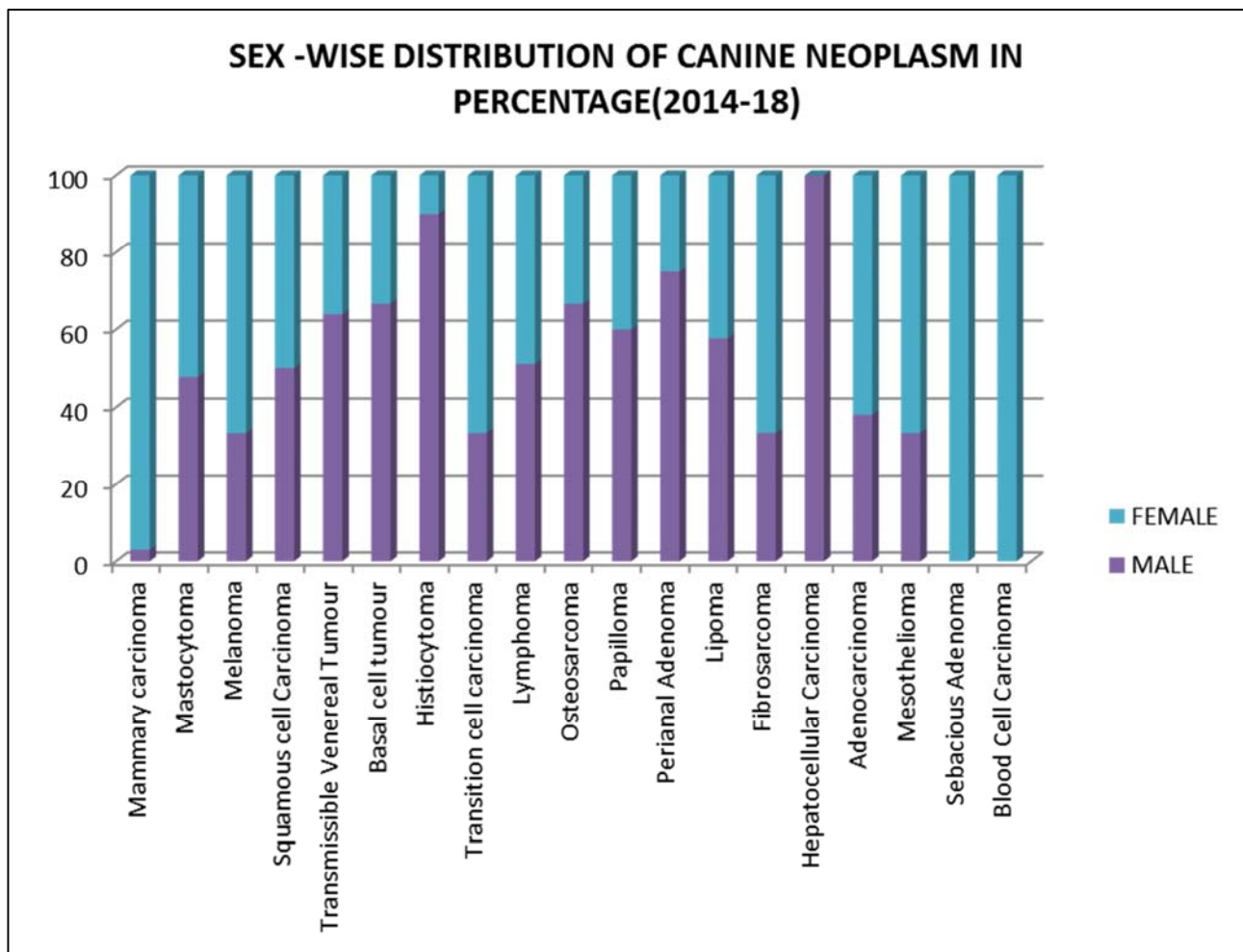
When multiple dog breeds are at an elevated risk for the same type of cancer, it is possible, even probable, that the breeds share an underlying genetic predisposition (e.g., all at-risk breeds segregate the cancer because they shared a common founder during breed development)<sup>[8]</sup>. There are many other examples of breeds with either a predisposition for, or apparent protection from particular cancers. For instance, when considering brain and central nervous system cancers, a 2013 study showed that the boxer, golden retriever, French bulldog, and Boston and rat terriers were at a significantly increased risk, whereas the cocker spaniel and Doberman pinscher were at a low risk<sup>[9]</sup>.

**Sex Predisposition in Canine Neoplasm**

The sex-wise distribution of tumor cases revealed higher incidence 226 cases (58%) in females and 162 (42%) in males.

**Table 2:** Sex-wise distribution of Canine Neoplasm

NEOPLASM	Male	Female
Mammary carcinoma	3	96
Mastocytoma	11	12
Melanoma	2	4
Squamous cell Carcinoma	5	5
Transmissible Venereal Tumour	39	22
Basal cell tumour	2	1
Histiocytoma	9	1
Transition cell carcinoma	1	2
Lymphoma	23	22
Osteosarcoma	2	1
Papilloma	3	2
Perianal Adenoma	21	7
Lipoma	15	11
Fibrosarcoma	5	10
Hepatocellular Carcinoma	4	0
Adenocarcinoma	16	26
Mesothelioma	1	2
Sebaceous Adenoma	0	1
Blood Cell Carcinoma	0	1



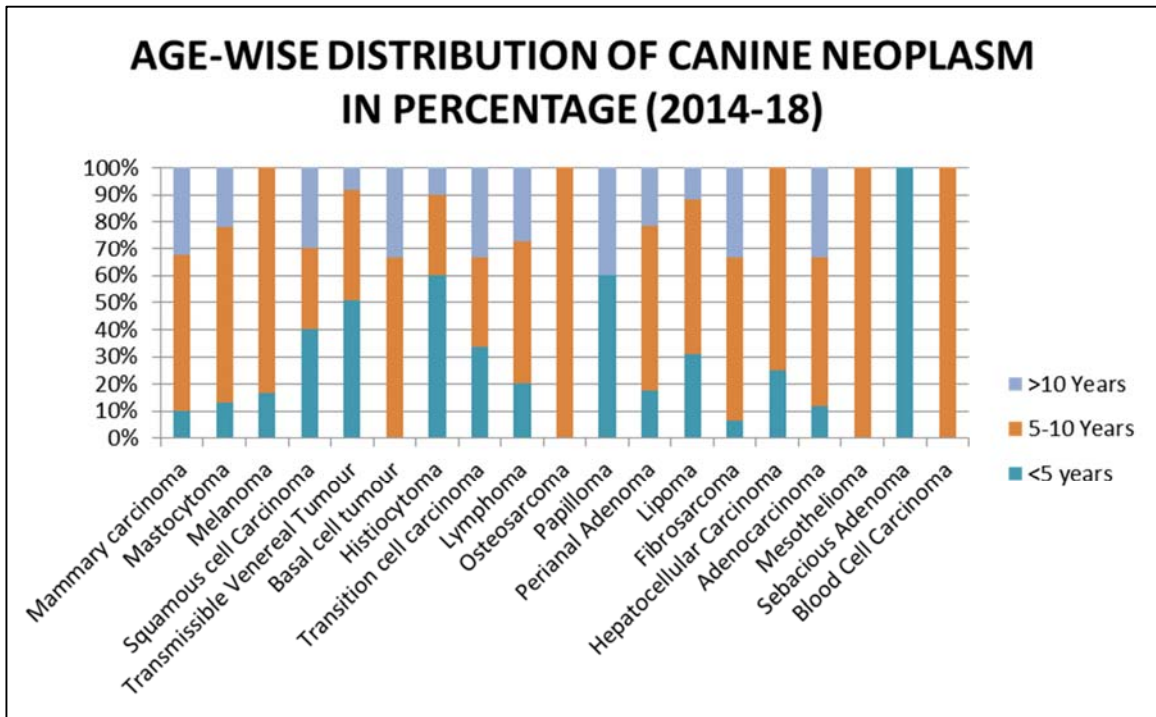
**Fig 2:** Sex-wise distribution of canine neoplasm in percentage(2014-2018)

Sexual predisposition depends mainly upon the type of neoplasm. For instance female hormones are found to be safe for Non- Hodgkin Lymphoma<sup>[10]</sup>, whereas male hormones increases the incidence of Perineal Adenoma<sup>[11]</sup>.

**Age Predisposition in Canine Neoplasm**

Maximum number of cases were 208 cases (53.8%) in the age

group of 5-10 years followed by 90 cases (23.3%) in above 10 years and 89 cases (23.1%) in 0-5 years. The incidence of canine neoplasm generally increase with increase in age upto 10 years of age which is average life expectancy of dogs<sup>[11]</sup>.



**Fig 3:** Age-wise distribution of canine neoplasm in percentage (2014-2018)

**Table 3:** Age-wise distribution of Canine Neoplasm

Neoplasm	<5 years	5-10 Years	>10 Years
Mammary carcinoma	10	57	32
Mastocytoma	3	15	5
Melanoma	1	5	0
Squamous cell Carcinoma	4	3	3
Transmissible Venereal Tumour	31	25	5
Basal cell tumour	0	2	1
Histiocytoma	6	3	1
Transition cell carcinoma	1	1	1
Lymphoma	9	23	12
Osteosarcoma	0	3	0
Papilloma	3	0	2
Perianal Adenoma	5	17	6
Lipoma	8	15	3
Fibrosarcoma	1	9	5
Hepato cellular Carcinoma	1	3	0
Adenocarcinoma	5	23	14
Mesothelioma	0	3	0
Sebaceous Adenoma	1	0	0
Blood Cell Carcinoma	0	1	0

**Summary**

The study was conducted mainly to identify the epidemiology of canine neoplasm which would be highly useful in diagnosing and treating cancer cases by veterinary physician. The predisposition factors were identified. With reference to One Health concept, studying Canine Neoplasm could potentially help in studying Human Oncology as dogs act as potential animal model for the study of human cancers.

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