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Incidence of certain tumors in dogs

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Abstract

The objective of present study was to evaluate the Incidence of certain tumors in dogs. Clinical cases of tumors were identified by examination of externally visible out growths over the body of the dogs, history of un healing wounds, animals going down in condition etc. Such cases were subjected for further diagnostic examinations like evaluation of the hemato-biochemical parameters, Fine needle aspiration cytology, biopsy of the tumor, radiographic examination, ultra-sonographic examination and were diagnosed as malignant tumors of various types. The incidence of certain tumours in dogs was evaluated.

Keywords: Incidence, malignant tumors, dogs

Introduction

Cancer can be defined broadly as a disease in which there is uncontrolled multiplication and spread of abnormal forms of the body's own cells within the body. These results in new and diseased form of tissue growth called as neoplasm. It is one of the major causes of death in human beings and dogs. Neoplasms are of two types benign and malignant. A benign tumour such as a common skin wart remains confined to its original location neither invading surrounding normal tissue nor spreading to distant body sites. A malignant tumour however is capable of both invading surrounding tissues and spreading throughout the body via the circulatory or lymphatic systems (metastasis). Only malignant tumours are referred to as cancers and it is their ability to invade and metastasize that makes cancer so dangerous [2]. Both benign and malignant tumours are classified according to the type of cell from which they arise [14]. Carcinomas which include approximately 90% of the canine cancers are the malignancies of epithelial cells [2, 14]. Sarcomas which are rare in canines are solid tumours of connective tissues such as muscle, bone, cartilage and fibrous tissue. Leukemias and lymphoma which account for approximately 8% of malignancies arise from the blood forming cells and from cells of the immune system. Tumours are further classified according to tissue of origin (e.g. lung or mammary carcinoma) and the type of cell involved e.g. fibro sarcoma arise from fibroblasts and erythroid leukemias from precursors of erythrocytes (RBC) Cancer occurs in number of types and conditions including benign to malignant form, they also differ in the acuteness of malignancy. Canine cancers are associated with varied clinical signs and thus present a challenge for the veterinary physician for accurate diagnosis and treatment. As some of the cancers show a high potential of metastasis to various organs of the body the therapy is often challenged in curtailing the spread and clearance of the cancerous cells [2, 14]. Despite the availability of wide range of diagnostic modalities for cancer no single modality is full proof for identification of cancer. Laboratory assessment for cancer with fine needle aspiration, histopathology etc is the main source of reliable diagnosis. Ultrasonography, radiography etc may be used for further confirmation of cancer and metastatic growths in the body. Further electron microscopy is the most advanced diagnostic method for differentiating the cellular details of various cancers [2, 14]. Uncontrolled proliferation with decreased requirements of extracellular growth factors, Less stringent cell-cell and cell-matrix interactions, Failure of differentiation and loss of function, Invasiveness, Angiogenesis and Metastasis were the main features of a cancerous tissue [2, 14].

Materials and methods

Dogs with signs suggestive of neoplasia such as palpable masses at various parts of the body like genitalia, mammary gland, skin and bone; persistent unhealed ulcers; anorexia; weight loss etc. were taken up for the study to record the incidence of various tumours. Intra abdominal masses were identified for recording the incidence based on palpation, radiographic and ltrasonographic examination. Detailed symptomatology was recorded in all the confirmed malignant tumor cases. The dogs selected for the study were subjected to thorough clinical

examination. Observations such as palpation of superficial lymph node were recorded. Superficial lymph nodes palpated included prescapular, axillary, inguinal and popliteal lymph nodes for enlargement as well as for unilateral or bilateral involvement. The tumours were also examined for size, location, number, erythema, ulceration, necrosis and bleeding. Presence of invasive growth, attachment to the underlying muscles, pedunculation and adherence to overlying skin were also recorded. Furthermore the nature of discharges i.e., bloody, serous, serosanguineous etc was documented. Clinical samples i.e., fine needle aspiration of the tumour mass and biopsy were collected to undertake cytology and histopathology from the dogs suspected for tumour based on clinical examination for further confirmatory diagnosis. Haematology and biochemistry was performed to evaluate the patient's health condition (or) suitability for treatment.

Results

During the study period, out of the 48,600 dogs presented to small animal medical outpatient ward of Teaching Veterinary Clinical Complex, Bhoiguda, College of Veterinary Science, Rajendranagar, 3,240 were suspected for neoplasms and were screened by various diagnostic modalities. Out of these 458 dogs of different age, breed and sex were diagnosed for certain malignant tumours with an incidence of about 0.94%. Based on specific diagnostic techniques, such as FNAC and histopathology these tumours were further classified and confirmed as TVT, mammary tumours, perianal tumours and other skin tumours with an incidence rate of 25.77 percent (118 dogs), 22.27 percent (102 dogs) and 8.95 percent (41 dogs), 23.14 percent (106 dogs) and miscellaneous tumours like lipoma (6.33 percent), lymphoma (4.80 percent), squamous cell carcinoma (4.15 percent), osteosarcoma (3.93 percent), transitional cell carcinoma and (0.66 percent) were recorded among 106, 29, 22, 19, 18 and 3 dogs respectively as presented in Table No.1

The age wise incidence of various tumours studied in the present investigation revealed a highest incidence rate of 43.23 percent which corresponds to 198 dogs among the age group of >5-10yrs, followed by 33.84 percent among 155 dogs of 0-5yrs of age and with a lowest incidence of 22.93 percent i.e. 105 dogs that were aged more than 10 yrs respectively. The results pertaining to age wise incidence of tumours recorded in the present study are shown in Table No. 2

Table 1: Incidence of certain malignant tumors in dogs (n=458)

Sl. No	Tumor type	Incidence	Percentage
1	TVT	118	25.77
2	Mammary tumors	102	22.27
3	Perianal tumors	41	8.95
4	Other skin tumors	106	23.14
5 Miscellaneous tumors			
1	Lipoma	29	6.33
2	Lymphoma	22	4.80
3	SCC (oral)	19	4.15
4	Osteosarcoma	18	3.93
5	TCC (bladder)	3	0.66
Total		458	100

Table 2: Incidence of tumours in different age groups of dogs (n = 458)

Age group	No. of dogs	Percentage (%)
0-5 years	155	33.84
>5-10 years	198	43.23
>10 years	105	22.93
Total	458	100

In young dogs up to 5 yrs TVT had a highest incidence of 56.78 percent, followed by 27.97 percent in >5-10 yrs and least incidence of 15.25 percent among dogs aged beyond 10 yrs. The mammary tumours were highly prevalent in dogs aged between >5-10 yrs (42.16 percent), followed by more than 10 yrs (33.33 percent) and (26.42 percent) and lowest among the dogs aged between 0-5 yrs (24.51 percent) and (25.47 percent), respectively. With respect to perianal tumours, highest incidence was recorded as 56.10 percent among middle aged dogs of >5-10yrs, followed by 26.83 percent incidence among young dogs of 0-5 yrs and whereas dogs aged more than 10yrs showed only 17.07 percent incidence. Further, age wise incidence of miscellaneous tumours viz., Other skin tumours like mast cell tumours, basal cell tumours, squamous cell carcinoma of skin and histiocytoma were reported to be highly prevalent i.e., 48.11 percent among middle aged dogs of >5-10 yrs followed by >10 yrs which was 26.42% and lowest of 25.47% was observed in dogs less than 5 years. Osteosarcoma, lymphoma, squamous cell carcinoma and transitional cell carcinoma was reported to be highly prevalent (61.11 percent, 59.09 percent, 42.10 percent and 66.67 percent) among middle aged dogs of >5-10 yrs followed by young dogs up to 5 yrs (22.22 percent, 22.73 percent, 31.58 percent and 33.33 percent) and lowest incidence of 16.67 percent, 18.18 percent, 26.32 percent, and 0 percent were recorded among dogs beyond 10 yrs. With respect to lipoma, highest (48.28%) incidence was recorded in dogs of age group >5-10 yr, followed by dogs less than 5 yrs (31.03%) and lowest in dogs more than 10 yrs (20.69%) (Table No.3).

In the present study, the breed wise incidence of various tumours is given in Table 4. Out of 458 dogs that were diagnosed for different tumours, highest prevalence of 24.24 percent (111 dogs) was noticed in Spitz, followed by 14.85 percent in Labrador (68 dogs), 13.76 percent in Mongrel (63 dogs), 7.86 percent in GSD (36 dogs), 7.42 percent in crossbreed (34 dogs), 5.46 Percent in Dachshund (25 dogs), 5.24 percent in Great dane (24 dogs), 4.58 percent in Doberman (21 dogs), 4.15 percent in Boxer (19 dogs), 3.71 percent in Dalmatian and Golden retriever (17 dogs), 3.28 percent in Rottweiler (15 dogs) and least prevalence of 1.74 percent among 8 Irish setter dogs respectively.

The gender wise incidence of various tumours recorded in the present study that is shown in Table No. 5 reveals a higher incidence of 54.80 percent in females compared to males whose incidence rate was 45.20 percent, which corresponds to 251 and 207 dogs respectively. Further, females were recorded to be more sensitive towards TVT and mammary tumours with a relatively highest incidence of 54.23 percent (64 dogs) and 98.03 percent (100 dogs) respectively, compared to that of males 45.77 percent (54dogs) and 1.97 percent (2 dogs). Whereas the perianal tumours were more seen in male dogs than in females with an incidence of 63.41% in males and 36.59% in females respectively. In the present study, miscellaneous tumours like other skin tumours, osteosarcoma, lymphoma, squamous cell carcinoma and transitional cell carcinoma, and lipoma were more prevalent (64 percent, 66.67 percent, 68.18 percent, 78.95 percent, 66.67 percent, and 58.62 percent) in males, compared to that of their incidence among females (39.62 percent, 33.33 percent, 31.82 percent, 21.05 percent, 33.33 percent, and 41.38 percent). The details are given in Table No.5

Table 3: Age wise incidence of certain tumours in dogs (n= 458)

Sl. no	Age group	TVT (118)		Mammary tumours (102)		Perianal Tumours (41)		Other Skin Tumours (106)		Miscellaneous										Total (458)	
										Osteosarcoma (18)		Lymphoma (22)		SCC (19)		TCC (3)		Lipoma (29)			
		No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
1	0-5 years	67	56.78	25	24.51	11	26.83	27	25.47	4	22.22	5	22.73	6	31.58	1	33.33	9	31.03	155	33.84
2	>5-10 years	33	27.97	43	42.16	23	56.10	51	48.11	11	61.11	13	59.09	8	42.10	2	66.67	14	48.28	198	43.23
3	>10 years	18	15.25	34	33.33	7	17.07	28	26.42	3	16.67	4	18.18	5	26.32	-	-	6	20.69	105	22.93
	Total	118	100	102	100	41	100	106	100	18	100	22	100	19	100	3	100	29	100	458	100

Table 4: Breed wise incidence of certain tumours in dogs (n = 458)

Sl. no	Breed	TVT(118)		Mammary Tumours (102)		Perianal Tumours (41)		Miscellaneous													
								Other Skin Tumours (106)		Osteosarcoma (18)		Lymphoma (22)		SCC (19)		TCC (3)		Lipoma (29)		TOTAL (458)	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	no	%	no	%	no	%
1	German Shepherd	9	7.63	6	5.88	9	21.95	5	4.72	1	5.56	3	13.64	1	5.26	-	-	2	6.90	36	7.86
2	Labrador	17	14.41	11	10.78	3	7.32	16	15.09	3	16.67	8	36.37	5	26.32	1	33.3	4	13.80	68	14.85
3	Golden Retriever	2	1.69	4	3.92	1	2.44	5	4.72	-	-	2	9.09	-	-	2	66.67	1	3.44	17	3.71
4	Great Dane	4	3.38	3	2.94	1	2.44	10	9.43	2	11.11	-	-	2	10.53	-	-	2	6.90	24	5.24
5	Rottweiler	1	0.85	3	2.94	3	7.32	5	4.72	1	5.56	1	4.55	-	-	-	-	1	3.45	15	3.28
6	Dachund	5	4.24	7	6.86	2	4.88	8	7.55	-	-	-	-	-	-	-	-	3	10.34	25	5.46
7	Spitz	37	31.36	32	31.37	8	19.50	19	17.92	4	22.22	2	9.09	6	31.58	-	-	3	10.34	111	24.24
8	Dalmatian	1	0.85	3	2.94	1	2.44	9	8.49	-	--	1	4.55	-	-	-	-	2	6.90	17	3.71
9	Boxer	2	1.69	3	2.94	1	2.44	7	6.60	-	-	1	4.55	2	10.53	-	-	3	10.34	19	4.15
10	Mongrel	29	24.58	15	14.71	4	9.76	8	7.55	2	11.11	1	4.54	2	10.53	-	-	2	6.90	63	13.76
11	Crossbred	5	4.24	10	9.80	5	12.19	7	6.60	3	16.66	1	4.54	1	5.26	-	-	2	6.90	34	7.42
12	Irish setter	1	0.85	1	0.98	1	2.44	3	2.83	-	-	1	4.54	-	-	-	-	1	3.45	8	1.74
13	Doberman	5	4.24	4	3.93	2	4.87	4	3.77	2	11.11	1	4.54	-	-	-	-	3	10.34	21	4.58
	Total	118	100	102	100	41	100	106	100	18	100	22	100	19	100	3	100	29	100	458	100

Table 5: Gender wise incidence of certain tumours in dogs (n = 458)

S. No	Gender	TVT (118)		Mammary tumours (102)		Perianal tumours (41)		Miscellaneous														TOTAL (458)	
								Other Skin tumours (106)		Osteosarcoma (18)		Lymphoma (22)		SCC (19)		TCC (3)		Lipoma (29)					
		No	%	NO	%	No	%	No	%	No	%	NO	%	NO	%	NO	%	NO	%	No	%		
1	Male	54	45.77	2	1.97	26	63.41	64	60.38	12	66.67	15	68.18	15	78.95	2	67.67	17	58.62	207	45.20		
2	Female	64	54.23	100	98.03	15	36.59	42	39.62	6	33.33	7	31.82	4	21.05	1	33.33	12	41.38	251	54.80		
	Total	118	100	102	100	41	100	106	100	18	100	22	100	19	100	3	100	29	100	458	100		

Discussion

In the present study dogs bearing tumours and presented with various other clinical signs pertaining to cancer were screened. The suspected dogs were subjected for detailed Dogs bearing tumors and presented with various others clinical signs pertaining to cancer were screened. The suspected dogs were subjected for detailed diagnostic evaluation. After diagnosis of various malignant cancers, certain of them were subjected to treatment with various chemotherapeutic drugs.

Incidence

The incidence of various tumours was calculated based on the total number of diagnosed tumour dogs from among the total cases which were treated at the hospital. Out of 48600 cases presented at the Bhoiguda Veterinary hospital during the study period, 458 cases were confirmatively diagnosed to be suffering from various types of malignant tumours. The incidence rate was calculated to be 0.94 percent, which where in partial agreement with the incidence rate reported by Dobson and Lascellus^[6], Cullen *et al.*^[4]. From among these, the dogs suffering with certain tumours like TVT, mammary tumours and perianal tumours were taken up for chemotherapy. They were randomly divided into two Groups of similar tumours and were subjected for chemotherapy with a single different chemotherapeutic drug for each group.

Among the 458 dogs diagnosed for neoplasia, dogs affected with Transmissible venereal tumours were the highest with 25.77% incidence (118 dogs) which was in accordance with Purohit^[20] who enumerated that TVT was the most frequent tumour in dogs with an incidence of 23-43% of the total number of tumours in canine population. Gandotra *et al.*^[8] also reported similarly that TVT was 28.6% of the total number of tumours in canine patients. In the present study this was followed by mammary tumours which were seen in 102 dogs with 22.27% incidence. This was in accordance with the findings of Gupta^[11] who documented an incidence of 25.85% of mammary tumours in dogs, and also Kristiansen *et al.*^[16], Marconato *et al.*^[18], Kuldip *et al.*^[17], who enumerated that mammary tumours were the second most common neoplasms in dogs. In the present study perianal tumours were diagnosed in 41 dogs with 8.95% incidence respectively, which were in agreement with Goldshmidt and Hendrick^[10], Turek *et al.*^[21], Natasa *et al.*^[19], Javad *et al.*^[13], and Kokila *et al.*^[15]. The incidence of miscellaneous tumours like other skin tumours, Lipoma, lymphoma, squamous cell carcinoma, osteosarcoma and transitional cell carcinoma, in the present investigation were 23.14%, 6.33%, 4.80%, 4.15%, 3.93% and 0.66%, and in 106, 29, 22, 19, 18 and 3 dogs respectively. These findings were in agreement with the findings of Endicott *et al.*^[7], Hayes *et al.*^[12], and Camps *et al.*^[1].

The age wise incidence of various tumours was evaluated and found that the highest incidence was observed in dogs of >5 to 10 years age (43.23%) and next high incidence was in age less than 5 years (33.84%) and lowest incidences were seen in the dogs of age group of more than 10 years with 22.93 percent. These findings were in agreement with Costa *et al.*^[3] who stated that dogs affected with various tumours were aged between 3-17 years with mean age of 8.43 years, Das *et al.*^[5], and Girmabirhan *et al.*^[9] reported that dogs of any age were at high risk for TVT

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