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A retrospective study on cases of common male genital tumours in canines at veterinary college Bangalore during 2015-2020

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Abstract

Present study describes the retrospective analysis of male genital tumours that were presented in the year 2015-20 to clinics of Dept of Veterinary Gynaecology and Obstetrics, veterinary college, Bengaluru. Among genital tumours, Transmissible venereal tumor (TVT) accounts for highest incidence (77.42%) followed by testicular tumour (20.97%) with scrotal tumour being least and rare with incidence of 1.61%. Most of the animals presented with tumours condition was non-descriptive with exception of German Shepherd dog (GSD) and boxer having highest incidence rate with respect to testicular tumours. Young sexually active dog between age group 3-5 years shown highest incidence (39.58%) of TVT, where as age old intact male between age group 6-10 years witnessed higher incidence (61.53%) of testicular tumours. Sertoli cell tumours (92.30%) had higher incidence followed by seminoma (7.70%) with Leydig cell tumour (not observed) being rarest among three. 61.5% of the animal with testicular tumours had history of either unilateral or bilateral inguinal testis (90.09%) or abdominal testis (9.09%) whereas 31.5% of animal had normal scrotal testis. TVT animals shown best recovery rates of 43.90% for more than three times vincristine treatment, whereas surgical excision is most used (92.30%) treatment protocol for testicular and scrotal tumours.

Keywords: Canine, germ cell tumour, paraneoplastic syndrome, transmissible venereal tumor, scrotal tumour

Introduction

Genital organ tumours are more oftenly seen in Intact age-old male dogs. Among these tumours, germ cell tumors and penile neoplasms like transmissible venereal tumor (TVT), and scrotal tumours are more likely to occur in the sexually active animals. Infact following skin tumours, testicular neoplasia stands second among most commonly occurring neoplasia in male dogs (Hayes & Pendergrass, 1976) ^[7]. Cryptorchid condition is one of the main predisposing factors for occurrence of testicular tumors of germ cell origin (Hayes & Pendergrass, 1976; Hayes *et al.*, 1985; Yates *et al.*, 2003 and Ortega Pacheco *et al.*, 2006) ^[7, 8, 20, 16]. The mean age group affected with such testicular tumors are 9.0 years as reported by Cotchin, (1960) ^[3], 10.8 years as reported by Pugh, (1991) ^[19]. Boxer being the most prone (Lipowitz *et al.*, 1973) ^[12] and other breeds like beagle, daschund, Labrador retriever and mongrel breed are less prone for testicular tumours (Hayes & Pendergrass, 1976) ^[7]. Kennedy *et al.*, 1998 ^[11] classify germ cell tumours into Sertoli cell tumours (SCT), Leydig cell or Interstitial cell tumours (ICT) and Seminoma (SEM) whose incidence is approximately in equal frequency (Ladds, 1993) ^[11]. In contrast to this SCT having highest incidence of 44%, followed by SEM with 31% and 25% for ICT as reported by many reviewers (James and Heywood, 1979 and Pugh, 1991) ^[10, 19].

a. Sertoli cell tumors

It's a testicular neoplasm of Sertoli cell/Nurse cell origin. The neoplasm mostly occurred in age old uncastrated dogs with the mean age of diagnosis at, 10.6 years for SCT (4 to 18 years), as reported by Nascimento *et al.*, 2020 ^[15]. Dogs with undescended testis are more prone (23 times as compared with normal scrotal testis) for SCT with Boxers and weimeraners breeds being at high risk for the same (Hayes & Pendergrass, 1976) ^[7].

SCT is usually diagnosed with signs associated with a feminizing paraneoplastic syndrome with bilateral alopecia caused by estrogen secretion along with estrogen induced pancytopenia (Metzger *et al.*, 1993) [13]. He also reported that SCT usually associated with squamous metaplasia of prostate. Other, method employed for diagnosis of SCT is ultrasonography for visualizing metastatic tumours in the abdomen in case of retained testis cases, preputial washing smear cytology to visualize cornified cell (estrogen dependent) and serum estrogen analysis. Treatment of SCT usually involves either surgical excision or combination of tumour excision with chemotherapy using drugs like cisplatin (60 mg/m²), vinblastine, cyclophosphamide and methotrexate (Dhaliwal *et al.*, 1999) [5].

b. Seminoma

These are tumours of germ cells within the testes. Mean age of diagnosis of SEM is 10.8 years (10 month-15 years). German Shepherd has a breed predisposition factor and abdominal testis is being more prone for SEM than inguinal testis (Lipowitz *et al.*, 1973) [12]. Clinical signs mostly associated with non-pruritic alopecia (Barsanti *et al.*, 1979) [1], prostate disease and non-insulin dependent diabetes mellitus which can be nullified after castration (Foorden *et al.*, 1993) [6]. Effective treatment includes combination of castration with chemotherapy using cisplatin (60mg/m²) and radiotherapy (Dhaliwal *et al.*, 1999) [5].

c. Leydig cell tumours

It arises from Leydig cell of testis more commonly occur in intact dog with mean age group of 10 years. Clinical signs are mostly similar to above other tumours with hyper estrogenism and hypotestosteronemia.

d. Transmissible Venereal Tumor (TVT)

TVT occur more in sexually active animals of age group 2-5 years with both male and female having equal frequency of getting affected (Das *et al.*, 2020) [4]. Coitus is the main spreading factor making free-roaming dogs with suboptimal breeding practices are more prone for TVT (Papazoglou

2001, Boscós 2004) [17, 2]. It can also transmit through licking, biting, and sniffing tumor affected areas. TVT mass looks like fragile ulcerative cauliflower-like proliferation usually seen at bulbus glandis of the penis. TVT is Usually diagnosed with cytology of the smear drawn from the lesion which is quite reliable and easiest way of diagnosing TVT cells. Chemotherapy with Vincristine (0.025 mg/kg BW, i/V) is better treatment of choice (Das *et al.*, 2020) [4]. Surgical, radiological and immunotherapy can also be employed as a treatment option (Das *et al.*, 2020) [4].

e. Scrotal neoplasia

Canine scrotal neoplasm usually occurs in the overlying dermis. The most common type of scrotal neoplasia is Squamous cell carcinoma, Melanoma and Mast cell tumour. Cryotherapy, Radiotherapy and surgical excision with chemotherapy are the available treatment for scrotal tumours.

Materials and Methods

The present retrospective study was analyzed considering the genital tumour cases presented in the year 2015-20 to Out Patient ward, Dept of Veterinary Gynaecology and Obstetrics, veterinary college, Bengaluru. All the information related to genital tumour cases like age group, breed, common causes of the tumour, different diagnosis method employed and treatment protocol followed for the same. The data obtained was recorded and tabulated. Incidence rate, breed disposition factor etc. was calculated from the data.

Results and Discussion

1. Overall incidence rate of genital tumours

Out of total andrological cases (569), male genital tumours accounts for 10.89% (69/569). Commonly presented genital tumours are TVT, Germ cell tumours and Scrotal neoplasia and their incidence rate is presented in Tables 1. Among the presented genital tumour cases TVT accounts highest (77.42%) cases followed by testicular (20.97) and scrotal (1.61%) tumour.

Table 1: Distribution of genital tumour cases

S. No	Types of genital tumors	Number	Percentage
1	TVT	48	77.42
2	Testicular tumour	13	20.97
3	Scrotal neoplasia	1	1.61
	Total	62	100

a. TVT

Present study revealed higher incidence of TVT compared to all other type of genital tumours in male dogs. The age

factor and breed distribution, frequency of chemotherapy followed in treating TVT in presented dogs was detailed in table 2.

Table 2: Distribution of TVT according to age and breed wise with treatment protocol

S. No	Breeds	Number With%	Age (year)				Treatment (Chemotherapy)					
			1-2	3-5	6-10	11-14	Vincristine			Doxorubicin		
							T	TT	>TTT	T	TT	>TTT
1	Non-Descript	24 (50%)	2	10	06	6	12	04	08	-	-	-
2	Labrador Retrievers	08 (16.7%)	02	02	04	-	02	01	01	02	02	
3	Golden Retrievers	03 (6.25%)	01	02	-	-	01	-	-	-	02	-
4	Saint Bernard	01 (2.08%)	01	-	-	-	-	-	-	-	01	-
5	Belgium Shepherd	01 (2.08%)	01	-	-	-	-	-	01	-	-	-
6	Germen Shepherd	03 (6.25%)	01	02	-	-	-	01	02	-	-	-
7	Boxer	02 (4.17%)	-	-	02	-	-	-	02	-	-	-
8	Pit-bull	01 (2.08%)	-	-	01	-	01	-	-	-	-	-
9	Siberian Husky	03 (6.25%)	-	02	01	-	01	-	02	-	-	-
10	Great Dane	02 (4.17%)	-	01	01	-	-	-	02	-	-	-
	Total	48(100%)	08 (16.66%)	19 (39.58%)	15 (31.25%)	06 (12.5%)	17/41 (41.46%)	06/41 (14.63%)	18/41 (43.90%)	02/7 (28.57%)	05/7 (71.3%)	00/7 0%

No animals with TVT were subjected for surgical excision. T = no of animals receiving chemotherapy T = single treatment; TT = Double treatment; >TTT = more than 3 times treatment

b. Testicular tumour

Present retrospective study revealed, among genital tumours about 77.42% accounts for TVT and incidence rate is high compared to the reports given by Preethi and das *et al.*, 2020 where they reported incidence rate of 23-43% for TVT among canine genital tumours. This study also revealed that highest incidence of TVT was found in dogs with age group 3-5 years (39.58%) followed by age group of 6-10 years (31.25%) and least incidence was found in dogs with age group 10-14 years. Our study results were almost matching with reports given by, many authors regarding incidence age of TVT in male dogs. Higgins, (1966) [9], Preethi and das *et al.*, 2020 [4] have reported that TVT is most commonly seen in 2-5-year-old dogs whose observation is almost co-incide with our study results. Highest cases were observed in Non-descript breeds but with respect to all other presented breed no much difference in the frequency of occurrence. 41 animals were treated with vincristine sulphate (0.025 mg/Kg I/V) and 7 animals were administered with doxorubicin (30 mg/m² I/V). Among vincristine treated animals, 41.46% of animals received one dose for complete reduction in the tumour mass, where as 14.63% of animals received 2 doses and 43.9% of dogs received more than 3 doses of vincristine for complete reduction in size. Similarly, in doxorubicin

treated animals, 28.5% of animals received one dose and 71.3% of animals received 2 doses of doxorubicin for complete reduction in the tumour mass.

c. Testicular tumours

Present study revealed, among testicular tumours, the most common presented type was Sertoli cell tumours (92.30%), followed by seminoma (7.70%). In the study year no case of Leydig cell tumours were diagnosed. Our study observation was similar to observations of James and Heywood, 1979 [10] and Pugh, 1991 [19] where they have reported high incidence of SCT (31%) followed by seminoma (25%).

About 61.5% of the animals with testicular tumours had a history of retained testis and 38.5% of them had normal scrotal testis. Among retained testis 90.09% of the animal had inguinal testis and remaining 9.09% of the animal had abdominal testis. The animal with abdominal testis was positive for seminoma diagnosed through Histopathology. These observations were almost similar to studies of Nascimento *et al.*, 2020 [15] where he recorded more incidence of testicular tumour in dog with inguinal testis compared with abdominal testis. Incidence of testicular tumour and their distribution with age and breed wise is detailed in table 3 and 4.

Table 3: Incidence of different type of testicular tumour in male dog during 2015-2020

S. No	Testicular tumours types	Number of animals with testicular tumours	Incidence of Germ cell tumours			Percentage
			Cryptorchid testis		Normal intact animals	
			Inguinal testis	Abdominal testis		
1	Sertoli cell tumours	12 (92.30%)	10		2	92.30
2	Seminoma	01 (7.70%)	-	01	-	7.70
3	Leydig cell tumours	-	-	-	-	-
	Total	13 (100%)	(90.09%)	(9.09%)	2	100
			(61.5%)		(38.5%)	

Among all the animal with testicular tumours presented, about 61.53% of the animal were belongs to the age group of 6-10 years and remaining 37.5% of them were belongs to age group of 10-14 years. Breed wise, German shepherd, Boxer and Non-descript shares the major incidence and the detailed breed distribution is given in the table 4. Lipowitz *et al.*, 1973^[12] and had reported that boxer (Hayes & Pendergrass, 1976)^[7] and German Shepherd dogs are more prone for testicular tumours and this coincide with our present study observation. But to the same extent of boxer, even significant number of non-descript breed also shown

testicular tumours. 92.30% of the presented animal has been treated with surgical excision and only 7.70% of the animal had received chemotherapy treatment with more than 3 times doxorubicin. But most of the researcher had given a mixed opinion on this. Few researchers have found positive result with only chemotherapy but Dhaliwal *et al.*, 1999^[5] reported that combination of surgical excision with chemotherapy will yield a better result. However, the Chemotherapy may give good results only when the tumour is in initial stages without metastasis.

Table 4: Distribution of Testicular tumour according to age and breed wise with treatment protocol

S. No	Breeds	Number of animals with Germ cell Tumours	Age (year)				Treatment			
			1-2	3-5	6-10	11-14	(Chemotherapy)			Tumour excision
							T	TT	>TTT	
1	Non-Descript	02 (15.4%)	-	-	01	01	-	-	-	02
2	Labrador Retrievers	01 (7.70%)	-	-	01	-	-	-	01	-
3	Boxer	02 (15.4%)	-	-	01	01	-	-	-	02
4	Germen Shepherd	05 (38.5%)	-	-	04	01	-	-	-	05
6	Pomeranian	01 (7.70%)	-	-	-	01	-	-	-	01
7	Daschund	01 (7.70%)	-	-	-	01	-	-	-	01
8	German shepherd	1(seminoma) (7.70%)	-	-	01	-	-	-	-	01
	Total	13(100%)	-	-	08 (61.53%)	05 (37.5%)	01 (7.70%)			12 (92.30%)

T = no of animals receiving chemotherapy T = single treatment; TT = Double treatment; >TTT = more than 3 times treatment

d. Scrotal neoplasia

Among all the tumours presented, scrotal neoplasia account for 1.61% (1/62) which was witnessed in non-descriptive breed. The tumor type was squamous cell carcinoma (SCC). Treatment employed was scrotal ablation after wide surgical excision. Usually, SCC invade locally but metastasis occur slowly (Muller *et al.*, 1983)^[14]. In the presented case of study also, tumour was within the scrotum and no such lesions were seen in part of the body indicating slow metastasis manner which made surgical excision to be better choice of treatment combine with chemotherapy.

Conclusion

The present retrospective study evidenced that TVT has the highest occurrence rate compared to other tumours conditions of genital organs. Among testicular tumours, Sertoli cell tumour followed by seminoma occurrence is more with Leydig cell tumour being rarest among three. SCC of Scrotum are always of locally invasive with slow metastatic rate, so early surgical intervention in combination with radio and chemotherapy could lead to complete recovery. Study also witnessed that TVT was more evidenced in young sexually active dogs and in contrast testicular and scrotal tumour was mostly seen in age old intact dogs. More than 3 doses of chemotherapy yield better results in TVT and in contrast, surgical excision is the choice of treatment in case of testicular and scrotal tumours. The study also revealed non-descript breeds being almost vulnerable to all kind of genital tumour but in particular German Shepherd and Boxer being more prone with regard to testicular tumour.

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