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Incidence and clinical features of transmissible venereal tumour in dogs

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Abstract

Transmissible venereal tumor (TVT) is a round cell type neoplasia that is transmitted by mating and physical transfer of tumor cells. It is one of the most common benign tumors in dogs that can be seen in both the gender. An analysis was conducted from November, 2020 to November, 2021 on a total of 253 canine patients presented at VCC, Anand; JCT, Ahmedabad; SDF, Ahmedabad and VCARE, Vadodara, with various reproductive disorders. Among 253 cases of dogs registered, 22 canine patients were found to be having TVT. They were subjected to collection of pertinent history and detailed clinical examination, incidence, age, sex, site of growth and physical features etc. The incidence was more in female (54.55%) than male dogs (45.45%) and in animals in the age group of 2 to 4 years (40.90%). The external genital area was the main location of the tumour. The most common clinical signs are lobular masses with rapid bleeding which are seen in the caudal part of the penis, in the posterior region of the vagina and at the vestibulo-vaginal junction. The volume of the tumour increases and the lesions are seen multilobular, cauliflower-like, brittle, hyperaemic, and haemorrhagic. In present study clinical examination and signs, incidence, age, sex, site of growth and physical features of TVT are presented.

Keywords: TVT, incidence, age and sex, site of growth, physical features

Introduction

TVT can also be cited as sticker tumour or sarcoma, venereal granuloma, infectious granuloma, canine condyloma, and infectious lymphosarcoma, identified as the first cancer to be transmitted clonally, nearly 150 years ago (Nowinsky, 1876; Murgia *et al.*, 2006; Regmi *et al.*, 2020) [25, 22, 32]. The prevalence of TVT in affected populations is usually below 10%, being generally higher in countries with larger populations of free-roaming dogs, as these act as reservoirs for the disease (Strakova and Murchison, 2014) [8]. Young dogs, stray dogs and sexually active dogs are most regularly affected by this tumour (Nak *et al.*, 2005) [24]. It is classified into two groups, genital TVT and extragenital TVT, depending upon the sites of the tumour mass is present (Das and Das, 2000) [6]. Genital TVT is transmitted via coitus or by social contact, like sniffing or licking (Otomo *et al.*, 1981) [26].

TVT, macroscopically, can be solitary or multiple tumour masses with cauliflower-like ulceration, haemorrhagic, friable and irregular appearance can be seen. Lesions are fragile and mostly haemorrhagic as a result of low cohesion amongst neoplastic cells. Tumour size varies from millimeters (mm) to several centimeters (less than 1 to 3 mm in diameter) with a dark red to greyish pink colour (Das and Das, 2000; Purohit, 2009; Lopes *et al.*, 2015) [6, 31, 18]. Lesions are small (1 to 3 mm in diameter), superficial and coloured pink to red at the onset of tumour formation (Purohit, 2009) [31]. The masses can be 5 to 7 cm in diameter which then advances deeper into mucosa as multilobular subcutaneous lesions with diameter that can go beyond 10 to 15 cm. Tumor bleeds easily and while they become larger, usually ulcerate and gets contaminated (Martins *et al.*, 2005) [19]. The present study was under taken with a view to assess an incidence and clinical features of TVT in dogs.

Materials and Methods

The present research work was carried out during the period from November, 2020 to November, 2021 on a total of 253 canine patients presented at Veterinary Clinical Complex (VCC), Anand; Jivadaya Charitable Trust (JCT), Ahmedabad; Shri Danev Foundation (SDF), Ahmedabad and VCARE, Vadodara, with various reproductive disorders. Among 253 cases of dogs registered, 22 canine patients were found to be having TVT. They were subjected to collection of pertinent history and detailed clinical examination, incidence, age, sex, site of growth and physical features etc.

Results and Discussion

Incidence

Out of 253 cases, 22 canine patients were found to be having TVT. These animals were subjected to the detailed clinical study. The location wise the per cent incidence were found to be the highest (10.20) at JCT, Ahmedabad, followed by VCARE, Vadodara, VCC, Anand and SDF, Ahmedabad, to be 9.10, 8.43 and 7.41 (Table 1), respectively, with an overall incidence of 8.70 per cent.

Clinical signs

The clinical signs noticed in a total of 22 canine patients having TVT include a complaint of massive swelling, constant bloody discharge from external genitalia, soiling of the floor, bad odour, swelling, ulceration and anorexia.

Sex and Age of Dogs

The canine patients (n=22) covered in the present study comprised the female (n=12; 54.55%) having comparatively higher incidence of TVT than the male (n=10; 45.45%) dogs

(Table 1; Fig. 1), as reported by Murugan *et al.* (2009) [23] (females, 81.5% vs. males, 18.5%); Paranzini *et al.* (2015) [28] (females, 65.21% vs. males, 34.78%); Senthil *et al.* (2020) [35] (females, 58% vs. males, 42%); Mukaratirwa (2009) [20] (females, 65% vs. males, 35%); Khimta *et al.* (2010) [14] (females, 70.72% vs. males, 29.28%); Soni (2017) [37] (females, 67.00% vs. males, 33.00%); and Phogat (2015) [29] (females, 56.25% vs. males, 43.75%). The high incidence in females might be related to reproductive behaviour, because during oestrus females can mate with several males (Sobral *et al.*, 1998) [36]. In contrary to the present findings, Tiwari (2017) [40]; Khan *et al.* (2009) [13] (38.36% females vs. males, 61.64%); and Chikweto *et al.* (2013) [5] (females 48.72% vs. male, 51.28%) had reported that male dogs were more affected, *i.e.*, higher incidence with canine transmissible venereal tumour than female dogs. However, Kabusu *et al.*, (2010) [11] and Strakova and Murchison (2014) [38] had reported that there was no sex predilection in animals, *i.e.*, there is no gender bias for the occurrence of CTVT.

Table 1: Incidence of CTVT among canine patients presented with gynaecological disorders

Sr. No.	Location	Gynaecological Disorders	TVT	Percent	Sex (n=22)	
					Male	Female
1	VCC, Anand	166	14	8.43	6	8
2	JCT, Ahmedabad	49	5	10.20	1	4
3	SDF, Ahmedabad	27	2	7.41	2	0
4	VCARE, Vadodara	11	1	9.10	1	0
	Total	253	22	8.70	10 (45.45)	12 (54.55)

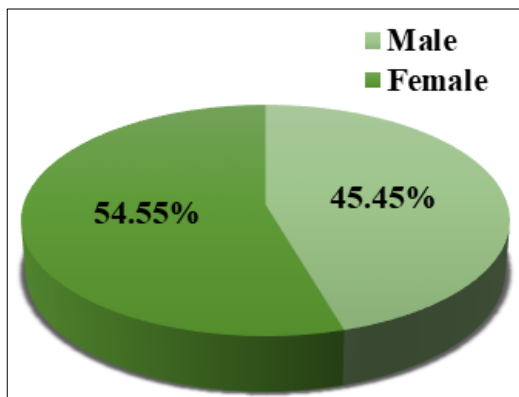


Fig 1: Sex-Wise Distribution

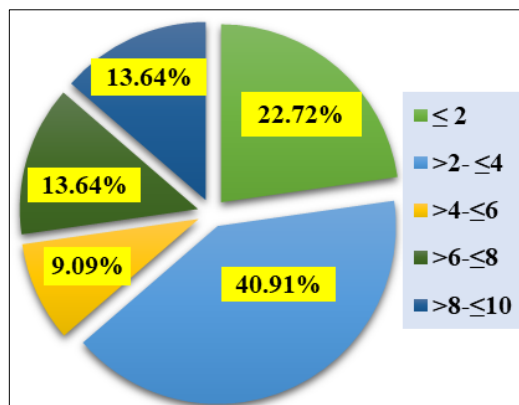


Fig 2: Age Wise Distribution of Animals

Age wise distribution of venereal tumours in canine (n=22) patients (Table 2; Figure 2) comprised five (22.70%) cases under ≤2 years of age group, nine (40.90%) cases in >2-≤4

years age group, two (9.10%) cases in >4 - ≤6 years age group and three (13.65%) cases under >6 - ≤8 years age group, and three (13.65%) cases in >8 - ≤10 years age group. Similar findings were reported by Soni (2017) [37], in her study on the age wise per cent occurrence of tumour in dogs, who reported that out of 15 cases, 2 (13.33%) cases were in 0 to 2 years age group, 7 cases (46.67%) in 2 to 4 years age group, 4 cases (26.67%) in 4 to 6 years age group and 2 cases (13.33%) were recorded in 6 to 11 years age group. These observations are in the same line with the findings of the present study as maximum number of cases found was between 2 to 4 years of age. The findings of the present study are also in agreement with the observations recorded by Kokila *et al.*, (2020) [16], Das and Das (2000) [6], and Higgins (1966) [9] who also reported that canine TVT is the most common in dogs of age 2 to 5 years with no breed or sex predisposition. TVT are easily transmitted within a household by a new dog, even if other dogs in the home are neutered or spayed.

Site of growth

Female dogs (54.55%, n=12) having TVT comprised location wise distribution of tumours found at vagina (50.00%; 6 cases) and vulvo-vaginal (50.00% 6 cases). No cases were found having TVT on areas other than genitalia. Whereas in case of male dogs, the most common area of occurrence of TVT was penis (80.00%, n=8) comprising of shaft, base and apex, followed by single case, each, in preputial area and extra genital area (at the base of the tail).

The present findings associated with location of venereal granuloma were also supported by the observation reported by Higgins (1966) [9]; Mulligan (1949) [21]; and Boscós and Ververidis (2004) [4] who observed that in female dogs, neoplastic lesions were most commonly found in the vestibule (95.6%) and less frequently in the vagina (44.5%) or

infiltrating the vulvar lips (18.6%). Neoplastic lesions were more prevalent in the caudal region of the glans penis (bulbus glandis, 81.5%) than in the shaft (pars longa glandis, 25.9%) or tip (9.9%) of the glans penis in male dogs. Purohit (2008) [30] who reported that in male dogs, lesions usually localized cranially on the glans penis, on preputial mucosa or on the bulbus glandis whereas, in female dogs, tumour mass could be localized in the vestibule, caudal vagina and vulva causing a deformation of the perineal region. Aydin *et al.* (2009) [11] stated that in bitches, the tumor is usually observed in the posterior part of the vagina. Phogat (2015) [29] who observed that in TVT in female (n=9) dogs, anatomically tumours observed were inside vagina (3/9), vaginal area (3/9), near vulva (1/9), vulvovaginal area (1/9), extravaginal area (1/9) and in male dog(n=7) the sites were glans penis (1/7), shaft of penis (2/7), base of penis (3/7), testicular area (1/7). Further, one male dog possessed ulcerated nodular lesions toward the testicular area. Karlson and Mann (1952) [12]; Das *et al.* (1989) [7]; Panchbhai *et al.* (1989) [27]; Rogers (1997) [34]; Das and Das (2000) [6]; Thangathurai *et al.* (2008) [39]; and Kisani and Adamu (2009) [15].

Physical Features of TVT

The canine patients (n=22) presented with TVT had a distinctive appearance (Table 2) of transmissible venereal tumour with an irregular cauliflower shaped nodules of several sizes with or without ulcerated surfaces. They were either pedunculated or sessile and of various shapes (Table 2) such as cauliflower, filiform etc. Consistency of the tumours varied from soft to hard. The consistency of neoplastic masses

was soft, irregular and relatively firm and fragile. TVT mass showed cut surface with soft consistency and irregular growth (Table 2). On clinical examination of all the cases the tumours were found to be having the colour (Table 2) of cut surface of tumour growth to be greyish-reddish, pinkish-reddish, reddish-pink, reddish, whitish and pinkish etc. The neoplasms were pink to bright red in colour and having a usual tendency to bleed profusely associated with tumour fragility and while growing larger, became ulcerated and contaminated. The degree of ulceration was not a common finding and minimal, i.e., only found in two (9.09%) cases only with rest of the dogs having an intact mass of tumour (Table 2).

The present findings corroborated well with the observations reported by Sharma (1988) [41] who found typical dark, pinkish cauliflower growth around the base of penis involving preputial sheath on clinical examination. Dinesh *et al.* (1993) [8] reported that the canine venereal granuloma was characterized by nodular or cauliflower like tumours on the shaft of penis in males and in vulva and vagina in females. Ayyappan *et al.* (1994) [2] stated in their study that there was multiple cauliflower like nodular growths on the penile sheath and root of penis. The growths were pink, friable and fragile, i.e., bled even on slight manipulation. Thangathurai *et al.* (2008) [39] on gross appearance of the neoplasm found that they were irregular, cauliflower like with a tendency to bleed. Kisani and Adamu (2009) [15] reported canine transmissible venereal tumours were cauliflower like growth, which might be single or multiple, pedunculated, nodular, papillary or multilobulated in appearance.

Table 2: Case wise clinical details of TVT growths in canine's patients (n=22)

Sr. No.	Case No.	Sex	Age (Years)	Site of Growth	Physical Features of Growth			Ulceration
					Shape	Consistency	Colour	
1	3433/427	F	8.0	Vulva and vagina	Nodular	hard	Whitish-pinkish	No
2	1667/232	M	9.0	At the apex and base of the penis	Irregular	Moderately soft	Whitish-pinkish	No
3	3180/174	F	2.5	Vulva and vagina	Irregular/ Cauliflower	Moderately hard	Pinkish	No
4	2821/627	M	4.0	Base of the penis	Irregular	Moderately soft	Whitish-grey	No
5	3478/472	M	4.0	Base of the penis	Irregular/ Cauliflower	soft	Reddish-pink	No
6	3686/679	M	3.5	Base of the penis	Irregular/ Cauliflower	Moderately soft	Brownish-pink	No
7	7696/198	F	2.5	Vulva and vagina	Cauliflower	soft	Reddish	No
8	8137/639	F	1.5	Vulva and vagina	Cauliflower	soft	Reddish	No
9	1738/303	M	3.5	Three growths on base and shaft of the penis	Nodular	hard	Reddish-pink	No
10	11617	F	5.0	Vagina	Cauliflower	Moderately soft	Reddish-pink	No
11	22/4465	M	1.5	Throughout the shaft	Lobulated	Moderately hard	Pinkish	No
12	6926/101	M	1.0	Base of the penis	Nodular	hard	Pinkish	No
13	11192	F	9.0	Vagina	Irregular	Moderately hard	Pinkish-reddish	No
14	11595	F	2.5	Vulva and vagina	Irregular	hard	Pinkish	No
15	11724	F	4.5	Vagina	Cauliflower/ Lobulated	Moderately soft	Reddish	No
16	11468	M	3.5	Throughout the shaft of penis and preputial skin	Irregular/ Lobulated	Moderately soft	Whitish-grey	Yes
17	22/3673	M	1.5	Throughout shaft of penis and base of tail	Irregular/ Lobulated	Moderately hard	Greyish- reddish	Yes
18	24/682	M	7.0	Throughout shaft of penis	Lobulated	Moderately soft	Reddish- pink	No
19	1538/103	F	2.0	Vagina	Lobulated	Hard	Whitish-pinkish	No
20	2967/773	F	10.0	Vulvo-Vagina	Cauliflower	Soft	Reddish	No
21	4113/308	F	3.0	Vagina	Cauliflower/irregular	Partially hard	Pinkish-reddish	No
22	6020/785	F	8.0	Vagina	Nodular	Hard	Whitish-pinkish	No

*(M = Male, F = Female)

In the present study, the most common shape of the tumour mass observed was irregular, followed by cauliflower like. Javanbakht *et al.* (2014) [10] in their study divided all the growth samples were into four groups, viz., multilobular (six cases), papillary (two cases), pedunculated (two cases), and tubular (two cases of seminoma). They found that most often presented tumour type was multilobular (6/10, 60.00%)

followed by pedunculated (2/10, 20.00%), papillary (2/10, 20.00%), and tubular (two cases of seminoma, 100.00%). Birhan and Chanie (2015) [3] reported that TVT on the external genitalia of canines appear initially as small hyperaemic papules that later progress to nodular, papillary multilobulated, cauliflower-like or pedunculated proliferations. The mass of tumor is firm but friable and the

superficial part is commonly ulcerated and inflamed. During rapid tumor mass growth, the colour was bright red owing to extensive vascularization. Rizk *et al.* (2015)^[33] reported that in canine TVT, the tumour mass appeared to be firm and white-brown in colour. Grossly, on cut section, it appeared with multiple nodularity of greyish white to brown in colour, firm in consistency. The present findings associated with the physical appearance of venereal granuloma were also supported by Karlson and Mann (1952)^[12]; Das *et al.* (1989)^[7]; Das and Das (2000)^[6]; and Nak *et al.* (2005)^[24].

Conclusions

Among the reproductive disorders recorded in canines during the study period, CTVT was found up to 8.70 per cent. The female dogs were found to be having higher prevalence of CTVT than the male dogs, with maximum rate of occurrence in dogs between 2 to 4 years of age. Consistency of the tumours varied from soft to hard being relatively firm and fragile. The most common shape of the tumour mass observed was irregular, followed by cauliflower like. The colour of cut surface of the tumours were found to be greyish-reddish, pinkish-reddish, reddish-pink, reddish, whitish and pinkish etc. The neoplasms were pink to bright red in colour and having a usual tendency to bleed profusely.

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