RESEARCH ARTICLE
Open Access

Journal of Veterinary and Animal Sciences
ISSN (Print): 0971-0701, (Online): 2582-0605
https://doi.org/10.51966/jvas.2023.54.2.382-387

Occurrence of canine transmissible venereal tumour#

Aja Taj Nazer[1], B. Bibin Becha[2*], C. Jayakumar[3], M. P. Unnikrishnan[4] and S. S Devi[5]
Department of Animal Reproduction, Gynaecology and Obstetrics
College of Veterinary and Animal Sciences, Mannuthy, Thrissur- 680651
Kerala Veterinary and Animal Sciences University
Kerala, India

Citation: Aja, T.N., Becha, B.B., Jayakumar, C., Unnikrishnan, M.P. and Devi, S.S. 2023. Occurrence of canine transmissible venereal tumour. *J. Vet. Anim. Sci.* **54**(2):382-387
DOI: https://doi.org/10.51966/jvas.2023.54.2.382-387

Received: 07.11.2022 *Accepted: 31.12.2022* *Published: 30.06.2023*

Abstract

Canine transmissible venereal tumour (CTVT) is the most common neoplasm of the genital sites transmitted through allogenic transplantation of tumour cells during coitus or at extragenital sites like oral or nasal mucosa by licking, scratching or sniffing affected area. In this study the overall occurrence of CTVT and its occurrence was analysed based on breed, age, gender, parity, season, reproductive status and breeding history, collected from retrospective data of clinical records maintained at University Veterinary Hospitals. The overall occurrence of CTVT was 0.15 per cent among total presented cases, 0.88 per cent among total reproductive disorders, 21.42 per cent among total canine tumour cases and 4.74 per cent among cases with vaginal bleeding. Higher occurrence was recorded in female dogs (88.59%), dogs aged 2-5 years (73.91%), intact females (88.04%), pluriparous dogs (41.10%) and during south-west monsoon season (32.07%). Breed wise occurrence was higher in Labrador Retriever dogs (41.30%) followed by non-descript dogs (22.28%). Occurrence was higher in dogs with history of mating with stud dogs (81.60%) when compared to stray dogs (18.40%).

Keywords: *Canine transmissible venereal tumour, breed, season*

The canine transmissible venereal tumour (CTVT) is a contagious tumour commonly seen in sexually active young dogs of both the sexes. The CTVT has a worldwide distribution and was reported to be endemic in about 90 countries (Strakova and Murchison, 2014). Transmission of CTVT occurs by transplantation of viable tumour cells through abraded skin or mucosa, mainly during coitus. Gross findings include the presence of multiple nodular, haemorrhagic, cauliflower-like, friable mass that bleeds easily. Diagnosis of CTVT is based on clinical history, signalment, cytology and histological examination, along with cytogenetic and molecular techniques. Treatments

#Part of MVSc thesis submitted to Kerala Veterinary and Animal Sciences University, Pookode, Wayanad, Kerala

1. *MVSc Scholar*
2. *Associate Professor*
3. *Associate Professor and Head i/c*
4. *Assistant Professor*
5. *Assistant Professor, Department of Veterinary Pathology*

**Corresponding author: bibinbecha@gmail.com, Ph. 9447971872*

include chemotherapy, surgical excision, cryosurgery, immunotherapy, radiotherapy and combination therapy (Rao *et al*., 1993; Das and Das, 2000). Control measures include stray dog population control and effective treatment protocols. A retrospective study was conducted to analyse the overall occurrence of CTVT particularly related to breed, gender, age, parity, reproductive status of the animal and season.

Materials and methods

A review of clinical records of all cases presented at the University Veterinary Hospital, Kokkalai and Mannuthy during the three-year period from July 2019 to June 2022 were utilised for the study. Occurrence of CTVT among the total number of cases presented, total canine reproductive disorders and total canine tumour cases presented at both hospitals were recorded. These cases were categorised and analysed according to their breed, gender, age, body size, parity, season, reproductive status and breeding history. Data on the occurrence of CTVT in relation to age, body size and season were analysed statistically by chi-square test using SPSS version 24.0.

Result and discussion

Overall occurrence of CTVT among total presented cases

Out of 1, 25,989 total cases presented at University Veterinary Hospitals, Kokkalai and Mannuthy, 184 CTVT positive cases were recorded, with an overall occurrence of 0.15 per cent during the period of observation. Amaral *et al*. (2004) reported a high prevalence rate of 17.1 per cent among total cases presented over a period of ten years and with an annual incidence of 11.80–24.10 per cent. Strakova and Murchison (2014) reported that CTVT was distributed globally with a prevalence rate of one to ten per cent in countries of South and Central America, Africa and Asia. Andari *et al*. (2016) and Schectman *et al*. (2022) reported a lower occurrence of 0.62 per cent and 1.40 per cent, respectively, while Honparkhe *et al*. (2010) reported a higher occurrence of 31 per cent. The lower occurrence of CTVT in the present study could be due to better breeding management adopted by pet owners and low number of stray dogs presented to these clinical units.

Overall occurrence of CTVT among total canine reproductive disorders

Out of 20,792 total cases of canine reproductive disorders presented at the small animal reproduction units of these hospitals, 184 were CTVT positive giving an overall occurrence of 0.88 per cent. Sathiamoorthy and Raja (2011) reported that CTVT was the second most common reproductive disorder in the stray dog population of Chennai, with a total prevalence rate of 6.59 per cent. According to Nair (2012), 0.27 per cent of total reproductive disorders were CTVTs. Ramsingh *et al*. (2013) reported that 30 per cent of canine reproductive disorders were CTVTs. Priyadarshini *et al*. (2021) reported a higher prevalence of 25.46 per cent of CTVT among the total reproductive diseases. Juneja *et al*. (2021) reported an occurrence of 3.36 per cent CTVTs among total gynaecological cases. The low occurrence of CTVT among total reproductive cases in the present study was probably due to scientific breeding practices adopted by pet owners and dog breeders.

Overall occurrence of CTVT among total canine tumours

Out of 859 canine tumour cases presented during a three-year period, CTVT recorded an overall occurrence of 21.42 per cent. Thangathurai *et al*. (2008) reported CTVT as the most prevalent canine neoplasia of the tropical and subtropical regions. Babu *et al*. (2012) reported that out of 21.31 per cent of tumours affecting the genital system, the majority was CTVT (84.62%). Among total canine tumours, the occurrence of CTVT reported by different authors were 7.60 per cent (Bhaiyat *et al*., 2013), 18 per cent (Chikweto *et al*., 2013) and 34.15 per cent (Priyadarshini *et al*., 2021). The higher prevalence of CTVT among canine tumour cases could be probably due to the transmissible nature of the tumour, easy mode of transmission through coitus, scratching and licking of affected areas of CTVT affected dogs and also because of high reporting rate of easily identifiable tumour mass noticed by the owners.

Overall occurrence of CTVT among total cases with vaginal bleeding

Overall occurrence of CTVT among cases of canine vaginal bleeding was 4.74 per cent. Nair (2012) reported that 95.12 per cent of the CTVT affected dogs showed vaginal bleeding. In the present study, majority of vaginal bleeding cases (95.26%) presented were brought for breeding advice with normal proestrus bleeding.

Occurrence of CTVT in relation to age

In relation to age, dogs aged between 2–5 years had the highest occurrence of 73.91 per cent, (Table. 1) which was in accordance with Honparkhe *et al*. (2010). Highly significant difference was observed in the age-wise distribution of CTVT (p<0.01). On the contrary, Bhaiyat *et al*. (2013) reported the highest occurrence of CTVT in dogs >12 years of age (31.4%) followed by the 1–3 year age group (25.7%), >5–8 years (17.1%), >3–5 year (14.3%) and >8–12 year (11.5%) age groups. Bakhodirovich and Bobokulovich (2022) reported 40 per cent of CTVT cases in young dogs aged 3–5 years, 20 per cent in dogs aged 5–7 years and 11 per cent in dogs aged 1–3 years. Priyadarshini *et al*. (2021) reported highest incidence of CTVT in female dogs aged 2–11 years, with a peak incidence at 2–4 years (46.34%) followed 4–6 years (31.71%). The present study, corroborated with the reports of Florez *et al*. (2012) and Lima *et al.* (2013) who observed the highest incidence in sexually active dogs aged 2–5 years.

Table 1. Occurrence of CTVT in relation to age (n=184)

Age groups	No. of dogs diagnosed with CTVT	Per cent occurrence
< 2 years	8	4.35
2–5 years	136	73.91
> 5 years	40	21.74
Chi-square value: 144.70**; p value: 0.001; **Highly significant at 1% level		

Occurrence of CTVT in relation to gender

In relation to gender, female dogs showed a higher occurrence (88.59%) than males (11.41%). This was in accordance with Florez *et al.* (2012), Hithem *et al*. (2020) and Priyadarshini *et al*. (2021). Honparkhe *et al*. (2010) reported higher occurrence in female dogs (56%) than male dogs (42%). Chikweto *et al*. (2013) reported an almost equal distribution of CTVT in both genders (51% males and 49% female). In contrast, Bhaiyat *et al*. (2013)

Table 2. Occurrence of CTVT in relation to breed (n=184)

Breed	No. of dogs diagnosed with CTVT		Per cent occurrence		
	Total		Total		Total
	Female	Male	Female	Male	
Labrador Retriever	73	3	39.67	1.63	41.30
Non-descript	30	11	16.30	5.98	22.28
German Shepherd	26	2	14.13	1.09	15.22
Spitz	7	1	3.80	0.54	4.35
Crossbred	7	1	3.80	0.54	4.35
Dachshund	2	2	1.09	1.09	2.17
Pug	3	--	1.63	--	1.63
Dobermann	3	--	1.63	--	1.63
Siberian Husky	2	1	1.09	0.54	1.63
Golden Retriever	2	--	1.09	--	1.09
St. Bernard	2	--	1.09	--	1.09
Rottweiler	2	--	1.09	--	1.09
Lhasa Apso	1	--	0.54	--	0.54
Chippiparai	1	--	0.54	--	0.54
Boxer	1	--	0.54	--	0.54
Pit Bull	1	--	0.54	--	0.54

reported higher incidence of CTVT in males (54%) when compared to females (46%). The probable reason for higher occurrence of CTVT in females might be due to the fact that one affected male dog can transmit tumour to numerous female dogs and further, females get more attention in breeding management.

Occurrence of CTVT in relation to breed

Breed-wise occurrence of CTVT was reported to be highest in Labrador Retrievers (41.30%) followed by non-descript dogs (22.28%) (Table 2). The CTVTs are commonly observed in stray dogs or freely roaming dogs or wild dogs with unrestricted sexual activity (Hithem *et al*., 2020). Bakhodirovich and Bobokulovich (2022) reported higher incidence of CTVT in mongrel dogs (21%) followed by German Shepherd dogs, Spaniels, Dobermann and Labrador Retriever dogs. Priyadarshini *et al*. (2021) reported higher incidence of CTVT among non-descript (73.17%) compared to pure breeds. Bhaiyat *et al*. (2013) reported higher incidence in mixed breed dogs (62.6%), followed by German Shepherd dogs (6.5%), Labrador Retriever (5.6%), Rottweiler (4.3%), Dobermann (3.2%), Pompek (3.0%) and Pit Bull dogs (2.2%). Nair *et al*. (2021) reported higher incidence of canine tumours in Labrador Retrievers and Rottweilers (38% each) in the same locality. The increased occurrence of CTVTs in Labrador Retrievers in the present study might be due to the popularity of this breed for breeding purposes in this geographical area and warrants its greater awareness among the pet breeders.

Occurrence of CTVT in relation to body size

In relation to body size, large sized dog breeds showed highest occurrence (60.87%), followed by medium sized breeds (29.35%) and small sized breeds (8.70%) (Table 3). Statistical analysis revealed highly significant difference ($p<0.01$) in the occurrence of CTVT based on the body size of the animal. Higher occurrence of CTVT in large and medium sized breeds was probably because of higher popularity and use of these breeds for breeding purposes in this geographical area under study.

Occurrence of CTVT in relation to parity

Higher occurrence of CTVT (41.10%) was recorded in pluriparous dogs, while nulliparous and primiparous dogs had an occurrence of 29.45 per cent each, which was in accordance with Lima *et al*. (2013). Higher occurrence among pluriparous female dogs might be due to increased exposure to male dogs and reduced immunity due to ageing.

Occurrence of CTVT in relation to reproductive status of dogs

Intact female dogs showed highest occurrence of CTVT (88.04%) followed by intact male dogs (10.88%), which indicated that the major mode of transmission was by coitus in intact dogs. Castrated and spayed dogs showed a lower incidence of 0.54 per cent each. Non-coital modes of transmission like licking, biting, scratching or sniffing the tumour mass might be associated with transmission in neutered dogs (Strakova and Murchison, 2014).

Contrary to this, Schectman *et al*. (2022) reported that neutered dogs were at higher risk when compared to intact dogs in Grenada, as a result of persistent learned mating behaviours in dogs neutered post-pubertally and that the transmission of CTVT occurs through both sexual and non-sexual modes.

Table 3. Occurrence of CTVT in relation to body size of the dogs (n=184)

Body-size	No. of dogs diagnosed with CTVT	Per cent occurrence
Small sized breeds (< 10 Kg)	16	8.70
Medium sized breeds (10-25 Kg)	54	29.35
Large sized breeds (25-45 Kg)	112	60.87
Giant sized breeds (> 45 Kg)	2	1.09
Chi-square value: 157.74**; p value: 0.001; **Highly significant at 1% level		

Occurrence of CTVT in relation to breeding history

Female dogs bred to stud dogs showed higher occurrence (81.60%) compared to those mated with stray dogs (18.40%). Priyadarshini *et al*. (2021) reported higher incidence of CTVT among stray dogs because of their unrestricted sexual activity. On the contrary, present study reported high occurrence of CTVT in females mated with stud dogs which might be due to increased exposure or restricted mating of female dogs to CTVT positive stud dogs. The lower estimation of this disease in stray dogs might be due to decreased presentation to hospitals.

Occurrence of CTVT in relation to season

The occurrence of CTVT was highest during south-west monsoon season (32.07%), followed by summer season (26.63%) (Table 4), which was in accordance with Das and Das (2000), as the authors reported higher incidence during peak sexual activity and during rainy and summer season. Statistical analysis revealed significant difference ($p<0.05$) in the occurrence of CTVT in relation to season in affected dogs. Scarpelli *et al*. (2010) reported delayed remission of CTVT during summer and rainy months, due to seasonal modulation of the immune system. Highest occurrence during south-west monsoon season might be due to increased breeding activity during this period and reduced immunity of the dogs.

Table 4. Occurrence of CTVT in relation to season (n=184)

Season	No. of dogs diagnosed with CTVT	Per cent occurrence
Winter (Nov–Feb)	46	25.00
Summer (Mar–May)	49	26.63
South-west monsoon (Jun–Sep)	59	32.07
North-east monsoon (Oct–Nov)	30	16.30
Chi-square value: 9.44*; p value: 0.024; *Significant at 5% level		

Conclusion

The present study recorded occurrence of CTVT over a three-year period from 2019-2022 at the University Veterinary Hospitals and their occurrence in relation to age, gender, breed, body size, parity, reproductive status, breeding history and season. Occurrence was higher in dogs aged between 2–5 years, in females, in Labrador Retrievers followed by non-descript dogs, in large sized dog breeds than in small or medium or giant sized ones and during south-west monsoon season. Intact female dogs showed highest occurrence of CTVT followed by intact male dogs. An increased occurrence was also observed among pluriparous dogs and in female dogs bred to stud dogs.

Acknowledgements

We thank the Head and staff of University Veterinary Hospitals, Kokkalai and Mannuthy for their cooperation and help during the study.

Conflict of interest

The authors declare that they have no conflict of interest.

References

Amaral, A.S., Gaspar, L.F.J., Bassani-Silva, S. and Rocha, N.S. 2004. Cytological diagnostic of transmissible venereal tumor in the Botucatu region, Brazil (descriptive study: 1994-2003). *Rev. Port. Cien. Vet.* **99**: 167-171.

Andari, C.M., Kardena, I.M. and Puja, I.K. 2016. A survey on cases of canine transmissible venereal tumor (TVT) in Kintamani dog. *Vet. Sci. Med. J.* **4**: 23-25.

Babu, P., Abraham, M.J. and Lalithakunjamma, C.R. 2012. An epidemiological study of canine neoplasms. *Indian J. Anim. Res*. **46**: 196-198.

Bakhodirovich, Y.J. and Bobokulovich, D.N. 2022. Treatment and prevention of transmissive veneric sarcoma in dogs. *Eur. Med. Res. Periodical*. **7**: 81-85.

Bhaiyat, M.I., Chikweto, A., Tiwari, K.P., DeAllie, C., Pawaiya, R.S., Inga, A., Hegamin–Younger, C. and Sharma, R.N. 2013. A retrospective study of canine tumors in Grenada, West Indies. *Adv. Anim. Vet. Sci.* **1**: 134-139.

Chikweto, A., Kumthekar, S., Larkin, H., Deallie, C., Tiwari, K.P., Sharma, R.N. and Bhaiyat, M.I. 2013. Genital and extragenital canine transmissible venereal tumor in dogs in Grenada, West Indies. *Open J. Vet. Med.* **3**: 111-114.

Das, U. and Das, A.K. 2000. Review of canine transmissible venereal sarcoma. *Vet. Res. Commun*. **24**: 545-556.

Florez, M.M., Pedraza, F., Grandi, F. and Rocha, N.S. 2012. Cytologic subtypes of canine transmissible venereal tumor. *Vet. Clin. Path*. **41**: 3-5.

Hithem, B., Said, B., Abdelaziz, A., Khouloud, B. and Adel, A. 2020. Surgical treatment of transmissible venereal tumor (sticker sarcoma). *Bangladesh J. Vet. Med.* **18**: 25-29.

Honparkhe, M., Ghuman, S.P.S. and Kumar, A. 2010. A Clinical study on the prevalence of reproductive disorders and dystocia in canines: A comprehensive report of 110 cases. *Intas Polivet*. **11**: 88-89.

Juneja, R., Jhamb, D., Gaur, M., Nirwan, S.S., Pargi, K., Kumar, K., Mehta, M.K. and Saini, B.S. 2021. A retrospective study of incidence of canine reproductive cases in Udaipur district. *J. Ent. Zool. Stud*. **9**: 166-169.

Lima, C.R.D.O., Rabelo, R.E., Vulcani, V.A.S., Furtado, A.P., Helrigel, P.A., Brito, L.A.B. and Moura, V.M.B.D.D. 2013. Morphological patterns and malignancy criteria of transmissible venereal tumor in cytopathological and histopathological exams. *Brazilian J. Vet. Res.Anim. Sci.* **50**: 238-246.

Nair, R.S. 2012. Occurrence clinical findings treatment of canine transmissible venereal tumour. M.V.Sc. thesis, Kerala Veterinary and Animal Sciences University, Pookode, 77p.

Nair, S.S., Narayanan, M.K., Anoop, S., Krishna, D.B., Usha, N.P. and Martin, J.K.D. 2021. Occurrence of canine mammary and skin/subcutaneous neoplasms in and around Thrissur district of Kerala during 2017-2020: A review of 265 cases. *J. Vet. Anim. Sci.* **52**: 350-356.

Priyadarshini, N., Das, D.P., Panda, S.K. and Samal, L. 2021. Transmissible venereal tumours (TVT) in bitches: A haematological, biochemical and histopathological study. *J. Entomol. Zool. Stud.* **9**: 490-493.

Ramsingh, L., Rao, K.S. and Muralimohan, K. 2013. The reproductive disorders and dystocia in canines. *IOSR J*. **3**: 15-16.

Rao, T.M., Kumar, V.G., Raghavender, K.B.P., Joshi, M.R. and Rao, R.L.N. 1993. Cryosurgical treatment of canine transmissible venereal tumours. *J. Vet. Anim. Sci.* **24**: 149-152.

Sathiamoorthy, T. and Raja, S. 2011. Prevalence of reproductive disorders in the stray dogs of Chennai City. *J. Indian Vet. Ass.* **9**: 62-63.

Scarpelli, K.C., Valladao, M.L. and Metze, K. 2010. Predictive factors for the regression of canine transmissible venereal tumor during vincristine therapy. *Vet. J.* **183**: 362-363.

Schectman, S.J., Khanam, A., Walters, M.N., Kirwan, E., Sylvester, W.R. and Khan, F.A. 2022. A retrospective study of canine transmissible venereal tumour in Grenada, West Indies. *Vet. Med. Sci.* **8**: 1008-1012.

Strakova, A. and Murchison, E.P. 2014. The changing global distribution and prevalence of canine transmissible venereal tumour. *BMC Vet. Res*. **10**: 1-11.

Thangathurai, R., Balasubramaniam, G.A., Dharmaceelan, S., Balachandran, P., Srinivasan, P., Sivaseelan, S. and Manohar, B.M. 2008. Cytological diagnosis and its histological correlation in canine transmissible venereal tumour. *Vet. Arh*. **78**: 369-376. ■