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A detailed hematological study and successful therapeutics management with chemotherapy on canine transmissible venereal tumors (TVT)

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Abstract
A 3-years-old female local dog was brought to the state veterinary hospital of Tezpur, Govt. of Assam, with genital organ bleeding; Serosanguineous exudate and a haemorrhagic cauliflower-shaped friable tumour on the external genitalia were discovered during a thorough clinical examination. Samples were collected from the genitalia using a glass slide for exfoliative cytology and whole blood for hematology. The case was classified as a canine transmissible veneral tumour based on clinical and analytical evidence. The tumour mass in the bitch was remitted after four weeks of chemotherapy with vincristine sulphate at a dose rate of 0.025 mg/ kg intravenously once weekly and supportive therapy with haemostat and multivitamin.

Keywords: Chemotherapy, dogs, oncology, transmissible venereal tumor, vincristine

Introduction
TVT, also known as infectious sarcoma, venereal granuloma, transmissible lymphosarcoma, or Sticker tumour, is a benign reticuloendothelial tumour of the dog that mostly affects the external genitalia but can also affect the internal genitalia. Canine transmissible venereal tumour (CTVT) is a contagious venereal tumour found in dogs that are in close proximity to one another, as well as stray and wild dogs who engage in unrestrained sexual behavior (Purohit 2008; Jacob *et al.,* 2015) [20, 12]. Only puppies and immunocompromised dogs experience TVT metastasis. TVT is unique in that it is the only known example of a naturally occurring tumour that is conveyed as an allograft via cell transplantation and becomes self-contained from its original host. (Kumar *et al.,* 2021) [15] To put it another way, the tumour acts like a parasite. This type of tumour has only been found in dogs, most likely because of the significant abrasions and bleeding of the vaginal area that occurs during coitus, making tumour transplanting simple. In contrast to the species' usual 78, transmissible venereal tumour cells have an aberrant number of chromosomes, ranging from 57 to 64 and averaging 59 (Theilen and Madewell, 1987) [22]. Based on surface antigen characteristics, all TVTs are thought to have originated from a single canine tumour (Behera *et al.,* 2012) [3]. The host's ability to respond immunologically plays a key role in the growth of these tumours (Cizmeci *et al.,* 2012) [5], with an increase in severity found in immunologically damaged animals. During mating or licking of afflicted genitalia, neoplastic cells exfoliate and transplant into the genital mucosa, as well as nasal and oral mucosa (Johnston, 1991) [13]. Transmission is aided by a loss of mucosal integrity (Vermooten, 1987) [23]. It is transplanted with intact viable cells across MHC barriers within the same species (Mukaratirwa and Gruys, 2003) [16] and even to other canine family members such as foxes, coyotes, and jackals during coitus (Higgins, 1966) [11].
TVT is the most commonly reported tumour in dogs in India, accounting for 23-43 percent of the total number of tumours in the canine population (Gandotra *et al.,* 1993) [9]. TVT has an age-related occurrence (Higgins, 1966; Pandey *et al.,* 1997) [11, 19], with the tumour being most frequent between the ages of 2 and 5.
In atypical cases, biopsy and histological examination may be required. Clinical history, signalment, and cytological features are often obvious for establishing a diagnosis. The majority of patients can be cured with three weekly vincristine sulphate IV injections. The disease is difficult to prevent due to the participation of stray and wild dogs, which demands long-term animal birth control in stray dogs as well as timely treatment of sick dogs. (Andari *et al.,* 2016) [2].

This paper will go through how to properly care for and treat a bitch with a transmissible venereal tumour, including hematobiochemical changes, diagnosis, and therapeutic management.

Case history and clinical examination

This study was conducted at state veterinary hospital, Tezpur Govt. of Assam, India. The bitch was brought into the clinic with a 30-days history of vaginal bleeding, anorexia, genital licking, vulva swelling, and a protruding mass from the vulva. Vulvo-vaginal examination of the bitch revealed, accumulation of serosanguineous, foul smelling discharge at the ventral commissure of vulval lips and a large haemorrhagic cauliflower shaped friable mass formed by the fusion of multiple nodules between the floor of the vestibule and caudal vagina (fig.2). For haematological analysis three millilitres of whole blood from the cephalic vein were collected in an EDTA vial and hematological parameters were determined by using fully automated haematological analyser. The hematological parameters haemoglobin (Hb), packed cell volume (PCV), total erythrocyte count (TEC), total leucocyte count (TLC), Platelets, Neutrophil, Eosinophil and Lymphocytes were estimated on 0th and 45th days after treatment (Table-1). A smeared mass of vulva was smeared onto a clean, grease-free slide. After air drying, the slide was fixed with 10% ethanol for 10 minutes before staining with Giemsa stain. The slide was examined using a light Microscope with a 100x objective and oil immersion after adequate staining. TVT was confirmed by presence of vacuole cells (Fig.1).

Treatment

At weekly intervals, the dog was injected with vincristine sulphate diluted in normal saline at a dose of 0.025 mg/kg body weight, I/Vly. In addition, to prevent anaemia and thrombocytopenia, Hematostat syrup (5ml PO BID) and a supportive therapy of Vitamin B complex (5ml BID PO) was given in order to control the bleeding. Antihistaminic (chlorpherniramine maleate) was also given intramuscularly for 7 days at a dose of 0.5 mg/kg BW,I/M ly. The medication was continued until the animal was completely recovered.

Results and Discussion

The case study animal was 3 years old, which is in keeping with certain researchers who believe that dogs between the ages of 2 and 5 years are prone to venereal tumours (Das *et al.*, 1991) [7]. On the first day of evaluation,(table-1) the mean haemoglobin of TVT affected dog was 12.10 g/dl, which was found to be increased non significantly on the 45th day (13.70 g/dl). Similarly, when compared to 45 days of observation (PCV: 41.36 percent and TEC: 5.98 x 10^6/mm^3), dogs had a non-significantly lower PCV (36.40 percent) and TEC (5.81 x 10^6/mm^3) on 0^{th} day. Pretreatment platelet count (2.09 $\times10^5$/mm^3) was found to be increased to 2.71×10^5/mm^3 after four weeks of treatment. Reduced Hb, PCV, TEC, platelets may be attributed to tumoral bleeding, inappetance and immunosuppressive nature of the disease (Das *et al.*, 1991) [7]. Increased TLC level was also noticed in this current stydy. According to Cizmeci *et al.*, (2012) [5] leucocytosis in TVT dogs was caused by tumoral haemorrhage and infection of the lower urinary system. (Behera *et al.*, 2012; Girmabirhan *et al.*, 2015) [3, 10] both observed an increase in total leucocyte count in TVT dogs, which is consistent with our findings. DLC exhibited identical levels of neutrophils, eosinophils, and lymphocytes in TVT affected dogs on day 0^{th} compared to treatment after 45 days, which were consistent with (Kabuusu *et al.*, 2010; Behera *et al.*, 2012; Girmabirhan *et al.*, 2015) [14, 3, 10].

Table 1: Hematological parameters comparison between 0 day and 45 days of treatment in dog with TVT

SL	Parameters	0^{th} day values	45^{th} days values
1	Haemoglobin (gm/dl)	12.10	13.70
2	PCV(%)	36.40	41.36
3	TEC(10^6/mm^3)	5.81	5.98
4	TLC(10^3/mm^3)	16.88	16.97
5	Neutrophil (10^3/mm^3)	12.30	12.97
6	Eosinophil (10^3/mm^3)	1.23	0.79
7	Lymphocyte (10^3/mm^3)	3.35	3.21
10	Platelet count (10^5/mm^3)	2.09	2.71

TVT cells have a characteristic cytological appearance (Duncan and Prasse, 1979) [8]. They are round to oval in form, with chromatin clumping and one or two conspicuous nucleoli, and frequently contain mitotic figures. The appearance of many conspicuous cytoplasmic vacuoles is the most prominent cytological observation. As TVT cells degenerate, vacuolation rises in the early stages of regression. Endoplasmic reticulum and ribosome levels rise during degeneration, as do mitochondrial enlargement and vacuolation. Many membrane-bound granules and clusters can be found in degenerating cells (Cockrill and Beasley, 1975) [5].

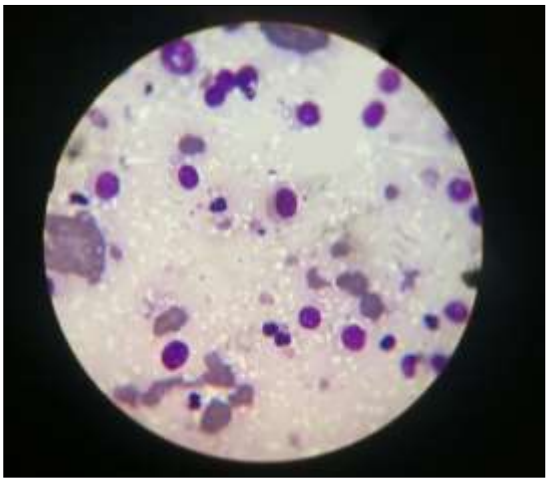

Fig 1: Numerous rounds to oval cells are present with multivacuolated cytoplasm.

The salt of an alkaloid derived from the common periwinkle (*Vincarosa livia*), vincristine sulphate is also known as leurocristine (Boscos, 1988; Singh *et al.*, 1996) [4, 21]. In human medicine, it is used in combination chemotherapy with other anti-tumour medicines (Nathan *et al.*, 1993) [17]. It has been discovered to produce mitotic arrest and act on intercellular tubules, however the specific mechanism of its activity is still being debated (Whitehead *et al.*, 1980) [24]. The anti-mitotic impact of vincristine on bone marrow haemopoiesis could explain the dogs' mild and temporary normocytic normochromic anaemia and leucopenia. Because of the low dosage and well-spaced short time of therapy, the dogs may have tolerated the unfavourable effects of vincrisitine. This is clearly preferable to the side effects of certain previously used combination anti-tumour medications,

which necessitated the administration of fluid and/or antibiotic supportive therapy to the dogs (Amber *et al.*, 1990; Oni, 1994) [1, 18].

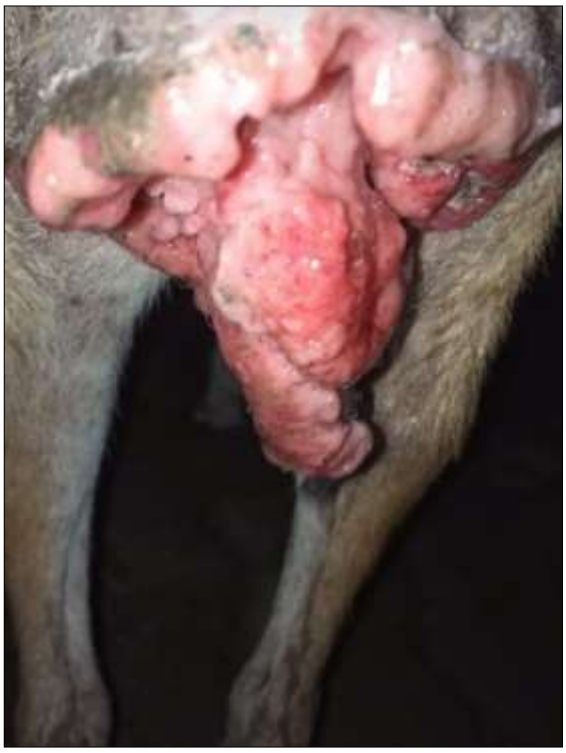

Fig 2: On 0th day dog was presented with TVT lesion

Fig 3: After 45 days of treatment dog showed improvement of TVT lesion

The considerable reduction in mitotic figures was detected at the second dosage regimen, however the tumour cells became more compact on the fourth and final administration (45th day), with significant fibroplasias, no bacterial contamination, and no mitotic figures visible. The need for cost-effective, affordable and minimal side effect course of treatment of TVT necessitated the trial of the efficacy of single low dosage intravenous administration of vincristine sulphate in this study.

Conclusion

Along with supportive treatment, the dog showed total recovery from a widespread cutaneous and genital form of transmissible venereal tumour (TVT) after receiving vincristine sulphate at a dose rate of 0.025 mg/kg bwt IV once a week for four weeks.

References

1. Amber EI, Henderson RA, Adeyanju JB, Gyang EO. Single-drug chemotherapy of canine transmissible venereal tumour with cyclophosphamide, methotrexate, or vincristine. J Vet. Intern. Med. 1980;4(3):144-147.
2. Andari CM. Kardena IM, Puja IK. A Survey on Cases of Canine Transmissible Venereal Tumor (TVT) in Kintamani Dog Veterinary Science and Medicine Journal. 2016;4(1):23-25.
3. Behera SK, Kurade NP, Shongsir WM, Durga PD, Krishna KM, Ranjan KM. Clinico- pathological findings in a case of canine cutaneous metastatic transmissible venereal tumour. Vet. Arhiv. 2012;82(4):401-410.
4. Boscos C. Transmissible venereal tumour in the dog: clinical observations and treatment. Anim. Famil. 1988;3:10-15.
5. Cizmeci SU, Kose AM, Aydin I, Dinc DA, Maden M, Kose SI. Clinical efficiency of Doxorubicin and Cisplatin in treatment of transmissible venereal tumour of bitches. Revue Med. Vet. 2012;163(11):516-521.
6. Cockrill JM, Beasley JN. Ultrastructural characteristics of canine transmissible venereal tumor at various stages of growth and regression. American Journal of Veterinary Research 1975;36:677-681.
7. Das AK, Das U, Das BB. Clinical report on the efficacy of chemotherapy in canine transmissible venereal sarcoma. Indian Vet. J. 1991;68:249-252.
8. Duncan JR, Prasse KW. Cytology of canine cutaneous round cell tumors. Mast cell tumor, histiocytoma, lymphosarcoma and transmissible venereal tumor. Veterinary Pathology. 1979;16:673-679.
9. Gandotra VK, Chauhan FS, Sharma RD. Occurrence of canine transmissible venereal tumor and evaluation of two treatments. Indian Vet. J. 1993;70:854-857.
10. Girmabirhan, MC. A reveiw on canine transmissible venereal tumour from morphologic to biochemical and molecular diagnosis. Academic Journal of Animal Diseases. 2015;3:185-195.
11. Higgins DA. Observations on the canine transmissible venereal tumor as seen in the Bahamas. Vet Rec. 1966;79(3):67-71.
12. Jacob A, Bhanuprakash AG, Choudhary SS, Panigrahi PN, Mahendran K, Sharma DK, *et al*. Therapeutic management of Transmissible Veneral Tumor in canine Indian J Vet. Med. 2015;35(1):81-84.
13. Johnston SD. Performing a complete canine semen evaluation in a small animal hospital. Vet Clin North Amer Small Anim Pract. 1991;21(3):545-551.
14. Kabuusu RM, Stroup DF, Fernandez C. Risk factors and characteristics of canine transmissible venereal tumours in Grenada, West Indies. Veterinary and Comparative Oncology. 2010;8(1):50-55.
15. Kumar K, Jha AK, Ray K, Gautam AK, Singh D. Diagnosis of TVT with cell cytology and efficacy of treatment with Vincristine Sulfate in non- descriptive Indian canine breeds. Journal of animal research. 2021;11(55):1352-1355.
16. Mukaratirwa SEE. Canine transmissible venereal tumor: cytogenetic origin, Immunophenotype and immunobiology. A review. Vet Q. 25(3), 101-111. J Amer. Vet. Med. Assoc. 2003;183:690-692.
17. Nathan WP, Thomas JM, Siebert PE, Wallner SF, Carson SD, Carson DN, *et al*. Cyclophosphamide, Vincristine, Lomustine, Cisplatin and Doxorubicin in the treatment of

non-small cell lung cancer: Cancer Treat. Rep. 1993;67(4):375-376.
18. Oni SO. Chemotherapy of canine transmissible venereal tumour with cyclophosphamide/vincristine has no term effect on fertility. Trop. Vet. 1994;12:97-104.
19. Pandey SK, Dhawedkar RG, Patel MR. Canine transmissible venereal sarcoma: clinical trial with autogenous formalized vaccine. Indian Vet. J. 1977;54:852-853.
20. Purohit G. Canine Transmissible Venereal Tumor: A Review. The Internet Journal of Veterinary Medicine. 2008;6:1-7.
21. Singh J, Rana JS, Sood N, Pangawkar GR, Gupta PP. Clinico-pathological studies on the effect of different antineoplastic chemotherapy regimens on transmissible venereal tumours in dogs. Vet. Res. Commun. 1996;20:71-81.
22. Theilen GH, Madewell BR. Veterinary Cancer Medicine. Clinical Application of Cancer Chemotherapy. IInd edn., Lea and Febriger Philadelphia, 1987, 183-196.
23. Vermooten MI. Canine transmissible venereal tumor (TVT): A review. J S Afr Vet Assoc. 1987;58(3):147-150.
24. Whitehead R, Crowley J, Carbone F. cis-Dichlorodiammineplatimum (P), adriamycin (A), cyclophosphamide (C) CCNU (C), and Vincristine (O) (PACCO) combination. chemotherapy in advanced non-small cell bronchogenic carcinoma. Proc. Am. Assoc. Cancer Res. 1980;21:458.