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Medical Management of Transmissible Venereal Tumors (TVT) in dogs

P. Ramesh[1], CH. Sudha Rani Chowdary[2], C. Pavan Kumar[3] and N. Lakshmi Rani[4]

Department of Veterinary Medicine, NTR College of Veterinary Science,
Sri Venkateswara Veterinary University, Gannavaram-521 101, Andhra Pradesh

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Abstract

A five 3-6 year old male dogs were presented with dysuria, discomfort and occasional or continuous bleeding from the prepuce. Physical examination revealed fragile cauliflower like growths on the base of the penis or glans. Heamatology showed mild anemia and neutrophilia. Cytology of impression smears and histopathology revealed typical round to polyhydral sticker cells with grayish cytoplasm intracytoplasmic vacuolation, large nuclei and mitotic figures suggestive of TVT. All the dogs were treated with Inj.vincristine @ 0.025mg/kg once weekly for 4 times along with supportive therapy and four cases showed complete regression of growth following therapy.

Keywords: Dog, hematuria, venereal tumor, vincristine

Introduction

Transvenereal Tumor (TVT) also known as infectious sarcoma, venereal granuloma, transmissible lymphosarcoma or sticker tumor, is a benign reticuloendothelial tumor of the dog usually transmitted by the physical transfer of viable tumor cells by direct contact with injured skin and or mucous tissue (Stockmann *et al*., 2011). TVT is more prevalent in tropical and subtropical countries particularly in mongrel dogs with high levels of sexual activity coupled with roaming behavior (Biswas *et al*., 2024). Young, stray and sexually active dogs are most frequently affected by frequent licking, scratching and biting (Rogers *et al*., 1998). TVT is usually transmitted to genital organs during sexual intercourse but can affect the skin via the direct implantation of tumor cells during contact between skin and tumor masses (Tella *et al*., 2004). TVT commonly affects the external genitalia in dogs of both sexes.

In males, the tumor is commonly located in the caudal part of the penis, the glans and occasionally on the fore skin. In females, TVT is often found at the junction of the vestibule and the posterior region of the vagina and occasionally in the urethral opening (Milo and Snead, 2014). TVT can occur as a solitary mass or as multiple tumors with pendular, nodular, papillary or multilobar forms presenting a cauliflower like appearance. The tumor is friable and is often ulcerated and inflamed (Das and Das, 2000). The tumor size can vary form 3-12 cm in diameter. Clinical signs of genital TVT include profuse vaginal or preputial bleeding, intermittent or persistent ulcerative skin lesions, poor penile exposure, genital swelling and excessive licking of the genital area (Setthawongsin *et al*., 2022). Various treatment regimens, both invasive and non-invasive, have been employed for the management of transmissible venereal tumor (TVT), including surgery, immunotherapy, radiotherapy, biotherapy and chemotherapy (Ganguly *et al*., 2016). The present study focused on the treatment of transmissible venereal tumor (TVT) in dogs by using the chemotherapeutic agent vincristine, and to evaluate its outcome.

*Corresponding author: rameshvety777@gmail.com
[1]Associate Professor, Department of Veterinary Medicine
[2]Assistant Professor, Department of Veterinary Pathology
[3]Assistant Professor, Department of Veterinary Medicine
[4]Professor and Head, Department of Veterinary Medicine
NTR College of Veterinary Science, Sri Venkateswara Veterinary University, Gannavaram, Andhra Pradesh, India,

Materials and methods

Five dogs presented to the Veterinary Clinical Complex, NTR College of Veterinary Science, Gannavaram during one year period with the complaint of bleeding from penis and presence of cauliflower like tumor masses on the external genitalia on physical examination constituted the source materials for the present study.

Whole blood was collected from all the cases for complete blood count and impression smears from tumor masses on the external genitalia were collected for cytological examination. The cytological smears were subjected to Leishman's staining. Representative tumor samples were collected in 10% buffered formalin for routine tissue processing, microtomy and H & E staining.

All the dogs were subjected to radiographic examination to evaluate the metastatic lesions in the viscera or body cavities during the study period. Confirmed cases of TVT were treated with injection Vincristine sulphate @0.025mg/kg body weight intravenously once weekly for four to five weeks along with supportive therapy.

Result and Discussion

In the present study, five intact male dogs of various breeds, aged between 3 and 6 years with a recent history of mating were presented to the VCC, NTR CVSc, Gannavaram exhibiting clinical signs such as pyrexia, dullness, hyporexia, serosanguinous to bloody discharge from the prepuce (Fig. 1 and 2) and swollen, painful penile sheath. Physical examination revealed presence of fleshy mass at different locations viz. the tip or base of penis. The masses were pedunculated, unilobar to cauliflower like growths (Fig. 3 and 4).

Hematological evaluation of blood samples revealed mild anemia and moderate to severe neutrophilia in all the cases (Table 1). Cytology of impression smears from the tumor masses revealed sheets of round to oval cells with intracytoplasmic vacuolation, cytoplasmic basophilia, large round nuclei with prominent nucleoli and mitotic figures .Histopathology revealed large sheets of round cells containing round vesicular nuclei separated by an arborizing fibrovascular network with minimal stroma. The tumor also revealed mild to moderate infiltration of a few neutrophils, lymphocytes and macrophages (Fig.8-10). The cytological and histopathological features were characteristic of transmissible venereal tumor. The findings of the present study are in accordance with the observations of Gonzalez *et al*, (2000) who reported cytological features such as round to oval cells often contain mitotic figures with chromatin clumping and one or two prominent nucleoli with multiple clear cytoplasmic vacuoles in canine TVT.

All the dogs were treated with Inj. Vincristine @ 0.025mg/kg (1mg/m2) diluted with in 20ml of normal saline by intravenous route once in a week for 4-5 weeks along with oral hematinics and supportive therapy. Out of five dogs treated, four dogs showed improvement with gradual involution of lesions and complete remission of the growth after 4 weeks of therapy in three dogs and 5 weeks of therapy in one dog. One dog exhibited metastatic lesions in the pelvis and died inspite of receiving chemotherapy (Fig.5-7). Similar findings were reported by Singh *et al.* (1996) who documented that complete remission of tumor lesions in TVT usually takes 2 to 8 injections of therapy in more than 90% of the treated cases.

Though there are several therapeutic options, chemotherapy with vincristine sulfate offers several advantages, including a high cure rate, ease of administration, and potential efficacy. Vincristine is a naturally occurring vinca alkaloid act as antimicrotubule agent that

block mitosis by arresting cells in the metaphase. Vincristine is considered to be the first line drug of choice with high remission rates though other agents like lomustine and doxorubicin use is reserved for refractory cases of TVT with 93.1% of success rate (Pimentel *et al.*, 2025).

Summary

The findings of the present study suggest that the transmission of tumor cells likely occurs during coitus, as extensive abrasions and bleeding of the penile and vaginal mucosa facilitate the implantation of neoplastic cells. Impression smear cytology could be used for preliminary diagnosis of TVT with confirmation achieved through histopathology. Inj. Vincristine sulphate @ 0.025mg/kg body weight administrated intravenously at weekly intervals for four to five occasions was proved to be the most effective, safe and convenient chemotherapeutic agent with improved survival outcome. Factors like controlled breeding and limiting the stray dog population might help in the control of the TVT.

Conflict of Interest Statement:

Authors declares no conflict of interest.

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Table. 1. Mean ± SE values of hematological parameters of affected dogs (n=5)

S.No.	Parameter	Value (Mean±SE)
1	Haemoglobin (g/dl)	9.94±1.85
2	Packed Cell Volume (%)	29.88±5.09
3	RBC (106/µl)	4.12±0.89
4	WBC (103/cmm)	8.120±3.375
5	Neutrophils (%)	86±7.9
6	Lymphocytes (%)	13.2±6.9

Fig.1 and 2. Photograph showing prepucial bleeding in dogs

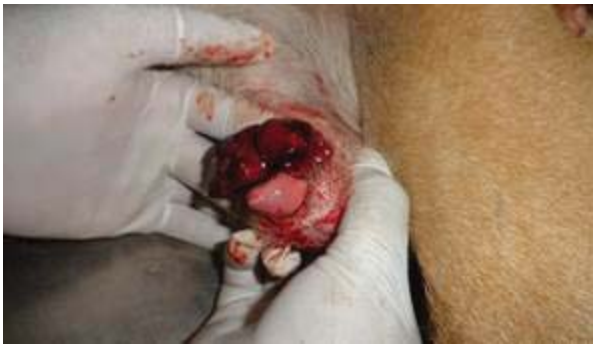

Fig.3 and 4. Photographs showing presence of fleshy, ulcerated masses at the base of penis

Fig.5. and 6. Photographs showing regression of tumors after therapy

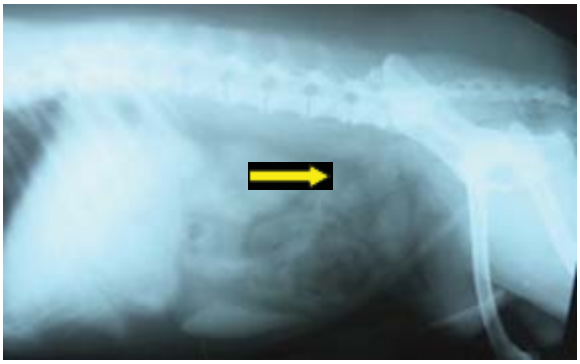

Fig.7. Radiographic findings of metastasis in the pelvis

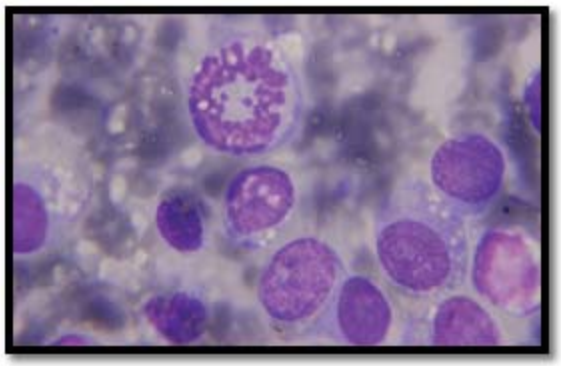

Fig.8: Cytology showing round to oval cells with punctuate cytoplasm

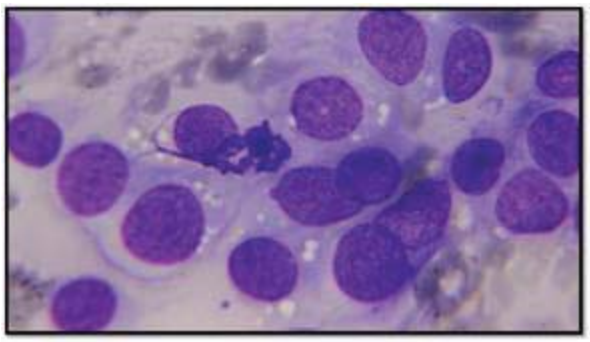

Fig.9. Photomicrograph showing polyhydral sticker cells with mitotic figures

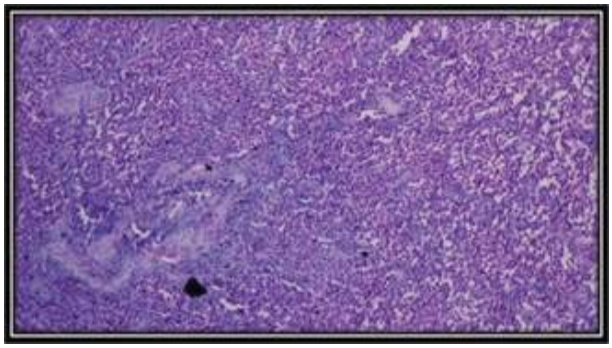

Fig.10. Histopathology showing large sheets of round cells, H & E x 40