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Case Study

Cytological diagnosis and haematological alterations in transmissible venereal tumour

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Abstract

The study was conducted in 12 non-descriptive dogs (8 female and 4 male) with nodular tumour growths on external genitalia which were presented to Veterinary Clinical Complex, Rajendranagar, Hyderabad, Telangana for treatment. Impression smears were taken from the tumour mass and stained with Fields stain for cytological diagnosis. Cytologically, the tumours revealed homogenous highly cellular mass. The neoplastic cells were large, round with multiple punctate vacuoles in cytoplasm and the nuclear chromatin was coarse to reticulate which were suggestive of transmissible venereal tumour. After diagnosis the affected dogs were treated with Vincristin. Further blood samples were collected and analyzed for various haematological parameters. In dogs, after treatment with Vincristin the total erythrocyte count, hemoglobin, packed cell volume, total leucocyte count and platelet count were significantly ($P<0.05$) decreased in comparison with before treatment. In differential leucocytic count, the neutrophil percentage was significantly ($P<0.05$) decreased and lymphocytic percentage was significantly ($P<0.05$) increased in dogs after treatment in comparison with before treatment.

Key Words; Cytology, haemotology, transmissible venereal tumour

INTRODUCTION

Transmissible Venereal Tumour (TVT) is a benign reticuloendothelial tumor of dogs that mainly affects the external genitalia. TVT occasionally noticed in other organs such as skin, mouth, eye, nasal cavity, abdomen and other sites (Gupta and Sood, 2012; Sritrakoon *et al*., 2020; Dhillon *et al*., 2021). It is also known as infectious sarcoma, venereal granuloma, transmissible

lymphosarcoma or stickers sarcoma (Saravanan *et al*., 2015). It is one of the known oldest and main neoplasms affecting the dogs. It is located on the base of the penis or prepuce in males and on the vagina in females. This neoplasm is contagious in nature, transmitted through the intercourse and more common in young animals especially at reproductive age. There is no breed or sex predilection in dogs for occurrence of TVT (Rogers, 1997). The present study deals with the clinical, cytological and haematological findings in TVT affected dogs.

MATERIAL &METHODS

Eight female dogs and four male dogs were presented to the Veterinary Clinical Complex, College of Veterinary Science, PVNRTVU, Rajendranagar, Hyderabad with a history of dullness, reduced appetite, bleeding and small nodular growths over the penis, prepuce, vagina and vulva. On physical examination, multiple cauliflower like fragile growths were noticed on external genital organs. Impression smears from the tumor masses were collected on clean, grease free glass slides for cytological analysis. Field's staining was done and then the slides were observed under 100x objective of microscope with oil immersion. Further 2 ml of blood sample from each dog (before and after treatment) was collected in EDTA containing tube for hematological examination (Huma count, med source ozone biochemical Pvt. Ltd). The data obtained were subjected to statistical analysis by applying one way ANOVA using statistical package for social sciences (SPSS) version 16.0. Differences between the means was tested by using Duncan's multiple comparison test and significance level was set at $P<0.05$ (Snedecor and Cochran, 1994).

RESULTS

Clinical examination: Tumour masses on the external genital organs (penis, prepuce, vagina and vulva) were irregular in shape, pedunculated, nodular, grey to red colored and showed cauliflower like appearance. They are very fragile; the consistency of the mass was soft to touch and had a tendency to bleed. In some animals tumour masses were ulcerated and necrotic. The tumor size was grossly reduced after the treatment with Vincristine.

Cytological examination: Cytology of the tumour revealed homogenous highly cellular mass. Large, uniform, round to oval shaped tumour cells were noticed with multiple distinct, clear punctate vacuoles in cytoplasm (Figure 1&2). The nucleus was round to oval in shape and the nuclear chromatin was coarse to reticulate. The nucleoli were basophilic and the number varied from one to three (Figure 3). There was anisokaryosis and anisonucleoliosis. The nuclear to cytoplasmic ratio was high. Mitotic figures were prominent (Figure 4).

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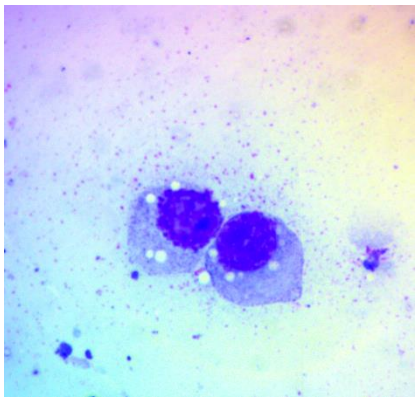

Fig.1. Cytology of TVT showing round tumour cells with multiple distinct, clear punctate vacuoles in cytoplasm. Fields stain x 1000.

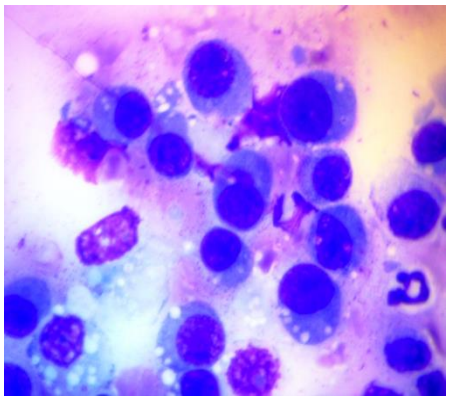

Fig. 2 Cytology of TVT showing round to oval tumour cells with multiple distinct, clear punctate vacuoles in cytoplasm. Fields stain x 1000

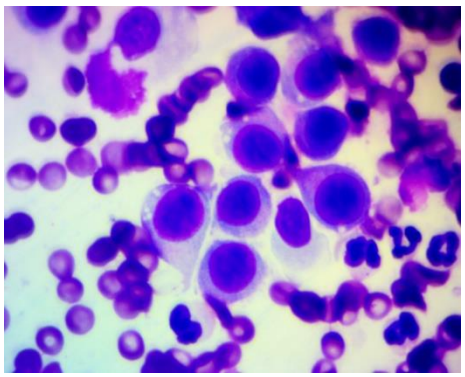

Fig 3. Cytology of TVT showing sheet of tumour cells with coarse to reticulate chromatin and basophilic cytoplasm. Fields stain stain x 1000.

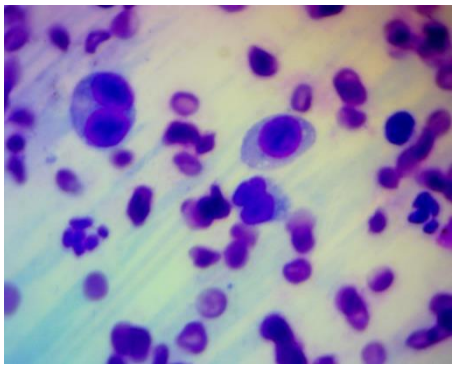

Fig 4. Cytology of TVT showing tumour cells with hyperchromatism and mitotic figures. Fields stain stain x 1000.

Hematological examination: TEC, Hb, PCV, TLC and platelets were significantly ($P<0.05$) decreased in dogs after treatment with Vincristin in comparison with before treatment. In differential leucocytic count, the neutrophil percentage was significantly ($P<0.05$) decreased and lymphocytic percentage was significantly ($P<0.05$) increased in dogs after treatment in comparison with before treatment (Table 1).

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Table 1: Hematological parameters in Dogs affected with TVT

S.No.	Parameter	Before treatment with Vincristin	After treatment with Vincristin
1.	TEC (x 10^6 /µl)	6.45±0.126[a]	5.05±0.177[b]
2.	Hb (g/dl)	12.08±0.15[a]	9.66±0.14[b]
3.	PCV (%)	38.0±0.68[a]	28.0±0.68[b]
4.	TLC (x 10^3 /µl)	18.92±0.16[a]	14.03±0.25[b]
5.	Platelets (x 10^5 /dl)	2.54±0.04[a]	1.75±0.02[b]
6.	DLC (%)		
	Neutrophil (%)	78.5±1.04[a]	65.0±1.40[b]
	Lymphocyte (%)	16.92±0.51[b]	28.0±0.58[a]
	Monocyte (%)	2.25±0.49	3.5±0.78
	Eosinophil (%)	2.33±0.5	3.5±0.73

Values are mean ± SE (n=12), One way ANOVA, Means with different superscripts in a column differ significantly (P<0.05).

DISCUSSION

Similar clinical finding were noticed by Kumar *et al.* 2021. Cytological features in current study are in correlation with earlier studies (Duncan and Prasse, 1979; Alleman and Bain, 2000; Thangathurai *et al.*, 2008). Vincristine is an alkaloid obtained from Vinca rosea that blocks mitosis by arresting cells in the metaphase (Said *et al.*, 2009). Haematological examination revealed a significant decline (P<0.05) in Hb, PCV and TEC after treatment with Vincristin which may be due to bleeding from tumour and myelosuppression induced by Vincristin. Similar observations were reported by Tella *et al.* 2004, Nak *et al.* 2005 and Said *et al.* 2009. In the present study, TLC was significantly (P<0.05) increased before treatment with Vincristin and it was significantly (P<0.05) decreased after treatment. These results are in agreement with Behera *et al.* 2012 and Girmabirhan *et al.* 2015. The leucocytosis may be due to urinary tract infection in TVT affected dogs.

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Neutrophilia, lymphocytopenia were recorded before treatment and these were significantly changed to neutropenia and lymphocytosis after therapy. Significant thrombocytopenia was also observed after therapy. These findings are similar with the earlier workers (Tella *et al.,* 2004; Nak *et al.,* 2005; Said *et al.,* 2009; Girmabirhan *et al.,* 2015). The decline of neutrophils, thrombocytes and increase in lymphocytes may be due to bone marrow suppression and myeloid toxicity induced by Vincristin (Todorova, 2005).

TVT is one of the common neoplasms of dogs and it can be rapidly diagnosed by cytology along with the clinical examination under field conditions. Vincristin is more effective in treatment of TVT even though the haematological values were slightly altered.

CONFLICT OF INTEREST

The authors declare no competing interests

DATA AVAILABILITY

The analyzed datasets generated during the study are available with the corresponding author and it will provide on reasonable request

AUTHOR'S CONTRIBUTION

All authors contributed equally to this work. Dr.S.Soujanya performed the research, analyzed the data and wrote the manuscript. Dr. D. Madhuri contributed to the editorial changes in the manuscript.

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