

## CYTOMORPHOLOGY OF CANINE TRANSMISSIBLE VENEREAL TUMORS

**Sudha Rani Chowdary CH\*<sup>1</sup>, M. Raghunath<sup>1</sup>, P.V. Sagar<sup>1</sup>, B. Sailaja<sup>2</sup>,  
P. Ravi Kumar<sup>2</sup> and N.V.V. Hari Krishna<sup>2</sup>**

<sup>1</sup>Department of TVCC, <sup>2</sup>Department of Veterinary Surgery and Radiology  
NTR college of Veterinary Science, Gannavaram, Andhra Pradesh 521 101

E-mail: drsudha84@gmail.com (\**Corresponding Author*)

**Abstract:** Twenty eight cases of transmissible venereal tumors were recorded during the period from March, 2013 to, February, 2015. They accounted for 39% of all the canine neoplasms. Impression cytology revealed sheets of round cells with cytoplasmic basophilia, intracytoplasmic vacuolation, round to oval nuclei with coarse chromatin and mitotic figures. In all genital TVTs, the cells were predominantly lymphocytic type and in case of extragenital TVTs, the cells were predominantly plasmacytic type.

**Keywords:** Canine, Transmissible venereal tumor, Cytology.

### Introduction

Transmissible venereal tumor (TVT) also known as venereal granuloma, infectious sarcoma, Sticker's sarcoma and canine condyloma is an unusual reticuloendothelial tumor that occur in all dog breeds and is seen in various parts of the world, especially in tropical and subtropical zones. However, it is particularly common in stray dogs, which mate without any control after reaching sexual maturation and is mainly transmitted through coitus [1]. The tumor is primarily located on the genitalia or, less commonly, on the lips or other portions of the skin or mucosa that come in contact with the genitalia. Dogs of both the sexes and all ages are affected, but tumor is most commonly seen in female dogs that have reached sexual maturity. These tumors grow rapidly at first and then remain static for a time, with eventual spontaneous regression after several months. There is infrequent metastasis to regional lymphnodes and rarely to viscera [2].

Cytology is the method of choice for diagnosis of TVT, since the technique is simple, cheap, minimally invasive, painless and furthermore, produces much less distortion of cell morphology than formalin fixed biopsy samples [3].

As morphology and biological behavior of tumors are two intimately related characteristics, an attempt has been made to study the differences in cytomorphology of canine TVTs.

*Received June 21, 2016 \* Published Aug 2, 2016 \* [www.ijset.net](http://www.ijset.net)*

## Materials and Methods

The study was conducted during the period from March, 2013 to February, 2015 on cases presented to Department of TVCC, NTR college of Veterinary Science, Gannavaram. Each case was classified according to its localization (as genital or extragenital) and its biological behavior (as primary, metastatic and recurrent). Impression smears were collected in all the suspected cases of TVT and stained with Leishman's stain. 100 TVT cells were counted on each slide to determine the predominant cell type. They were categorized as described by Amaral *et al.*, [3] as below.

1. **Lymphocytic type:** predominance of 60% or more of TVT cells with round morphology, scarce cytoplasm (increased nucleus: cytoplasmic ratio), with the presence of vacuoles tracking the cell periphery, round nucleus with rough chromatin and the presence of one or two salient nucleoli.
2. **Plasmacytic type:** predominance of 60% or more of TVT cells with ovoid morphology, abundant cytoplasm (lower nucleus: cytoplasmic ratio), with eccentric nucleus.
3. **Mixed type:** mixed cellularity between lymphocytic and plasmacytic cell types, in which none surpassed 59% of the total.

## Results

Twenty nine cases of TVTs with 25 females and 4 males were recorded during the present study. TVTs accounted for 39% of all canine neoplasms. External genitalia was the primary site of occurrence in twenty eight dogs. In addition to the genital tumor, extragenital TVT was identified in the oral cavity attached to the gum in a bitch. In a single case, extragenital TVT was recorded in the subcutaneous tissue in the left inguinal region of a male dog. The TVTs varied in their gross appearance from verrucous masses to nodular growths protruding from the surface of genitalia with profuse bleeding. The classification of canine TVTs based on localization and biological behavior are shown in table 1. The cytological preparations were analyzed as described earlier (Table 2). All the primary and recurrent genital tumors had lymphocytic type cytomorphology, characterized by sheets of cells with round to polyhedral morphology, cytoplasmic basophilia with prominent vacuoles, increased nuclear: cytoplasmic ratio, prominent nucleoli and mitotic figures (fig.1), whereas the extragenital type TVTs had plasmacytic cytomorphology, characterized by sheets of oval cells with abundant basophilic cytoplasm, prominent intracytoplasmic vacuoles, eccentric nucleus and large number (1 per 2-3 high power fields) of mitotic figures (fig.2). Mixed type cytomorphology was not observed in the study.

## Discussion

TVT has continued to be a serious problem around the world occurring at same frequencies in both male and female dogs. It is estimated to be more prevalent in temperate climates. It is commonly observed in dogs that are in close contact with one another, or in stray and wild dogs that exhibit unrestrained sexual activity. In India, TVT is known to be the most frequently reported tumor in dogs ranging from 23-43 % of the total number of tumors in canine population [4] which is in accordance with the findings of the present study.

Naturally occurring TVT generally develops in the external genitalia. Despite this, TVT occurs in the nasal and / or oral cavity [5], skin [6], subcutaneous tissue [7] and mammary glands [8] probably as a consequence of social behaviors. The presence of metastases in naturally occurring TVT suggests an estimated rate between 1.5 and 6%, according to Ferreira *et al.* [9], or from 0 to 17%, according to MacEwen[10] which is in accordance with the findings of the present study.

In the present study, based on cytomorphology of TVT cells, TVTs are classified as lymphocytic, plasmacytic and mixed type. Lymphocytic morphology was observed in primary and recurrent genital tumors whereas plasmacytic morphology was observed in extragenital TVTs. Similar findings were reported by Amaral *et al.* [3] in their studies on canine TVTs. In addition, they reported mixed type cytomorphology in few primary genital tumors. However, mixed type morphology was not observed in the present study. Varaschin *et al.* [11] also reported that malignant TVTs present cytology with abundant cytoplasm which correspond to plasmacytic type morphology.

In the present study, plasmacytic type TVT presented frequent mitotic figures (1 mitotic figure per 2-3 high power fields) than lymphocytic type suggesting that plasmacytic TVTs are more aggressive than lymphocytic TVTs which also correlated to their metastatic potential manifested by occurrence of plasmacytic TVTs in extragenital locations.

Hence, it is evident that TVTs of different cytomorphologies have different biological behaviour and such a classification based on cytomorphology would help a clinician to decide the treatment modality.

## References

- [1] Gurel A, Kuscu B, Gulanber EG and Arun SS. 2002. Transmissible venereal tumors detected in the extragenital organs of dogs. *Israel Journal of Veterinary Medicine*. **57**: 2.
- [2] Goldschmidt MH and Hendrick MJ. 2002. Tumours of skin and soft tissues. In: Meuten DJ, eds. *Tumours in Domestic Animals*. 4<sup>th</sup> edition. Iowa state press, Iowa. 45-118.

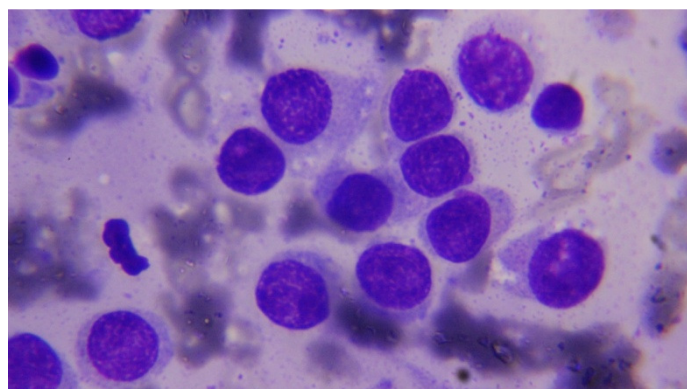
- [3] Amaral AS, Silva SB, Fierreira I, Fonseca LS, Andrade FHE, Gaspar LFJ and Rocha NS. 2007. Cytomorphological characterization of transmissible canine venereal tumor. *Revista Portuguesa De Ciencias veterinarias*. 102 (563-564): 253-260.
- [4] Purohit. 2008. Canine transmissible venereal tumor: A review. *The Internet Journal of Veterinary Medicine*. 6(1).
- [5] Raghunath M, Chowdary CSR, Sagar PV and Kumar PR. 2015. Genital and extragenital TVT in a bitch—a case report. *Scholars Journal of Agriculture and Veterinary Sciences*. 2(1B): 61-62.
- [6] Bharadwaj RK, Bharadwaj HR, Himalini and Singh R. 2014. Cytological diagnosis and therapeutic management of Transmissible Venereal Tumors in canines. *Indian Veterinary Journal*. 91(05): 79-80.
- [7] Kumar V, Hemalatha S, Balachandran C and Jayaprakash R. 2014. An unusual case of primary subcutaneous venereal granuloma (TVT) in a German Shepherd and its successful therapeutic management. *Indian Veterinary Journal*. 91(06): 84-86.
- [8] Veena P, Suresh Kumar RV, Srilatha CH. 2014. Glandular distribution and histology of canine mammary tumors. *Indian Veterinary Journal*. 91(04): 19-20.
- [9] Ferreira AJA, Jaggy A, Varejao AP, Ferreira MLP, Correia JMJ, Mulas JM, Almeida O, Oliveira P and Prada J. 2000. Brain and ocular metastases from a transmissible venereal tumour in a dog. *Journal of Small Animal Practice*. 41 (4): 165-168.
- [10] Mac Ewen EG. 2001. Transmissible venereal tumor. In: Winthrow SJ and Mac Ewen EG, eds. *Small Animal Clinical Oncology*. 3<sup>rd</sup> edition. Saunders, Philadelphia. 651-656.
- [11] Varaschin MS, Wouters F, Bernins VMO, Soares TMP, Tokura VN and Dias MPLL. 2001. Tumor venereo transmissivel canino na regioao de alfenas clinico-patologicas. *Clin Vet*. 6(32): 332-338.

**Table 1. Classification of TVTs**

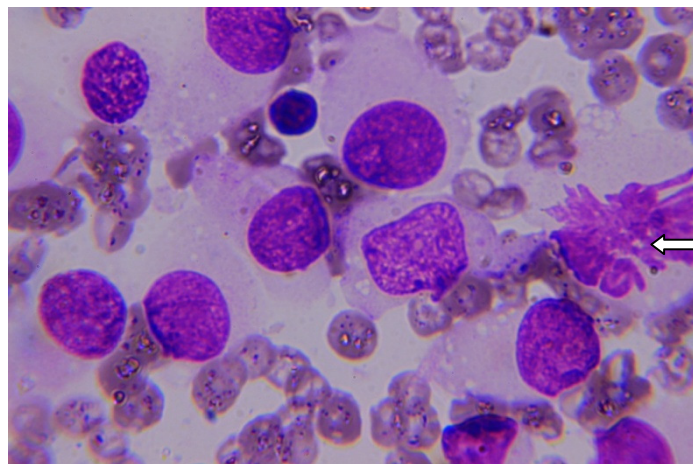
<b>Classification based on localization</b>				
	<b>Genital</b>	<b>Genital &amp; Extragenital</b>	<b>Extragenital</b>	<b>Total</b>
No. of cases (percentage)	27 (93.2%)	1 (3.4%)	1 (3.4%)	29 (100)
<b>Classification based on biological behaviour</b>				
	<b>Primary</b>	<b>Metastatic</b>	<b>Recurrent</b>	<b>Total</b>
No. of cases (Percentage)	26 (89.65)	1 (3.4)	2 (6.8)	29 (100)

**Table 2. Cytomorphology in different TVTs.**

<b>Cytomorphology</b>	<b>Primary, Genital TVTs</b>		<b>Primary, extragenital TVT</b>		<b>Extragenital, Metastatic TVTs</b>		<b>Recurrent, Genital TVTs</b>		<b>Total</b>
	<b>n</b>	<b>%</b>	<b>n</b>		<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	
Lymphocytic	26	92.6	0		0	0	2	7.4	27
Plasmacytic	0	0	1		1	100	0	0	2
Mixed	0	0	0		0	0	0	0	0

**Fig.1**

**Fig.2**



**Legend.**

**Fig. 1.** Genital TVTs with Lymphocytic type morphology. Leishman's stain, 1000X.

**Fig.2.** Extragenital TVT with plasmacytic cytomorphology. A mitotic figure (arrow) is seen in the figure. Leishman's stain, 1000X.