CASE REPORT

Cytopathology of Extragenital Transmissible Venereal Tumour in a Dog

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Transmissible Venereal Tumour (TVT) is a horizontally transmitted tumor of dogs, also known as canine transmissible venereal sarcoma, venereal granuloma, transmissible lymphosarcoma, or sticker tumor of mesenchymal origin (Saravanan *et al*., 2015). TVT can easily transmit from animal to animal during copulation by viable tumor cells by licking, biting, and by direct contact with the tumor and frequently affects dogs of either sex (Sritrakoon *et al*., 2020). TVT occasionally affects internal genitalia and extragenital sites such as skin, mouth, eye, nasal and other sites too (Gupta and Sood, 2012; Saravanan *et al*., 2015; Sritrakoon *et al*., 2020 and Dhillon *et al*., 2021). TVT is distinguished morphologically into three cytomorphological types: (1) Lymphocytic type, having granular cytoplasm with centrally placed nucleus and intracytoplasmic vacuoles. (2) Plasmocytic type, having eccentric nuclei with many cytoplasmic vacuoles, and (3) Mixed type, characterized by both lymphocytic and plasmacytic types (Florez *et al*., 2016). The histological features of TVT resemble histiocytoma, whereas in the cytology of TVT, cytoplasm reveals punctuate vacuoles in most cells that differ from histiocytic tumor and other round tumor cells (Abeka, 2019). The present case report deals with the hematobiochemical, cytological, and histopathological findings in an unusual case of extragenital TVT in a dog.

Case History and Clinical Observation

A seven-year-old German shepherd male dog was presented to the Multi-Speciality Small Animal Clinics of Department of Veterinary Clinical Complex, GADVASU, Ludhiana, with a history of dullness, reduced appetite, and multiple small nodules like growth over the dorsal body surface. On physical examination, there was raised reddish-brown crusting nodular mass around left eye (Figure 1) and prominent cutaneous nodules on the dorsal aspect of the body (Figure 2). Growth was also seen in the inguinal region (Figure 3). Blood was collected in EDTA containing tube and clot activator for hematological (Siemens Advia 2120i Haematology System) and biochemical examination (Ortho-Clinical Diagnostics Vitros 350 System).

For confirmatory diagnosis, impression smears from the tumor mass and biopsy samples were collected.

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The impression smears were stained with Leishman stain. The masses from cutaneous nodules (dorsal aspect of the body) were collected and fixed in 10% neutral buffer formalin for routine histopathological examination as per standard protocol.

Laboratory Findings and Discussion

In the present case, hemoglobin (Hb), total erythrocyte count (TEC), and packed cell volume (PCV) were decreased, whereas total leucocyte count (TLC) was normal. The hematological

Figure 1: Left eye: Small nodular reddish mass around eye (arrow).

Figure 2: Dorsal aspect of the body showing cutaneous nodular lesions

Figure 3: Lesion around the inguinal region

Table 1: Haemato-biochemical parameters of dog with TVT

Parameters	*Observed value*	*Reference values (Benjamin, 2010)*
Hematological values		
Hb (g/dL)	7.50	12–18
PCV (%)	24	37–55
TEC (10^6/cu mm)	3.99	5.5–9.5
TLC (10^3/cu mm)	14	6–17
Differential Leucocyte Count		
Neutrophil (%)	92	60–72
Lymphocyte (%)	08	12–30
Monocyte (%)	-	3–10
Eosinophil (%)	-	2–10
Basophil (%)	-	Rare
Absolute neutrophil count	12880	3600–12240
Absolute lymphocyte count	1120	720–5100
Serum biochemical Parameters		
ALT (IU)	32	8.2–57
Total protein (g/dL)	7.4	5.4–7.1
Serum albumin (g/dL)	2.4	2.2–3.2
BUN (mg/dL)	29	8.8–26
Creatinine (mg/dL)	1.9	0.5–1.6
Serum phosphorus (mg/dL)	6.9	2.6–6.2

findings were in concordance to Ferreira *et al.* (2019). Mild absolute neutrophilia was observed (Table 1), indicating inflammatory changes that might be due to anatomical site of mass, which may favor bacterial growth, chronic blood loss or trauma (Behera *et al.*, 2012; Costa and Castro, 2016). Serum biochemistry revealed slightly elevated creatinine and blood urea nitrogen (BUN) (Table 1), which was in concordance with the report of Komnenou *et al.* (2015). Elevated BUN level may be associated with glomerular filtration rate (GFR) or increased protein catabolism due to tumor cell necrosis and metabolic side effects, respectively, leading to renal dysfunction. However, an increase in catabolic activity may also lead to an increased serum creatinine value. Cutaneous lesions in the present case were small-sized uniform nodules. On the contrary, cutaneous TVT lesions are usually circumscribed and relatively of large size (Santos *et al.*, 2005).

Impression smear of right eye growth revealed very less cellularity, except few keratinized squamous epithelial cells. Impression smears from left eye growth (Figure 4), skin nodules (Figure 5), and area around the inguinal region (Figure 6) revealed presence of numerous round cells having cytoplasmic vacuoles, coarse nuclear chromatin, prominent nucleoli along with mitotic figures. These cytological findings were in accordance with findings of Behera *et al.* (2012),

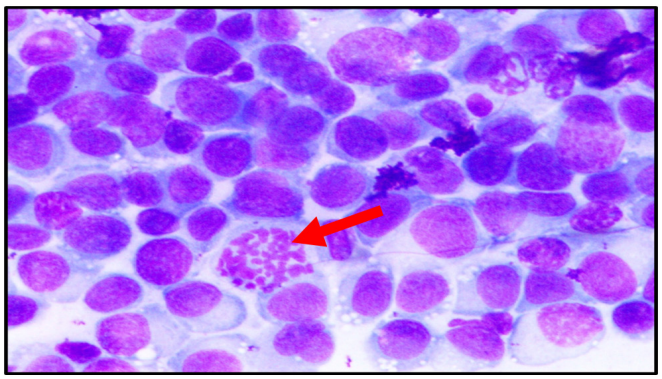

Figure 4: Left Eye: Slightly pleomorphic round anaplastic cells with punctate cytoplasmic borders having characteristics vacuoles along with mitotic figure (arrow) (Leishman stain; 100x)

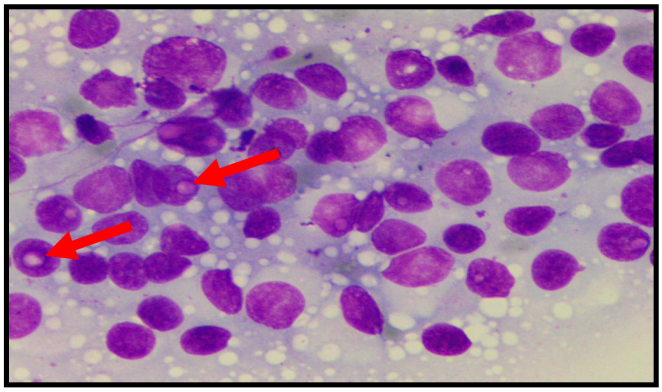

Figure 5: Skin nodules from the dorsal portion of the body: Presence of numerous, distinct walled vacuoles present in cytoplasm as well as outside the cell with prominent nucleoli (arrow) and coarse chromatin (Leishman stain; 100x)

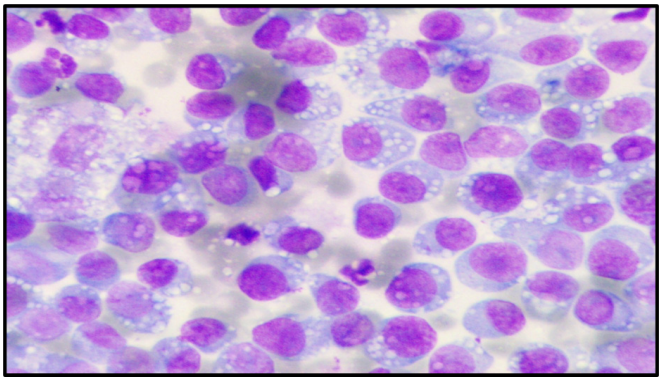

Figure 6: Inguinal region: prominent nucleoli in many cells and light blue cytoplasm with sharply defined cytoplasmic boundaries filled with vacuoles (Leishman stain; 100x).

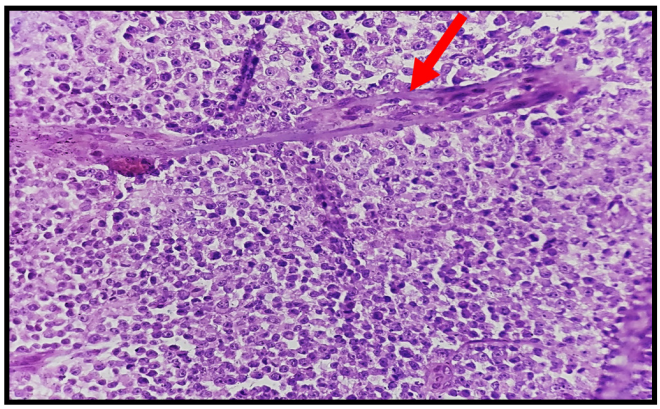

Figure 7: Loose sheets and uniform round to oval cells along with thin fibrovascular stroma (H&E stain; 40x).

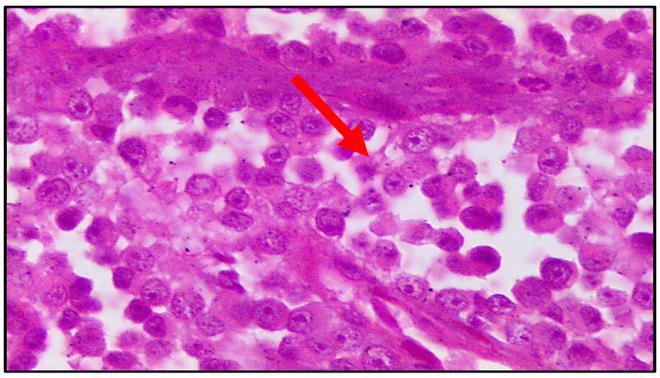

Figure 8: Large nuclei with prominent centrally placed nucleolus surrounded by marginated chromatin and the cells show cytoplasmic projection (arrow) (H&E stain; 100x).

Regmi *et al.* (2020), and Kokila *et al.* (2020). As seen in the present case, the extragenital occurrence of TVT involving skin and subcutaneous tissue has also been reported by Filgueira *et al.* (2013) and Valencoela *et al.* (2015).

Histopathological examination of the cutaneous nodular mass revealed large number of uniform sized, round to oval cells along with the presence of fine cutaneous fibrovascular strands (Figure 7). These cells also displayed hyperchromatic nuclei, prominent nucleoli, and punctate cytoplasm (Figure 8). The neoplastic cells had cytoplasmic projection, which gets stuck to the surface. Hence TVT also called a sticker cell tumor. Komnenou *et al.* (2015), Kolawole *et al.* (2020) and Sritrakoon *et al.* (2020) reported similar histological features.

Based on the observations of unusual extragenital TVT in a dog and its investigation, it is concluded that the diagnosis of TVT by fine-needle aspiration cytology is rapid, reliable, efficient, and more conclusive than histology. There is less distortion of cells in the cytological smear, and cytology is a non-invasive technique, hence causing less pain to the animals. In addition, histology alone may make TVT cells difficult to differentiate from other round cell tumors of extragenital locations.

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