CASE REPORT

Pathomorphological Alterations of Aggressive Genital and Extra-genital Canine Transmissible Venereal Tumour

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Ind J Vet Sci and Biotech (2025): 10.48165/ijvsbt.21.3.30

Transmissible venereal tumor (TVT) is one of the most common tumors in canines that mainly spread via mating. These tumors grow on the external genitalia and appear like cauliflower growth which can be nodular, papillary, pedunculated, or multilobulated and may cause serosanguinous discharge or bleeding from preputial orifices and genital canal in males and females, respectively (Panchkhande *et al*., 2019). It is also referred as venereal granuloma, canine transmissible venereal sarcoma, transmissible lymphosarcoma, and sticker tumor of mesenchymal origin (Saravanan *et al*., 2015).

TVT metastases are uncommon and can be mainly seen in immunocompromised animals (Sritrakoon *et al*., 2020). This tumor could be transferred from one location to another and from dog to dog by some common social behaviours such as sniffing, licking, close contact, scratching, or biting (Sritrakoon *et al*., 2020; Jadhao *et al*., 2022; Rugmini *et al*., 2025). Therefore, it is not only a sexually transmitted illness, it can also be transmitted horizontally. Apart from genital location, TVT is seen in only 5% of extragenital locations that can either be exclusively extragenital or in combination with genital location (Çeşme *et al*., 2015). Further, male canines are less likely to be affected as compared to female dogs (Abedin, 2020). Treatment is preferable over surgery in cases of TVT. Its effectiveness is more than 90% when vincristine sulphate is administered intravenously once a week for an average of three weeks (Das and Das, 2000). In non-responsive cases surgical excision is the alternate approach. In the current case, haematological and pathomorphological alterations of genital as well as extragenital TVT in a male dog have been described along with its surgical management.

Case History and Observations

A two-year-old male German shepherd dog was brought to the Veterinary Clinical Complex, College of Veterinary Science, Rampura Phul, GADVASU (Punjab, India), with a history of haematuria and small multiple growths over the neck and back region during the last three months. Previously dog was treated with three doses of vincristine sulphate by a local veterinarian but the size of the growth was not found to be reduced.

On thorough physical examination of the dog, red color ulcerated mass at the base of the penis along with small multiple growths over the neck and back region were observed (Fig. 1). Haematology performed using an automatic Haemanalyser (ADVIA 2120 Haematology System, Siemens Healthcare Diagnostics Inc. Deerfield, IL, USA, and Orphee Mythic 18-VET) and Differential Leukocyte count (DLC) done manually after staining blood smears with Leishman stain, revealed increased haemoglobin concentration and PCV suggesting haemoconcentration and absolute neutrophilia with mild left shift (Table 1).

Fine needle aspiration cytology was taken from all the growths and stained with the standard procedure of Leishman staining. On cytological examination of inguinal, neck, and back region growths, the sheet of individually arranged pleomorphic round cells with anisokaryosis, coarse chromatin, and prominent nucleoli were observed. The cytoplasm of the cells showed slight basophilia, sharp cytoplasmic boundaries, and presence of numerous prominent intracellular as well as extracellular cytoplasmic vacuolations along with few mitotic figures suggesting features of TVTs. The nucleus was found to be eccentric as well as in the center showing a plasmacytoid pattern and lymphocytoid pattern, respectively. However, the majority of the cells were found to be of plasmacytoid pattern (Fig. 2).

Radiography of the thoracic region was performed to rule out the metastasis, which revealed a military pattern in the caudal lobe of the lung (Fig. 3). Two doses of vincristine sulphate (@ 0.025 mg/kg body weight) were administered

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How to cite this article: Kumar, A., Syal, P., Singh, I. P., Bhardwaz, A., & Kumar, G. (2025). Pathomorphological Alterations of Aggressive Genital and Extra-genital Canine Transmissible Venereal Tumour. Ind J Vet Sci and Biotech, 21(3), 140-144.

Source of support: Nil

Conflict of interest: The authors declare no conflict of interest.

Submitted 05/02/2025 **Accepted** 26/03/2025 **Published** 10/05/2025

intravenously at weekly intervals but the size of the growths was not reduced at all and even the dog started showing signs of severe pain and severe haematuria. Hence, surgery was planned to resect all the growths.

Table 1: Haematological alterations in male German Shephard affected with TVT

Parameters	Observed value	Reference value
Hemoglobin (g/dL)	19.4	12-18
Packed cell volume (%)	52.2	37-55
Total erythrocyte count (10^6/µL)	6.2	5.5-9.5
Total leukocyte count (10^3/µL)	15.2	6-17
Neutrophil (%)	92	60-72
Lymphocyte (%)	81	12-30
Absolute neutrophil count	13984	3600-12240
Absolute lymphocyte count	1216	720-5100

Treatment and Discussion

The dog was fasted for 12 h, and the surgical site was prepared by clipping the hairs. Atropine sulphate @ 0.04 mg/kg and Butorphanol @ 0.2 mg/kg were used intramuscularly as a pre-anesthetic. For induction, Xylazine @ 1 mg/kg and Ketamine @ 5 mg/kg were given intramuscularly. Isoflurane @ 2.5-3% was used for maintenance. The animal was kept in dorsal recumbency and the surgical site was thoroughly scrubbed with 7.5% Povidone Iodine solution. Tumors were removed from all the sites and castration was also performed for further cure. Then, routine muscles and skin suturing was done (Fig. 4). Post-operatively, broad-spectrum antibiotics and anti-inflammatory drugs were administered intramuscularly for five consecutive days. Two doses of Vincristine Sulphate @ 0.025 mg/kg body weight (strict I/V) were given at weekly interval. After the surgical procedure, the masses were also collected in 10% Neutral Buffered Formalin for routine histopathological examination as per standard protocol after staining with Hematoxylin and eosin (Luna, 1968). Skin sutures were removed on 12th post-operative day. Dog recovered uneventfully (Fig. 5).

The extra-genital incidence of TVT affecting the skin and subcutaneous tissue including eyes similar to the present case has also been documented by Valencoela *et al*. (2015), and Leil *et al*. (2022) and Rugmini *et al.* (2025). Absolute neutrophilia observed in the current case could be due to the anatomical location of the tumor which may encourage the microbial contamination that might also be linked to the present case as ulcerated nodules were observed that developed an infection and turned to inflammatory (Behera *et al*., 2012; Costa and Castro, 2016). However, according to Mangieri such disorders can be paraneoplastic syndromes (PNSs).

The current cytological features also corroborated with Jadhao *et al*. (2022) and Kumbhani *et al*. (2022). It was described that the plasmacytoid pattern of TVT exhibited more aggressive behaviour as compared to the lymphoid pattern of TVT due to more P-glycoprotein expression that is mainly responsible for resistance of tumors (Amaral *et al*., 2007; Valençoela *et al.,* 2015). This finding could be the cause of no response to Vincristine in the present case.

In thoracic radiography a military pattern in the caudal lobe of the lung found that could be due to metastases, abscesses, or granulomas. Distinguishing the various causes of pulmonary nodules radiographically is impossible because of the similar appearance of tumors, granulomas, and abscesses. Recognition of secondary tumors in the thoracic radiographs is characterized by solitary masses or nodular pulmonary lesions. The most common solitary nodules in dogs are primary tumors, while the most common multiple nodules are pulmonary metastases (Kim *et al.,* 2014).

TVT is often progressive and should be treated as such, though spontaneous reversion can happen. The recommended course of treatment is vincristine sulphate @ 0.025 mg/kg, IV, once a week, for two weeks after the gross tumor mass has completely resolved, regardless of the size and extent of the neoplasm, the existence of metastases, or the length of the disease (Tella *et al*., 2004; Rugmini *et al.,* 2025). Chemotherapy resistance can be due to several factors, including naturally resistant tumor cells, resistance acquired by p-glycoprotein overexpression, defects in the regulation of genes controlling apoptosis, increased intracellular detoxification mechanisms, or mutation in DNA repair systems (Flórez *et al*., 2017). The plasmocytic subtype appears to cause greater resistance to chemotherapy, as well as a greater predisposition to metastasis (Valençoela *et al*., 2015).

Fig. 1: German shepherd dog with swelling at the base of penis and at dorsal neck region

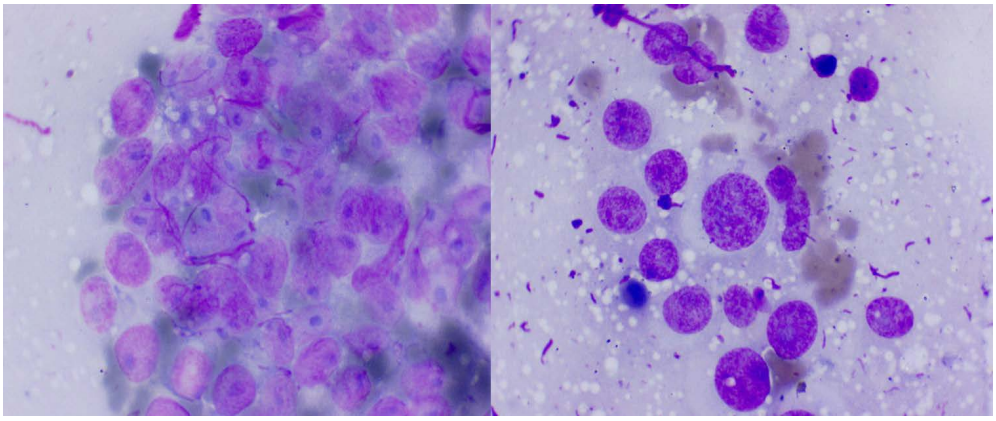

Fig 2: Cytological examination revealing pleomorphic round cells with basophilic cytoplasm having sharp cytoplasmic boundaries with the presence of numerous prominent cytoplasmic vacuolation

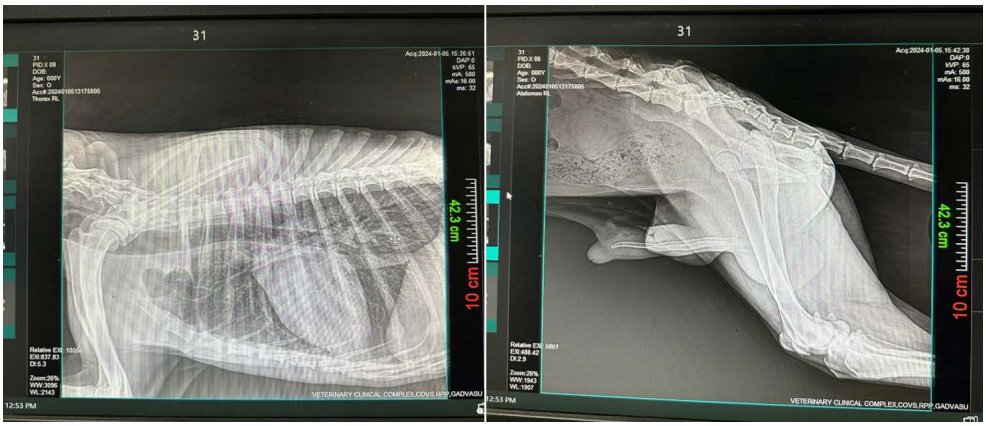

Fig. 3: Thoracic and caudal abdominal radiographs to rule out metastasis and attachment of growth at the base of the penis, respectively

Fig. 4: Surgical removal of growths from the base of the penis and dorsal neck

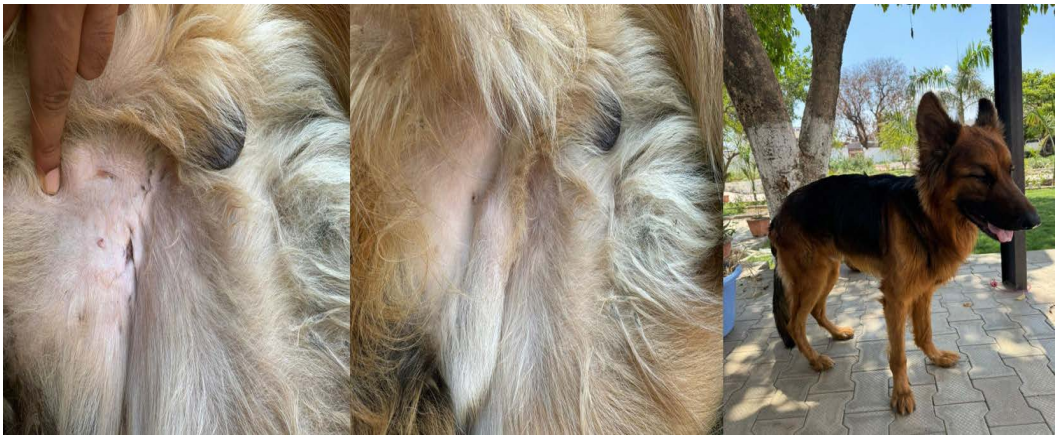

Fig. 5: Dog with complete recovery

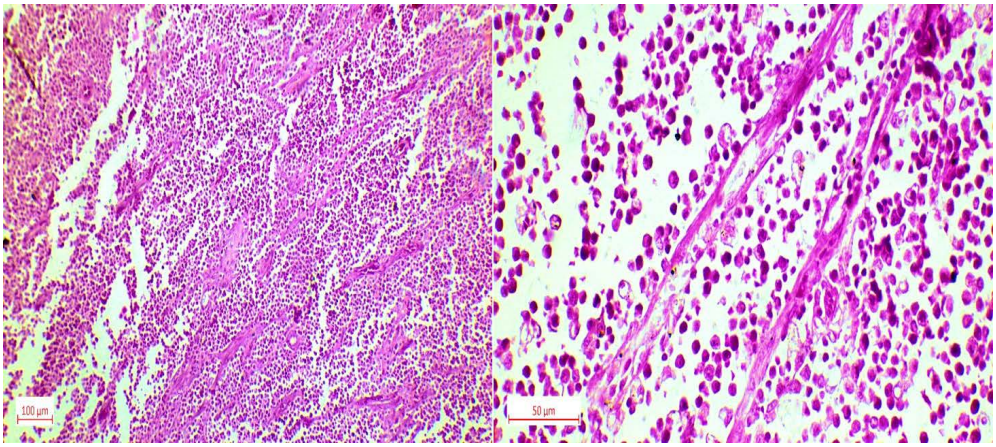

Fig. 6: Loose sheets or cords of round to ovoid cells with indistinct margins, round nucleus and fibrovascular stroma

Histopathological examination of all the resected growth also revealed the features of TVT *i.e.,* loose sheets or cords of round to ovoid cells with indistinct margins and round nucleus with prominent nucleoli, coarse chromatin, and pale to clear cytoplasm with cytoplasmic projections on the neoplastic cells adhered to the surface (Fig. 6). Hence this tumor is also called a sticker cell tumor. Mitotic figures were also evident along with inflammatory cell infiltration. Similar histological findings were described by Jadhao *et al*. (2022).

Based on gross, cytological, and histopathological examination, the case was diagnosed as a genital and extragenital transmissible venereal tumor in a male German Shepherd. It is determined that fine-needle aspiration cytology is a more quick, dependable, efficient, and conclusive method of diagnosing TVT than histology-based observations for the identification of lymphocytoid, plasmacytoid, and mixed types of TVT. The cytological smear shows less cell deformation, and because cytology is a non-invasive procedure, the animals experience less pain. Further, response to treatment of TVT could be associated with the morphological characteristics of tumorous cells that affect the behaviour of the tumor particularly linked to its aggressiveness that was observed in the present case of mixed type of TVT.

Acknowledgement

The authors are thankful to the Dean, COVS, Rampura Phul, GADVASU, Punjab for providing all the necessary facilities.

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