Short Communication
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Nasal Form of Transmissible Venereal Tumour: A Case Study

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Abstract

An adult dog was referred for evaluation of right sided unilateral epistaxis and growth at the base of the penis and prenasal area since one month. Upon clinical examination, a multilobular tumorous mass was located on the base of the penile bulb, causing sanguinous discharge. Nasal transmissible venereal tumour (TVT) in dogs is a rare manifestation of a tumour that typically develops from genital or oral lesions. The samples for cytological diagnostics were taken from nasal and preputial growth by FNAB and smears were prepared andstained with Wright's Giemsa for diagnostic purpose. The findings strongly suggested the presence of high levels of cellularity, tumour cells that were large, rounded cells with round nuclei, coarse and reticulated chromatin, abundant and lightly basophilic cytoplasm, and multiple punctate cytoplasmic vacuoles, all of which were conclusive of the cytological diagnosis of CTVT. The preputial lump was surgically removed, and its histology was evaluated. Cytology procured with histopathology recommended for TVT.

Keywords: TVT, Nasal Granuloma, Cytology, Histology.

Canine transmissible venereal tumour (CTVT) is a sexually transmitted, unique and fascinating type of canine neoplasm that has been reported from all over the world (Setthawongsin et al., 2023). CTVT was first described in the nineteenth century and now known by various names like canine venereal granuloma, canine transmissible lymphosarcoma, canine infectious sarcoma, canine Sticker's sarcoma and canine round cell sarcoma (Boscos and Ververidis, 2004; Cohen, 1973). CTVT has a greater prevalence in the tropical and subtropical countries, but it is now becoming a great problem in the countries such as India where stray dogs are abundant and unregulated (Abeka, 2019 and Anusha et al., 2022). The prevalence of CTVT in India was reported to be 23 to 43% of the total number of tumours in canine patients mostly in nondescript stray dogs due to uncontrolled sexual reproduction (Abeka, 2019). Dogs of any breed, age or sex were susceptible to CTVT, but it was reported to be more common in dogs to the age of greatest sexual activity (2 to 5 years) (Scarpelli et al., 2010). CTVT caused tumours that were typically found on the external genitalia of both male and female dogs, but sometimes it was also found on extragenital area including mouth, nose and skin or in organs such as the eye, tonsils, lung liver, spleen and kidney (Mukaratirwa and Gruys, 2003 and Park et al., 2006). This extragenital dissemination was frequently seen in the male dogs and could be related to the social behaviour (licking, sniffing, biting and fighting) during the breeding season or in routine socialization (Das and Das, 2000). CTVT had an aetiology like that of other contagious cancers, such as devil facial tumour disease (DFTD), which originated from an abnormal cell line with an unlimited proliferative capacity (Cohen,1973). Grossly the tumours would be variable in size ranges from 0.5 to 10 cm in diameter, single or multiple and usually had a cauliflower-like appearance. The tumour often had open sores and inflammation that made it bleed easily and caused severe pain and discomfort (Anusha et al., 2022).

CTVT was a remarkable example of a naturally occurring transmissible cancer that had survived and adapted for thousands of years in different dog populations (Park et al.,

2006). It provided valuable insights into the mechanisms and dynamics of cancer evolution and immunity, as well as the genetic diversity and history of dogs (Cohen, 19973). CTVT also posed significant challenges for dog health and welfare, especially in India where stray dogs are abundant and unregulated. Therefore, CTVT deserves more attention and research from both veterinary and biomedical perspectives.

An adult male dog was brought to the Department of Veterinary Clinical Complex, Belgachia WBUAFS, Kolkata with a history of firm, lobular, pedunculated, medium sized (5-7 cm) growth however friable in nature at the base of the penis since one month (Figure 1). Other than the preputial growth the dog had a swelling over the prenasal area covering the epicanthal fold of eye and frontal bone **(**Figure 2). Unilateral epistaxis was observed since 10 -12 days as reported by the owner. Anamnestic data revealedsero-sanguinous discharge from penis, which had been present for the past 15-20 days, there was presence of blood in the urine, and sniffing and leaking in the genital area. However, there were no obvious alterations in the overall state of the body. Fine Needle Aspiration Cytology (FNAC) and biopsy was performed from the tumerous mass. FNAC was performed from both the growth with a 10ml syringe and 22-gauge needle and smears were made using squash preparation. After that air dried smears were stained by Wright's stain (Himedia) using standard protocol and observed under oil immersion (100X). The diagnosis was also verified by histopathological analysis of a formalin-fixed tumour sample stained with haematoxylin and eosin.

Cytological examination from both the organ revealed, pure monomorphic appearance of round TVT cell infiltrates in the smear. TVT cells on examination revealed hyperchromatia, increased nuclear cytoplasmic ratio, anisocytosis and anisokaryosis (Figure 3a). The cells often had eight to ten tiny, 0.5–1 µm clear punctate vacuoles, which is a distinctive feature of this type of tumour, along with a modest amount of basophilic cytoplasm (Figure 3a and b). The nuclei were round in shape and central to eccentric with uniform stippled, ropy chromatin pattern includes one to two conspicuous nucleoli (Figure 3c and d). Mitotic figures could also detect in the smear (Figure 3a and b). Moderate amount of neutrophils and rare erythrophagia and leukophagia were also present in the smear (Figure 3c).

Biopsy of the tumour demonstrated disorganized growth pattern with a combination of solid sheets, cords and occasional papillary structures (Figure 4a). Neoplastic cells were arranged in clusters with a moderate degree of pleomorphism. Morphologically, the cells were round to oval in shape with a high nuclear cytoplasmic ratio. The nuclei were large, hyperchromatic and irregularly shaped occasionally containing irregular nucleoli. Cytoplasm had clear vacuoles. Cellular arrangements were densely packed with variable intracellular stroma (Figure 4b). Haemorrhagic areas and necrosis were observed within the tumour growth.

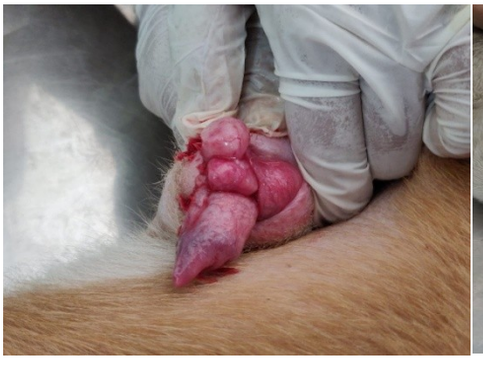

Figure 1: Nodular growth at the base of the penis

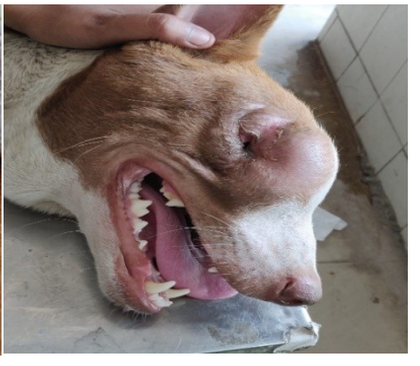

Figure 2: Swelling over the pre-nasal area

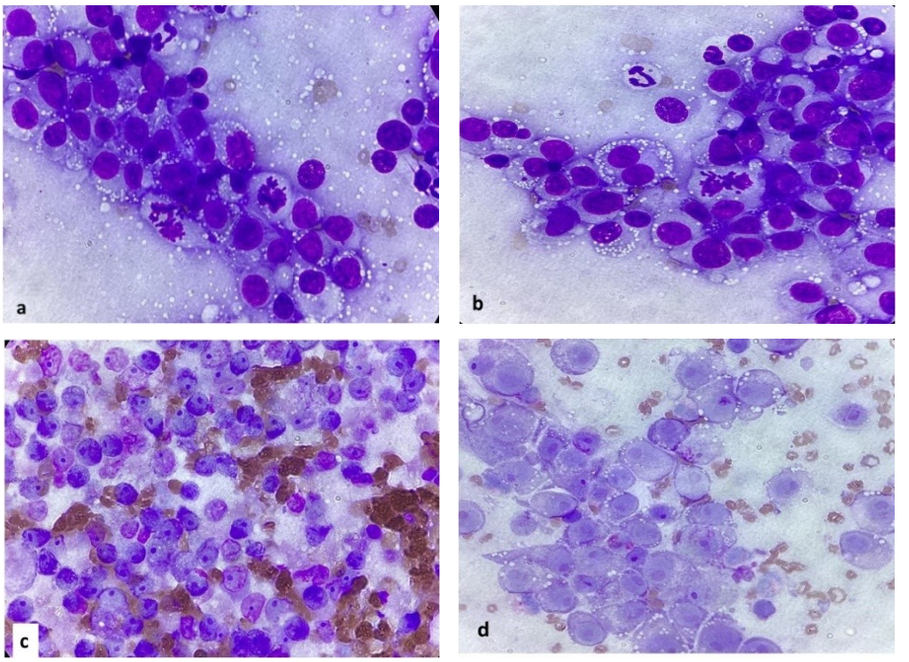

Figure 3: (a and b). Cytology of preputial growth. a. Round cell population showing anisocytosis, anisokaryosis mitotic figures. b. TVT cells showing nuclear budded cell, clear cytoplasmic vacuoles and leukophagia. (C and d) FNAC from prenasal swelling revealed prominent nucleoli, cytoplasmic as well as nuclear vacuolation and erythrophagia

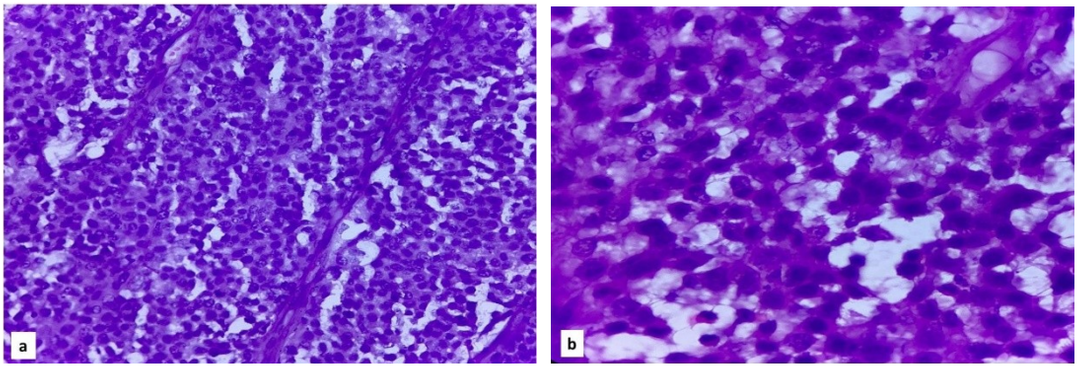

Figure 4: (a and b): a. Biopsy of tumerous growth revealed densely packed neoplastic cells arranged in a papillary structure separated by fibrous stroma b. TVT cells showing high N:C ratio and cytoplasmic vacuoles

Despite its propensity for malignancy, TVT is exceptional in that it responds to a wide range of therapeutic approaches. Recurrences of TVT had been documented after 8 months (Rogers et al., 1998), 6 and 12 months (Amber et al., 1990), and 2 months (Rogers et al.,1998) after vincristine and doxorubicin therapies. TVT would spread when malignant cells are directly exchanged between dogs during coitus, licking, biting, or sniffing tumour sites, such as the skin or external genitalia. The basic extragenital variants of CTVT's biological behaviour and aetiology are still poorly understood although there were few instances reported in pertinent studies (Kabuusuet al., 2010; Papazoglou et al., 2001). Damage to the external vaginal mucosa makes it easier for CTVT cells to spread through biting or scratching; nevertheless, no plausible explanation had been provided for the disease's intranasal form (Ganguly et al., 2016). According to studies, the inoculation and proliferation of TVT cells on the nasal mucosa might be caused by a dog sniffing its own or another canine's diseased genital (Papazoglou et al., 2001 and Filgueira et al., 2013).

Although there had been recorded cases of intranasal CTVT in the past, few had received treatment, and as a result, there is a dearth of knowledge about the way in which chemotherapy affected those patients or how far the tumour had spread (Papazoglou et al., 2001, Ganguly et al., 2016 and Filgueira et al., 2013). According to earlier research, the nasal type of CTVT accounted for 5%-13% of all CTVT cases, with adult male canines accounting for the majority of these instances (Ganguly et al., 2016 and Ogilvie et al., 1992). Nasal discharge was a frequent observation that was not always related to nasal CTVT and could occur in conditions such non-specific rhinitis, nasal neoplasia, fungal infection, cleft palate, periodontal disease, parasites, foreign materials, and primary bacterial disease (Ogilvie et al., 1992).

Histopathological analysis was used to achieve a conclusive diagnosis for CTVT despite conventional cytological testing. Exfoliative cytology had proven to be a secure, simple and quick technique for diagnosing TVT and monitoring the healing process (Erunal-Maral et al., 2000). The typical cytologic description of canine TVT included a predominance of discrete, round, individualized cells with a moderate to high nuclear:cytoplasmic (N:C) ratio, moderate amounts of pale, basophilic cytoplasm, and often small, round, clear, punctate cytoplasmic vacuoles (Raskinand Meyer, 2010).This vacuolation increased during early stages of regression as TVT cells undergo degeneration. During degeneration, amounts of endoplasmic reticulum and ribosomes also were increased, the same as the swelling of mitochondria. Degenerating cells often contained numerous membrane bound granules and clusters (Ganguly et al., 2016).There were three cytomorphological subtypes of TVT: lymphocytoid, plasmacytoid, and mixed (Setthawongsin et al., 2018). Lymphocytoid TVTs featured >60% spherical cells, a high N:C ratio, and occasionally few to no conspicuous vacuoles at the cell's periphery. The nuclei were positioned in the centre of the cell and had coarse chromatin and 1-2 variably identifiable nucleoli. The round to ovoid cells with a considerable expansion of pale basophilic cytoplasm and frequently recognised discrete, punctate vacuoles made up the majority (>60%) of the plasmacytoid subtype. In mixed TVTs, either the lymphocytoid or plasmacytoid population made up about 60% of the total population. (Ajayi et al., 2018).Cytology could be more accurate than histopathologic evaluation in the diagnosis of genital and extragenital TVT, however, sampling during the tumor's growth phase, infiltration of inflammatory leukocytes, bone lysis, and variable vacuolization of the neoplastic cells can complicate cytologic interpretation (Setthawongsin etal., 2016). According to a retrospective study by Costa et al. (2019), CTVT was the third most prevalent reproductive condition in female dogs and cutaneous and nasal manifestations occur more frequently than oral and lymph node presentations, which were followed by other less common manifestations such anal/perianal, in the mammary gland, and ophthalmic. As noted in this case, the atypical cytological features necessitated further evaluation by histopathology, which was also suggestive of TVT.

Conflict of interest:

Authors declare no conflict of interest for this investigational report

Data availability:

All raw data and backup photography are preserved at the Department of Veterinary Pathology, WBUAFS, Kolkata

Ethical statement:

An author maintained all ethical concern during sample collection and does not require IAEC certificate as it’s not experimental.

Author’s Contribution:

MN: Sample collection and preparation**, RH:** Sample collection and staining**, GS:** Preparation of draft manuscript**, SP:** Histopathology, **RNH:** Photography and data collection and **SM:** Cytology and manuscript preparation

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