

## Management of canine transmissible venereal tumour using autohaemotherapy: A promising approach

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### Abstract

Transmissible Venereal Tumour (TVT) is an infectious, neoplastic, solitary or multiple cauliflower-like pedunculated, small nodules to large-sized, often ulcerated mass generally seen in the genital region of canines. A total of 27 dogs were presented with complaints of tumorous growth and dripping of blood from the external genitalia. Clinical examination revealed a multilobulated mass over the genitalia, while in rare cases, the tumour mass had metastasized to the regional lymph node, rectum, subcutaneous tissue and inner eyelid. Based on cytological and histopathological examination, it was confirmed as transmissible venereal tumour. The presented cases were found to be unfit for conventional chemotherapy due to their clinical and physiological status (pregnant, anaemic, immunocompromised/geriatric). The affected dogs were treated with autohaemotherapy wherein 6-7 mL of blood was drawn from their cephalic/saphenous vein and was immediately injected into their gluteal muscles on both sides in divided doses for 7-8 sessions with an interval of 7 days along with regular assessment. Twenty-two (22) dogs were treated and recovered uneventfully.

**Keywords:** Autohemotherapy, Canines, TVT

### Highlights

- Transmissible venereal tumour (TVT) was treated with autohaemotherapy.
- Autohaemotherapy is categorised as an alternative form of medicine.
- 6-7 mL of blood was collected from the affected dogs and was injected for 7-8 occasions with an interval of 7 days.
- The cases were declared unfit to undertake conventional chemotherapeutic drugs on account of clinical status of the patients (anaemic, diseased or immunocompromised-pregnant and geriatric).
- A total of 22 dogs were treated with autohaemotherapy and recovered uneventfully.

“All contagious diseases are infectious, but all infectious diseases are not contagious”. The world of medicine was firmly guided by this statement since ages until the disease named transmissible venereal tumour (TVT) was carefully studied and pondered upon. TVT is also known as Sticker’s sarcoma, Sticker tumour, canine transmissible venereal tumour (CTVT), contagious venereal tumour, transmissible lymphosarcoma, transmissible venereal sarcoma, venereal granuloma, infectious granuloma, canine condyloma, infectious sarcoma and contagious lymphosarcoma (Murgia *et al.*, 2006). The disease is not caused by an infectious agent, yet it gets transmitted from an affected animal to a healthy one, mostly dogs and other canids, through coitus, licking, biting, and sniffing the affected animals (Kumar *et al.*, 2014). TVTs are large cauliflower-like pedunculated, nodular, papillary, or multilobulated, firm yet friable mass that varies in size from a small nodule

(5 mm) to a large mass (>10 cm) generally seen in genitalia; however, extra genital tumour lesions have also been reported (Arif *et al.*, 2017). It is transmitted by implantation of viable tumour cells in mucous membrane, especially if there are abrasions or loss of integrity on the surface (Gurel *et al.*, 2002; Igor *et al.*, 2012).

These tumours arise from the uncontrolled growth of certain types of immune system cells called histiocytes. Such cells are found in many areas of the body, including the skin. TVTs develop from skin histiocytes (Kolawale *et al.*, 2020). Metastasis of tumour mass to various body parts viz eyes, nose, rectum, lymph nodes is rare (Arif *et al.*, 2017).

Historically, it is considered that a tumour which first developed in dogs or wolves around 2000 to 2500 years ago has since been transmitted as an allograft, making it the oldest known transplantable somatic cell

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clone (Murchison, 2009). These cells behave as infectious cancer cells, capable of growing autonomously from the host (Dingli and Nowak, 2006).

The incidence is found to be higher in females as compared to the males, even if the male dogs are constantly sexually receptive than the females, who become sexually receptive only once every 6-7 months (Rogers, 1997). Moreover, the disease is recorded mostly in young to middle-aged dogs (Regmi *et al.*, 2020).

Although the available literature describes chemotherapy as the most effective and commonly available mode of treatment, it has many associated side effects like vomiting, anorexia, neutropenia, gastrointestinal bleeding and alopecia (Andrade *et al.*, 1999). Moreover, chemotherapy is unsuitable for anaemic, geriatric, pregnant or immunocompromised animals. Hence, autohaemotherapy (AHT) is widely used as an alternative approach for the treatment of TVT, especially in immunocompromised patients, for its positive response and wide safety margin (Drumond *et al.*, 2013; Lakde *et al.*, 2018).

Twenty seven adult dogs (17 females and 10 males) were presented to the Teaching Veterinary Clinical Complex (TVCC), Khanapara, with complaints of nodular, lobulated mass at the genital region (Fig. 1 and 2) along with other symptoms like restlessness, loss of body condition, swelling of genitalia or part thereof along with blood in urine. Moreover, anamnesis revealed that there is no or subtle loss of appetite in most of the animals.

Detailed physical examination revealed the presence of pink to red coloured, multinodular raised to pedunculated, soft, and haemorrhagic masses, some of which were inflamed, ulcerated and bled easily. All other clinical parameters like temperature, respiration, and pulse were within normal values. The conditions were tentatively diagnosed as CTVT based on the clinical observations, although histo-pathological examination, impression smear of the tumour and fine needle aspiration cytology (FNAC) were conducted for confirmatory diagnosis.

Cytological smears prepared from genital tissue, lymph node and subcutaneous growth were stained with Giemsa, which showed discrete cells with moderate to high features of malignancy like anisocytosis, anisokaryosis, pleomorphism, coarse aggregated chromatin material, multiple basophilic nuclei and light basophilic to colourless cytoplasm with clear and distinct cytoplasmic vacuoles. Routine urine analysis revealed no pathological process except the presence of few RBCs, pus and epithelial cells. The tissue section from genital growth showed diffuse sheets of tumour cells detached by fibrous stroma. Neoplastic cells were

arranged in a pseudo-alveolar pattern, while some cells had round hyperchromatic nuclei with mottled and lacy chromatin. Areas of necrosis and haemorrhage were seen at the periphery of the nodular lesion. Pleomorphic nuclei and mitotic structures were observed. Occasional neutrophils, bi-nucleate cells, plasma cells and macrophages were also observed (Fig. 3 and 4).

All the 27 presented cases were found to be unsuitable for chemotherapy on account of being anaemic, concurrent ailment, or in immunocompromised patients (viz. pregnant and geriatric). Considering their physical and physiological status and interpretation done through routine haemato-biochemical tests, these animals were rendered themselves as unfit candidates for chemotherapy. Moreover, conventional chemotherapeutic agents like vincristine sulphate, doxorubicin, cis-platin etc., which are commonly used in veterinary practices, come with numerous adverse effects. Therefore, the said patients were selected and treated with an alternative approach in the form of autohaemotherapy in lieu of commonly used anti-cancer drugs. The treatment was initiated by drawing 6-7 mL of blood from the cephalic/saphenous vein of the affected dogs and was immediately injected into its gluteal muscles on both sides in divided dose (Benavides *et al.*, 2017). The treatment continued for 7-8 sessions with an interval of 7 days along with regular assessment. Antihistaminic (chlorpheniraminemaleate @ 1-2 mg/kg body weight) was administered prior to the treatment in order to reduce the risk of any untoward side effects which might arise post AHT. Occasionally, a mild localised subcutaneous erythematous rash was observed in two animals post intramuscular injection which was easily resolved within a few hours post antihistaminic medications as mentioned earlier. Administration of multivitamins and application of topical povidone-iodine solution on the ulcerated mass was also practiced as an adjunct management.

Common anti-cancerous drugs like vincristine sulphate, cis-platin and doxorubicin which are used for the treatment of TVT have been documented to have numerous side effects which include loss of appetite, vomiting, diarrhoea and enteritis (Below and Das, 2022). Moreover, safety margins of such drugs are very low in severely weak, debilitated or anaemic patients and also poses a great risk of tissue damage/necrosis and even death if not administered strictly intravenously (Qweider *et al.*, 2007). Keeping in mind the adverse effects of chemotherapy and unsuitability of the admitted candidates, autohaemotherapy was chosen as an alternative to treat the mentioned cases.

The precise mechanism of action for autohaemotherapy remains a topic of debate within the

Management of TVT by autohaemotherapy



Fig. 1. Mongrel bitch with transmissible venereal tumour in vulva before treatment with autohemotherapy



Fig. 2. Mongrel dog with transmissible venereal tumour in penis before treatment with autohemotherapy

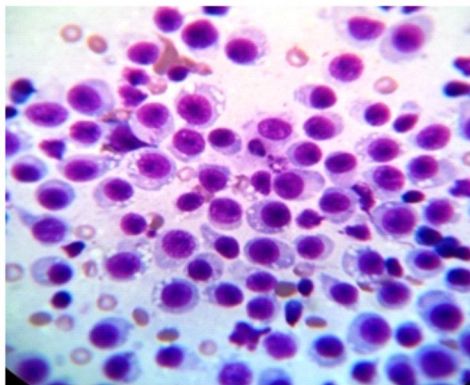


Fig. 3. Impression smear from penis (TVT) showing a typical neoplastic progressing growth phase

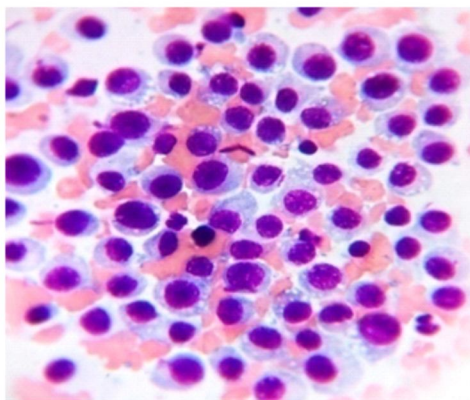


Fig. 4. Fine needle aspiration cytology from the growth



Fig. 5. Cases of TVT at different stages of recovery (Day 0, 1<sup>st</sup> week, 3<sup>rd</sup> week and 5<sup>th</sup> week respectively) following treatment with autohaemotherapy

scientific community. As per published scientific documentation, autohemotherapy functions by stimulating targeted tumour necrosis cells leading to tumour arrest and proliferation initiation. This therapeutic approach involves reintroducing various biochemical entities found within the patient's own blood, including antibodies, antigens, hormones, and biodegradation products of metabolism. This re-administration aims to significantly enhance the immune system, which consequently serves as circulatory biomarkers for ongoing diseases or pathology, triggering a robust immune response. Moreover, it plays a vital role in stimulating phagocytic neutrophils and monocytes, particularly the phagocytic mononuclear system (PMS), thereby augmenting the immune status of the organism and bolstering resistance against aggressive tumour growth by increased apoptosis of tumour cells and fibrosis (Drumond *et al.*, 2013).

Following treatment with autohemotherapy, gradual reduction in the size of tumour masses was observed at weekly intervals. Individual variation in number of days of recovery was observed in relation to the size and number of tumour masses. In twenty two (22) cases (irrespective of sex), complete diminution of tumour

mass was recorded with subtle hyperaemic/inflammatory lesions in few animals within fourth to fifth week of treatment (Fig. 5). The remaining five (5) cases showed no significant improvement in the tumour mass. The poor results in these cases might be due to late presentation of the case, huge tumour mass along with secondary infection.

Autohaemotherapy has shown to have a positive response in cases of TVT as an adjunct therapy and can be successfully used in cases which are not fit enough to undertake chemotherapy. However, results with complete remission of tumour mass are doubtful in the case of chronic/large lacerated/infected tumour growths.

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**Author's contribution:** SAA: Involved in investigation, sample collection and preparation of original draft; TD, DD: Performed acquisition of data, supervision and final editing; JK, UB, BC, DP: Involved in conceptualisation, methodology, editing and final proofreading.

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