

Clinical, Radiographic and Rhinoscopic Features of Primary Intra-Nasal Transmissible Venereal Tumour in Four Dogs and Its Treatment

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Abstract

Transmissible venereal tumours are contagious tumours that typically affect intact male and female canines. Four dogs were presented to Small-Animal out-patient unit of Madras Veterinary College Teaching Hospital with a history of chronic unilateral epistaxis and sneezing. Leukocytosis with neutrophilia was a consistent finding in all dogs whereas the serum biochemical values were unremarkable. Lateral and dorsoventral radiographs of the skull revealed space occupying lesion suggesting soft tissue mass in the nasal cavity. Rhinoscopy confirmed the presence of tumour mass occluding the nasal passage. Nasal cytology revealed the presence of characteristic transmissible venereal tumour cells. Chemotherapy was initiated with Vincristine sulfate at the dose rate of 0.7 mg/m². All four dogs showed complete clinical recovery after four weekly doses of vincristine chemotherapy. Radiography repeated after four weeks confirmed the absence of mass in nasal cavity.

Keywords: Dog, Nasal TVT, Radiography, Rhinoscopy, Vincristine

Introduction

Transmissible venereal tumour (TVT) in canines is a naturally occurring allogeneic tumour transmitted from dog to dog mostly through coitus. The most common predilection site is external genitalia, but it can be implanted on the oral, nasal and conjunctival mucosa or less commonly, the skin (Gurel *et al.*, 2002). Signs of canine nasal TVT include facial asymmetry, lymphadenopathy, oro-nasal fistula, epistaxis and other nasal discharge (Papazoglou *et al.*, 2001; Sankar *et al.*, 2016). The present work describes primary intranasal TVT in four intact male dogs and its successful treatment with vincristine sulfate.

Materials and methods

Four intact male dogs brought to the Small-Animal out-patient unit of Madras Veterinary College Teaching Hospital suffering from nasal TVT were included in the study. All four dogs were privately owned but had a history of occasional free roaming lifestyle and thereby contact with stray dogs. These dogs were subjected to detailed anamnesis, clinical examination, haemato-biochemical analysis, radiographic and rhinoscopic examinations. Computed tomography of the skull was performed only in one dog due to financial restraints by the other three pet owners. All diagnostic imaging was done in these dogs under general

anaesthesia in a standard manner. The radiographs of the skull were taken in standard dorsoventral (DV) and lateral views. Computed tomography of the skull was performed as described by Schwarz and Saunders (2011) where contiguous images were obtained from the caudal limit of the frontal sinuses to the nares with the animal on sternal recumbency. Rhinoscopy was performed as per the procedure described by McCarthy (2005) using anterograde and retrograde methods. A flexible bronchoscope (bronchoscope 3.5 mm diameter with two-way deflection- Olympus type BF 1T150, Japan) was used for posterior rhinoscopy. An arthroscope with cystoscopy sheath (2.7 mm 30-degree Karl Storz, Germany) was used for anterior rhinoscopy. Nasal swabs obtained from both nasal cavities were subjected to cytological analysis. Rhinoscopy-guided biopsy samples were obtained only in one dog whereas sampling was hindered due to excessive bleeding and obscuring of nasal passage in other three dogs. Tissue sample obtained using endoscopic forceps were fixed in 10 per cent formalin and used for histopathological studies (Bancroft and Gamble, 2008). Chemotherapy using vincristine sulphate at the dose of 0.7 mg/m² body surface area, intravenously, at weekly intervals was instituted in all dogs. Treatment was continued until the tumour mass regressed completely, as determined by weekly cytological and clinical evaluations. Weekly blood samples were taken prior to next vincristine chemotherapy for complete blood count evaluation.

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Results and discussion

In the present study, dogs were aged between 2 and 7 years, were sexually intact with a mean age of 4 years and sex predilection for male dogs (4/4; 100.00 per cent) similar to the findings of Papazoglou *et al.* (2001). The persistent clinical findings in all dogs with intranasal transmissible venereal tumour were unilateral epistaxis (Plate 1) and intermittent sneezing. Other clinical signs were stertor (2/4, 50.00 per cent) and

submandibular lymphadenopathy (1/4, 25.00 per cent). Nasal discharge in these dogs was purely haemorrhagic and was concurrent with sneezing. Similar signs were reported by Dhillon *et al.* (2021) in dogs with intranasal TVT. In the present study, no genital lesions were found in any of the four dogs, hence the nasal lesions were considered to be primary intra nasal transmissible venereal tumour as reported by Papazoglou *et al.* (2001) in six dogs.

Plate 1 - Clinical Signs in dogs with Nasal TVT



Unilateral epistaxis

Leukocytosis with neutrophilia was evident in haematology of all six dogs which concurred with reports of Priyadarshini *et al.* (2021) which is probably due to infection in tumoral tissue and its periphery as a result of immunosuppression, leading to secondary bacterial invasion, whereas the serum biochemical values in dogs with nasal TVT were unremarkable in the present study similar to the findings of Papazoglou *et al.* (2001) and Singh and Sood (2016).

The radiographic findings in the present study were unilateral opacities of the nasal cavity and frontal sinus without osteolysis (Plate 2). Radiographic findings in cases of histologically or cytologically confirmed intranasal TVT were radiopacity, bone lysis and frontal sinus involvement (Rezaei *et al.*, 2016). No bony lesions were reported by Dhillon *et al.* (2021) in dogs with nasal TVT similar to the present study.

Plate 2 - Radiography of Skull in Dogs with Nasal TVT



Lateral radiograph of skull –Loss of trabecular pattern in nasal cavity and increased radiopacity of the frontal sinus

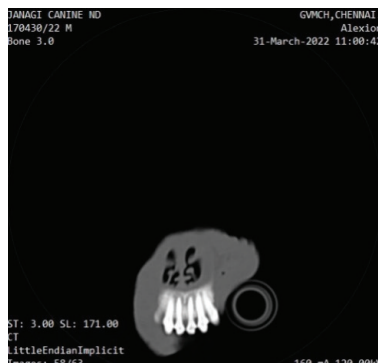


Dorso-ventral radiograph of skull - Loss of turbinate-bone detail with increased radiopacity of the nasal cavity on the right side

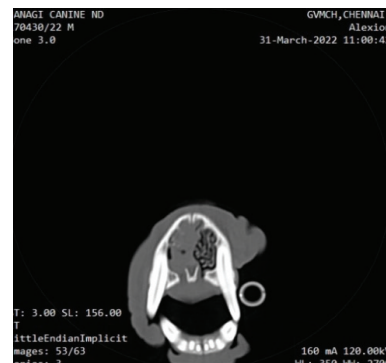
In skull CT, soft tissue opacity and contrast enhancing mass was present in the nasal cavity and

frontal sinus (Plate 3). Parker *et al.* (2021) observed soft tissue opacity with mild turbinate loss in the skull CT of a dog with nasal TVT.

Plate 3 – Sequential Computed Tomography Images Through The Nose of A Dog with Nasal Transmissible Venereal Tumour (Rostral To Caudal)



a. at the level of incisors



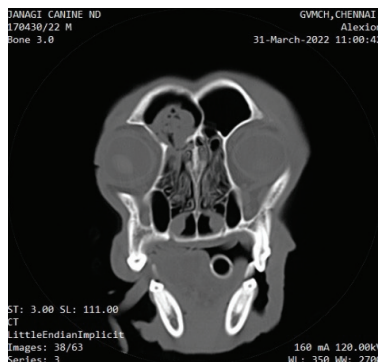
b. at the level of canine



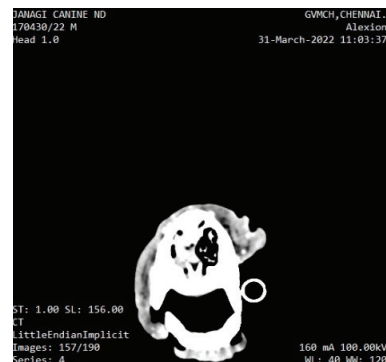
c. at the level of lateral nasal gland



d. at the level of maxillary recess through orbital region



e. through frontal sinus



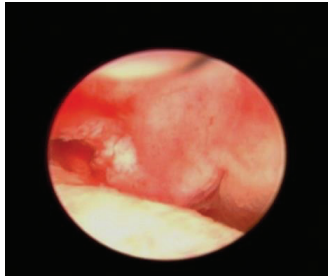
f. contrast enhanced image at the level of canines

(b) homogenous soft-tissue density occupying left nasal cavity with extensive turbinate destruction and **(f)** showing corresponding contrast enhanced mass. **(d)** and **(e)** dependent soft tissue density of the left ventral frontal sinus.

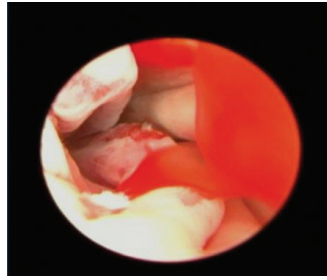
Anterior rhinoscopy revealed nasal mucosal hyperaemia, excessive fragility of nasal mucosa and nasal obstruction by friable, multiple soft tissue masses (Plate 4) similar to findings of Papazoglou *et al.* (2001). Posterior rhinoscopy revealed haemorrhage in all the cases. Rhinoscopy guided biopsy samples were obtained

only in one patient which was later confirmed by histopathological examination. In remaining three dogs, obtaining a representative biopsy sample was hindered by excessive nasal bleeding obscuring the nasal passage. Rhinoscopy revealed multifocal patches of discrete, white, wispy, vascularized abnormal tissue in intranasal TVT according to Parker *et al.* (2021).

Plate 4 - Rhinoscopy in Dogs with Nasal TVT



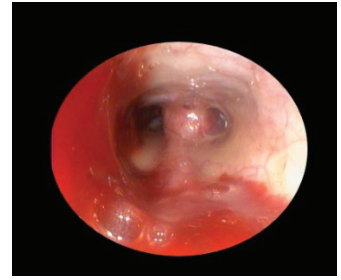
Tumour mass obstructing the nasal passage



Tumour mass occupying the nasal cavity and bleeding



Tumour mass in between turbinates

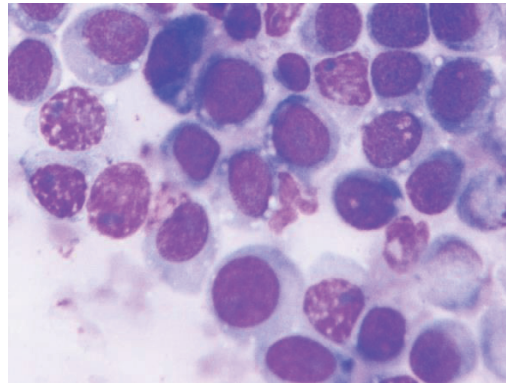
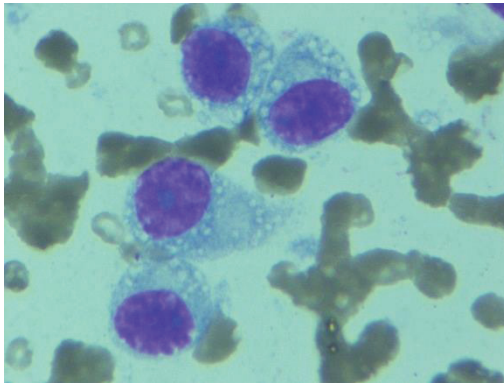


Posterior choanae: tumour mass

Cytology revealed the presence of transmissible venereal tumour cells in nasal swab obtained from all four dogs (Plate 5). The characteristic cytological features of nasal cytology in dogs with nasal TVT were abundant round, discrete, individual cells with increased nuclear: cytoplasmic (N:C) ratio, moderate amounts of

pale, basophilic cytoplasm with clear, punctate vacuoles similar to the findings of Ramanmurthy *et al.* (2021). Histopathological examination revealed sheets of round cells with pale eosinophilic cytoplasm containing clear cytoplasmic vacuoles, large round to oval nuclei containing finely stippled to vesicular chromatin in accordance to Parker *et al.* (2021).

Plate 5–Nasal Cytology in Dogs with Nasal TVT



Nasal cytology of dog with nasal transmissible venereal tumour showing cells with intracytoplasmic vacuolations 100 X

The positive response of all four dogs to vincristine chemotherapy was based on weekly clinical and radiological examinations of the nasal cavities. The most effective therapeutic modalities for TVT are chemotherapy and radiotherapy (Rogers *et al.*, 1998). Vincristine monotherapy, administered intravenously for four weekly cycles at the dose of 0.7 mg/m² has been very effective for regression of intranasal TVT mass in the present study. A similar successful outcome with vincristine monotherapy was reported by Singh and Sood (2016), Ignatenko *et al.* (2020), Dhillon *et al.* (2021), Nwoha *et al.* (2021) and Parker *et al.* (2021). Radiography repeated after four weeks confirmed

the absence of mass in the nasal cavity. Cytological assessment of nasal swabs obtained after chemotherapy revealed normal nasal cytology. All four dogs showed complete resolution of clinical signs after four weekly cycles of treatment without any adverse effects.

In conclusion, our data suggest that nasal TVT should be considered as a differential diagnosis in dogs with chronic epistaxis and sneezing which have a good response to vincristine treatment upon definitive diagnosis. This study provides a detailed description of diagnostic imaging in canine nasal TVT, and successful medical management with vincristine.

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