

## CANINE TRANSMISSIBLE VENEREAL TUMOUR: CLINICAL OBSERVATIONS IN SELECTED URBAN AREAS OF TANZANIA

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### SUMMARY

This study had an objective of describing the clinical forms of Canine Transmissible Venereal Tumour (CTVT) in Tanzania. Clinical examination of 470 dogs brought to three veterinary clinics in selected areas was performed. Dogs found with CTVT were further subjected to cytological testing in order to confirm the diagnosis. Three forms namely, genital, extragenital and generalized CTVT were observed. The genital form in males affected the prepuce, caudal part of the penis as well as the shaft of the penis. Affliction of the penile shaft was considered to be unusual. In females, this form commonly affected the vestibulo-vaginal junction. The other parts of the external genitalia from the vulva to the vagina were also found to be affected. The extragenital form of CTVT affected the conjunctivae, integument and occasionally the anal and perianal mucosae in both sexes. Male dogs were additionally affected by nasal form of extragenital CTVT. Generalized involvement of the integument was also observed and more so in weak and debilitated animals. Dog type was found to have a significant influence on the occurrence of CTVT ( $p < 0.05$ ). This appears to be due to differences in management patterns. None descript dogs were therefore at higher risk due to suboptimal management. Intercurrent diseases were also found to predispose dogs to CTVT ( $p < 0.05$ ). It was concluded that CTVT could affect any part of the body especially in immunocompromised dogs and that the level of management accorded to dogs was an important factor in the causation of CTVT.

### INTRODUCTION

Canine Transmissible Venereal Tumor (CTVT) is a naturally occurring tumour of dogs that affects the external genitalia and other mucous membranes of both sexes (Stone 1985; Boscos 1988). CTVT is reportedly common in tropical and subtropical countries, where there are large numbers of stray and wild dogs (Nielsen 1983). High incidence in these countries is also due to crowded canine populations and many unconfined, sexually active dogs (Calvert 1983).

Diagnosis of CTVT in the field is based on clinical picture. Studies done elsewhere indicate that there are

many forms of CTVT, whose occurrence vary according to management, nutritional status and other area specific factors.

Knowledge of the clinical features of all forms of the diseases in each area is necessary for correct diagnosis.

The present work aimed at providing information on the clinical features of all forms of CTVT in Tanzania.

### MATERIALS AND METHOD

The study was carried out in Morogoro, Dar es Salaam and

Kilimanjaro regions among four hundred and seventy dogs representing different age groups and different ownership.

The dogs used in this study were those attended for various reasons at the veterinary clinics in the respective regions. Each dog was subjected to a systematic clinical examination commencing from the head region ending with the perineum and including all parts of the limbs down to the paws. This was done in order to determine the clinical forms of CTVT. Dogs found with CTVT were used for detailed studies. Location size, colour and shape of CTVT lesions was determined by physical examination after exposing the sites of attachment. In all cases cytological examinations were done on samples taken from accessible mucous membranes in order to confirm the diagnosis of CTVT. Confirmation was based on cell type, contents in the background, nuclear and cytoplasmic characteristics of the cells. Occurrence of intercurrent diseases namely, allergic dermatitis, demodicosis, vulvovaginitis, balanoposthitis, perianal furunculosis, pyoderma, pemphigus foliaceus, pyometra, helminthiasis, seborrhea dermatitis, traumatic wounds and leptospirosis in the animals used was also recorded.

For purposes of statistical analysis dogs were divided into groups according to type and age. The types were: Police dogs (n=40), pets (n=115) and nondescript (n=315). Three age groups were identified. The first group represented dogs aged below 7 months, group two was formed by animals aged between 7 months and 4 years and the third group included dogs above 4 years. Different forms of CTVT for different dog types were compared in a 2 x 3 factorial analysis. The effect of age on the

occurrence of CTVT was evaluated using stratified 2 x 2 factorial design. The degree of association between different factors and CTVT, was measured by the odds ratio (OR) statistic. Odds ratio is an approximate measure of the strength of association between a factor and disease.

Statistical analysis of the individual intercurrent diseases data would not be valid because of concurrent occurrence and other uncontrolled factors. However, disease data was pooled and the occurrence of CTVT in dogs with and without intercurrent diseases compared. All data were analyzed by X<sup>2</sup> test according to statistical package Epi Info Version 3 on a microcomputer (Dean et al 1988).

## RESULTS

Three main forms of CTVT were noted namely genital, extragenital and generalized CTVT (Table 1). The genital form was characterized by bloody discharge from the external genitalia and the presence of tumour growths on the mucosae of the external genitalia. Growths were usually cauli-flower-like in appearance but occasionally they were nodular or papillary, non capsulated masses. They were also friable and varied in colour from cream through cream-red to red. Initially, in early cases, neoplastic lesions were usually superficial and limited to one or two pedunculated foci. In advanced stage, however, tumours were diffuse, ulcerated on the surfaces and with fetid smell. In males, blood exuding from the external genitalia was often the first presenting sign. This was sometimes severe and protracted that trauma was suspected. Lesions of CTVT in male dogs were found located on either the penis, the preputium or both.

**Table 1: Clinical forms of Canine Transmissible Venereal Tumour**

	Genital CTVT	Extragenital CTVT	Generalized CTVT
Guard dogs	126	5	8
Pets	17	1	0
Police dogs	0	0	0
<b>Total</b>	<b>143</b>	<b>6</b>	<b>8</b>

The commonest site was the caudal part of the penis from the crura to

bulbus glandis as well as the bulbus penis (Fig. 1).

**Table 2: Occurrence of Canine Transmissible Venereal Tumour for different dog types**

	CTVT positive	CTVT negative	Total
Guard dogs	139	176	315
Pets	18	97	115
Police dogs	0	40	40
<b>Total</b>	<b>157</b>	<b>313</b>	<b>470</b>

$\chi^2$  (Yates) = 52.64;  $p < 0.05$

In one case CTVT was found located on the penile shaft (Fig. 2). The tumours were seen on the external and internal parts of the prepuce (Fig. 3 & Fig. 4 respectively). In female dogs the presenting sign was bloody discharge or tumours bulging between the lips of the vulva. They were found located in any part of the external genitalia from the vulva to the vagina (Fig. 5). Deformation of the external genitalia in form of swelling and downward displacement of the vulva in females were common features in long standing cases.

The extragenital form affected several areas, including mucosae of the nose, conjunctiva and perianal region. It was also found to affect various parts of the skin and regional lymph nodes.

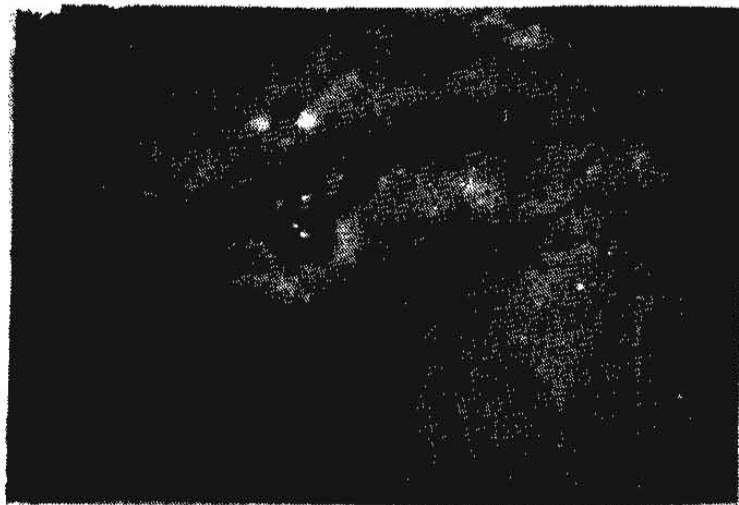
The nasal form of CTVT was recorded in three male dogs. This was normally seen as unilateral epistaxis. Other features were halitosis, dyspnoea and sneezing. Blood could be seen coming from one of the nostrils especially after sneezing. Laboured breathing was a constant feature of the nasal form of CTVT. Conjunctival CTVT was encountered in two cases during the survey (Fig. 6). Both were reported to have swollen conjunctivae, almost obliterating the palpebral apertures. The tumours were pinkish red, papillary non capsulated masses. Epiphora and bleeding from the conjunctivae was apparent. In both cases bilateral involvement of conjunctivae was recorded. One of the dogs had generalized involvement of the skin.



**Figure 1:** Canine Transmissible Venereal Tumour on *Bulbus glandis* and adjacent areas.



**Figure 2:** Canine Transmissible Venereal Tumour. Fleshy tumour mass encircling the penile shaft.



**Figure 3:** Nodules of CTVT located on the parietal layer of the prepuce.

Table 3: Occurrence of CTVT according to age and dog type

	CTVT positive	CTVT negative	Total
<b>Guard dogs</b>			
1 - 4 years	119	141	260
> 4 years	20	35	55
<b>Total</b>	<b>139</b>	<b>176</b>	<b>315</b>
<b>Pets</b>			
1 - 4 years	12	86	98
> 4 years	6	51	57
<b>Total</b>	<b>18</b>	<b>137</b>	<b>155</b>

## Summary of 2 Tables:-

Crude Odds Ratio for all strata = 1.91.  
 Mantel-Haenszel Weighted Odds Ratio = 1.40  
 Mantel-Haenszel Summary Chi Square = 1.29  
 P Value = 0.25631799

The other dog had the genital form of CTVT that was removed one month before the ocular problem was reported. Generalized CTVT was encountered with or without the presence of genital CTVT. The majority of cases were encountered in dogs that were in poor health.

This form was characterized by presence of CTVT lesions in a multitude of sites. Lesions consisted of raised areas up to 7 cm in diameter over the back, neck, flank and limbs. In long standing cases of CTVT, these lesions were ulcerated or excoriated. Metastasis of CTVT leading to

Table 4: Canine Transmissible Venereal Tumour in dogs with and without intercurrent diseases.

	CTVT positive	CTVT negative	Total
With interc. d'se	109	93	202
Without interc. d'se	48	220	268
<b>Total</b>	<b>157</b>	<b>313</b>	<b>470</b>

O.R. = 5.37;  $X^2 = 65.68$  P = 0.0001



Figure 4: Canine Transmissible Venereal Tumour on the visceral part of the prepuce.

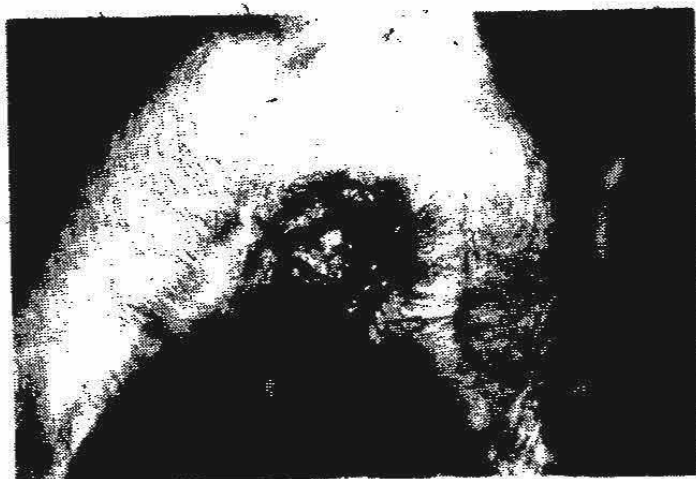


Figure 5: Canine Transmissible Venereal Tumour in between vulval lips.



Figure 6: Conjunctival CTVT. Tumours almost obliterating the cornea.

generalized lymphadenopathy was also observed. However, inguinal lymph nodes were the most frequent metastatic sites.

The occurrence of CTVT in different dog types is shown in Table 2. Differences in occurrence of the disease of different dog types was significant ( $p=0.05$ )

The influence of age on the occurrence of CTVT is demonstrated in table 3. Canine Transmissible Venereal Tumour was found to affect only dogs above 7 months of age. However for dogs above this age, there was no significant difference between age groups regarding their susceptibility to CTVT when the effect of dog type was eliminated ( $p>0.05$ ). The severity of the disease tended to vary with the animal's condition. It was more severe in animals in poor body condition and afflicted by intercurrent diseases such as allergic dermatitis, demodicosis, vulvovaginitis, balanoposthitis, perianal furunculosis, pyoderma, pemphigus foliaceus, pyometra and helminthiasis. Others were seborrhea dermatitis, traumatic wounds and leptospirosis. The influence of intercurrent diseases is shown in Table 4. Significantly more dogs with intercurrent diseases were affected by CTVT compared to healthy dogs ( $p<0.05$ ).

## DISCUSSION

In this study CTVT was noted to occur in a multitude of sites. In male dogs, however, the caudal part of the penis and the visceral parts of the prepuce were the most frequently affected areas. In females, the vestibulo-vaginal junction was the commonest site affected. It is supposed that these sites easily get damaged during copulation mainly due to their fragile nature and because of the high

pressure exerted on these areas. Since Canine Transmissible Venereal Tumour easily establishes itself on damaged sites (Boscos, 1988).

It was interesting to note that nasal CTVT was only seen in male dogs and this is considered to be sex related behaviour of male dogs which commonly sniff external genitalia of female dogs in heat and this could facilitate seeding of detached tumour cells onto the nasal mucosal of the male dog.

Some of the sites on which CTVT was found had previously not been reported in literature. In the genital form for example CTVT was found on the penile shaft, an unusual site. As for the extragenital form affection of the anal mucosa was not expected. Being the first reported case, it is worthwhile to speculate on the possible way by which the tumour cells were introduced onto the anal mucosa. One possibility is that this was an extension of the neoplastic process in the vulva and vagina. Itching caused by fleas and possibly *Dipylidium caninum* leads to self inflicted trauma when the affected animals scratches itself to relieve pain. If this is followed by simultaneously licking the external genitalia and the damaged anal mucosa, tumour cells will be transferred to the latter.

The dog type, which in most cases is an indicator for level of management, had a marked influence on the occurrence of CTVT ( $p<0.05$ ). Therefore management influence on the occurrence of CTVT. That there were no cases among police dogs and relatively few cases for pets compared to guard dogs is largely due to good management accorded to former dog types. Reliable balanced rations, accommodation and the control of movement appear to protect the police

and pet dogs from CTVT. It is customary to set free guard dogs during the night, a factor that allows for contact between large groups of owned dogs and with stray dogs. Guard dogs are therefore at higher risk of acquiring CTVT.

The minimum age for acquiring CTVT appear to be determined by the time at which sexual maturity is attained. Normally dogs reach puberty when they are 7 - 12 months of age (Christiansen, 1984). This underscores the significance of sexual contact in the transmission of CTVT.

Dogs afflicted by intercurrent diseases are more likely to be immunocompromised compared to healthy dogs. Results of the present work are in line with the findings of Cohen (1973), who has reported that Canine transmissible venereal tumour is common in immunocompromised dogs.

This study indicates that CTVT can affect any part of the animals body. The extent of involvement may depend on the animal's immune status although this could not be verified.

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