

Multiple cutaneous inverted papillomas in a dog

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ABSTRACT

Cutaneous inverted papillomas are described in an 8-month-old mixed breed domestic dog from Windhoek, Namibia. Multiple firm, rapidly growing, doughnut-shaped masses formed on the ventral abdomen, which histologically consisted of a cup-shaped rim of marked epithelial hyperplasia, giant keratohyaline granules and prominent koilocytes and marked hyperkeratosis filling the centre of the mass. Current literature on canine papillomas is briefly reviewed.

Key words: canine, inverted papilloma, papilloma virus, skin.

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INTRODUCTION

Canine cutaneous viral squamous papillomas are caused by papilloma viruses¹⁴. Although the exophytic oral and facial form (warts and verrucae) are common in the dog¹⁴, cutaneous endophytic inverted papillomas (CIP) are less common^{4,7}. Cutaneous inverted papillomas are usually seen in dogs under 3 years of age, occur on the ventral abdomen and groin, and are typically small (<2 cm diameter), raised and firm with a central pore^{7,14}. This case report describes a case of multiple CIP in a mixed breed dog from Windhoek, Namibia.

CASE HISTORY

An 8-month-old, male, mixed breed, unvaccinated domestic dog in good bodily condition was presented for veterinary attention because of multiple, rapidly growing, well-circumscribed, firm, raised, fig-shaped masses around the prepuce (Fig. 1). A basic clinical examination, restricted by cost considerations, showed no other abnormalities apart from a mild eosinophilia on blood smear, which was attributed to the mild tick burden and/or internal parasites. Fine-needle aspiration of the masses was unrewarding. Routine histological processing followed excisional biopsy of the masses. On section, the masses were firm with a pale tan outer rim and an inner lamellar section with a central raised pore (Fig. 2). Histologically,

the outer rim consisted of florid papillary epidermal hyperplasia with closely packed rete pegs and scant intervening dermis (Fig. 3). Epidermal cells were tightly packed, disorganised, had a high mitotic rate (5/HPF), scant eosinophilic cytoplasm and large round to oval nuclei with coarsely clumped chromatin and multiple, large magenta nucleoli. Irregular and disorganised keratinisation was characterised by prominent large keratohyaline granules and marked mainly orthokeratotic hyperkeratosis and dyskeratosis

(Fig. 4). Individual cell necrosis was common, and particularly on the edges of the papillae, associated with ballooning degeneration (koilocytes) and intra- and intercellular oedema. Rare cells swollen with basophilic granular cytoplasm were present. Intracellular inclusions were not seen. Adjacent and overlying epidermis was attenuated. Electron microscopy revealed no viral particles. A diagnosis of canine CIP was made.

DISCUSSION

The clinical presentation, macroscopic and histological features of these tumours are consistent with CIP⁴. Intracutaneous cornifying epithelioma was ruled out on the presence of typical ballooning degeneration and the absence of a complex branching cyst wall containing keratin pearls and dermal infiltration by cusps of basal cells¹⁵. As in this case, intracellular inclusions may be absent in CIP⁶.

Multiple papilloma viruses are implicated in the development of canine papillomas, and the virus responsible for CIP appears to be a different virus from the one which causes oral and facial papillo-



Fig. 1: Macroscopic appearance of cutaneous inverted papillomas around the prepuce of a dog: firm, raised, discrete nodules with a central pore (shown to scale).

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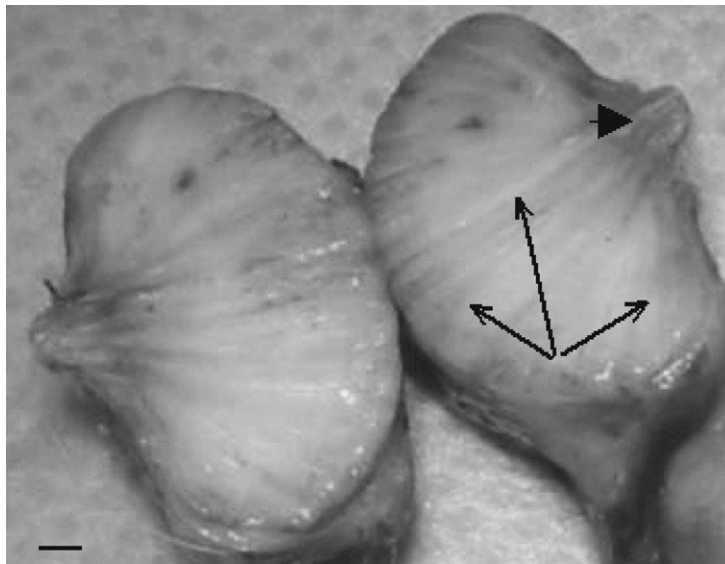


Fig. 2: Cut section of cutaneous inverted papilloma showing lamellar arrangement of keratin (arrows) and a central raised pore (arrowhead) (scale bar = 2 mm).

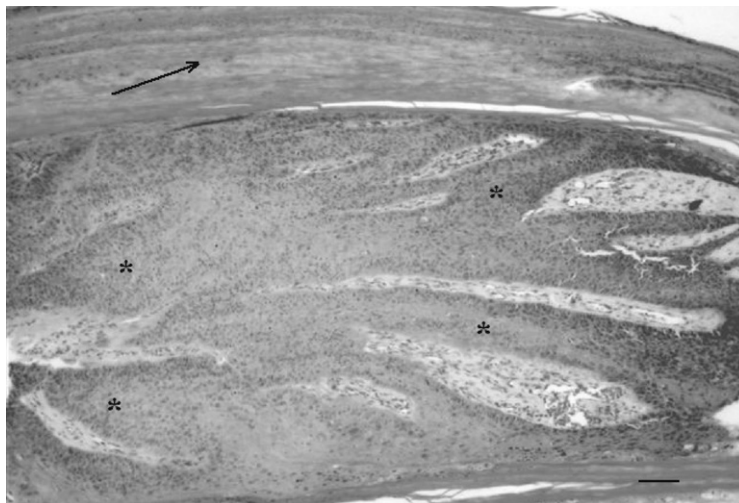


Fig. 3: Histological appearance typical of a papilloma papillary epidermal hyperplasia forming closely packed rete pegs (stars) with hyperkeratosis (arrow) (H&E; scale bar = 500 µm).

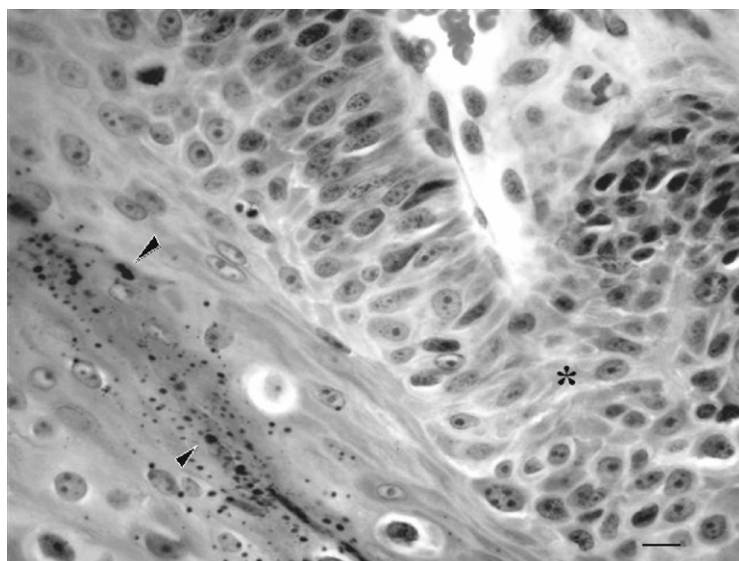


Fig. 4: Histological appearance typical of a papilloma – hyperplastic epidermal cells (star) undergoing irregular keratinisation with large intracytoplasmic keratohyaline granules (arrowheads) (H&E; scale bar = 15 µm).

matosis⁴. In natural and experimental infections, papilloma viruses may cause a wide range of skin lesions including epidermal hyperplasia, epidermal cysts, squamous papilloma, fibropapilloma, inverted papilloma, basal cell epithelioma, and squamous cell carcinoma^{3,6}. Human inverted papillomas are curiously most common in the nasal mucosa². Immunohistochemical stains, using polyclonal antiserum, showed that 44.2% of 95 canine cutaneous papillomas and 27 % of 100 squamous cell carcinomas contained papilloma viral antigen; antigen was detectable in 54.2 % of all oral and ocular papillomas and in 37.0 % of all cutaneous papillomas¹³. Viral transmission occurs by direct or indirect contact, and infection is believed to be established in damaged skin or oral mucosa¹⁴.

Most canine papillomas regress naturally following infiltration by CD4+ and CD8+ T lymphocytes^{11,12}. Solid immunity, thought to be due to production of circulating neutralising antibodies against the viral capsid antigens^{5,12}, usually follows experimental or natural infection¹¹. Unusually severe or persistent forms of papilloma are associated with immune suppression, old age and recent chemotherapy or corticosteroid therapy^{1,8,10,12}. Treatment of papillomas may include excision, cryo- or electrosurgery, injection with autogenous vaccine, and immune modulating drugs¹⁴. Since papillomas may regress spontaneously, the efficacy of autogenous vaccines is difficult to accurately assess¹².

Canine cutaneous papillomas are typically benign, rarely recur after excision and often spontaneously regress in time⁷; but malignant transformation has been recorded¹⁴. Control of papilloma virus-induced disease in multiple-dog households is hampered by the fact that canine oral papilloma virus, and presumably, other canine papilloma viruses are fairly stable in the environment¹².

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REFERENCES

1. Albanese F, Salerni F L, Giordano S, Marconato L 2006 Extragenital transmissible venereal tumour associated with circulating neoplastic cells in an immunologically compromised dog. *Veterinary and Comparative Oncology* 4: 57–62
2. Alonso P D, Clemente G A, Sanchez R D,

- Gonzalez P A 2005 Inverted nasosinusal papilloma. 11 cases and bibliographic revision. *Anales Otorrinolaringologicos Ibero-americanos* 32(3): 279–289
3. Bregman C L, Hirth R S, Sundberg J P, Christensen E F 1987 Cutaneous neoplasms in dogs associated with canine oral papillomavirus vaccine. *Veterinary Pathology* 24: 477–487
 4. Campbell K L, Sundberg J P, Goldschmidt M H, Knupp C, Reichmann M E 1988 Cutaneous inverted papillomas in dogs. *Veterinary Pathology* 25(1): 67–71
 5. Ghim S, Newsome J, Bell J, Sundberg J P, Schlegel R, Jenson A B 2000 Spontaneously regressing oral papillomas induce systemic antibodies that neutralize canine oral papillomavirus. *Experimental & Molecular Pathology* 68(3): 147–151
 6. Kaldrymidou E, Papaioannou N, Poutahidis T, Garderen E, Karayanopoulou M 2001 Canine cutaneous papilloma. Study of seven cases. *Bulletin of the Hellenic Veterinary Medical Society* 52: 126–134
 7. Lee Gross T, Walder E J (eds) 1992 *Veterinary dermatology: a macroscopic and microscopic evaluation of canine and feline skin disease*. Mosby Year Book, St Louis: 330–350
 8. Lucroy M D, Hill F I, Moore P F, Madewell B R 1998 Cutaneous papillomatosis in a dog with malignant lymphoma following long-term chemotherapy. *Journal of Veterinary Diagnostic Investigation* 10(4): 369–371
 9. Mill A B, Campbell K L 1992 Concurrent hypothyroidism, IgM deficiency, impaired T-cell mitogen response, and multifocal cutaneous squamous papillomas in a dog. *Canine Practice* 17: 15–21
 10. Narama I, Ozaki K, Maeda H, Ohta A 1992 Cutaneous papilloma with viral replication in an old dog. *Journal of Veterinary Medical Science* 54(2): 387–389
 11. Nicholls P K, Moore P F, Anderson D M, Moore R A, Parry N R, Gough G W, Stanley M A 2001 Regression of canine oral papillomas is associated with infiltration of CD4+ and CD8+ lymphocytes. *Virology* 283(1): 31–39
 12. Nicholls P K, Stanley M A 1999 Canine papillomavirus – A centenary review. *Journal of Comparative Pathology* 120: 219–233
 13. Schwegler K, Walter J H, Rudolph R 1997 Epithelial neoplasms of the skin, the cutaneous mucosa and the transitional epithelium in dogs: an immunolocalization study for papillomavirus antigen. *Zentralblatt für Veterinärmedizin – Reihe A* 44(2): 115–123
 14. Scott D W, Miller W H, Griffin C G 2001 (eds) *Muller and Kirk's small animal dermatology*. W B Saunders, Philadelphia: 1236–1414
 15. Yaeger J A, Wilcock B P (eds) 1994 *Color atlas and text of surgical pathology of the dog and cat: dermatopathology and skin tumours*. Wolfe Publishing, St Louis, Mosby Yearbook, 249–256