

GROSS AND HISTOPATHOLOGICAL CHARACTERISTICS OF FIBROPAPILLOMA IN CAMELS (*Camelus dromedarius*)

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ABSTRACT

A fibropapilloma tumour is a benign growth that is spread by a papilloma virus. This study describes the gross and histopathological characteristics of fibropapilloma in 2 camels. Two 18- and 24-month-old camels were presented each with a history of presence of a large mass on the metatarsal region. These were nodular proliferations, rough, greyish, with sizes between 3 and 4 cm in diameter. Histopathologically, the neoplastic proliferation of the connective tissue was so extreme that the lesion was primarily suspected as fibroma. The epidermis over the mass showed acanthosis and the stratified squamous epithelium was covered with a thick layer of orthokeratotic parakeratosis stratum corneum. The epidermis-dermis junction showed finger like projections of epidermal pegs extending deep into the fibromatous tissue of the dermis. The dermis consisted of irregular collagenous connective tissue with many fibroblasts, koilocytes including variably sized keratohyalin granules and a few intranuclear inclusion bodies. Hair follicle, sebaceous glands and other adenexae were not present in the dermis of these areas. Both these morphological patterns were defined as fibropapillomas.

Key words: Camel, fibropapilloma, gross pathology, histopathology, metatarsal

The term fibropapilloma is used to refer to a benign fibroblastic proliferation with overlying acanthosis, hyperkeratosis, and finger like projections of epidermal pegs (Yager *et al*, 1992, 1994). Fibropapillomas are usually seen in young animals such as cattle, horses, donkeys, mules, deers, and a pronghorn antelope (Lancaster and Sundberg, 1982; Sundberg *et al*, 1983; Reid *et al*, 1994; Tafti *et al*, 1998). The papillomavirus infections are most commonly seen in 2 years old cattle and horses between 3 and 6 years of age. In cattle, at least 3 different bovine papillomaviruses (BPV1, BPV2, and BPV5) are involved as the causative agents of fibropapillomas (Yager *et al*, 1992).

Fibropapillomas have been reported in the head, neck, and digits of cats and head, neck, ventral abdomen, and distal legs of horses, and on the head of camelids (Goodrich *et al*, 1998; Schulman *et al*, 2001, 2003). Feline cutaneous fibropapillomas with histologic features similar to bovine fibropapilloma occur in cats (<5 yr old) (Gumbrell *et al*, 1998; Schulman *et al*, 2001). Combined epithelial and fibrous proliferation of skin are also common in cattle (Rebhun *et al*, 1980; Hunt, 1984) and sheep (Vanselow *et al*, 1982) However, in goats papillomas generally show only epithelial proliferation (Theilen *et al*, 1985).

Fibropapilloma reports in camel are rare and only 1 case has been seen in a 6 year old camelids (Schulman *et al*, 2003).

This report describes the macroscopic and microscopic characteristics of fibropapillomas in two camels.

Materials and Methods

A mass of 3.1x2.5x2.8 cm was observed on the metatarsal region of a 18 months old camel and another mass of 3.8x3.6x4.2 cm approximately in the same place in another 24-month-old male camel. Tissue samples of 1 cm³ in dimension were fixed in 10% neutral buffered formalin, processed routinely, embedded in paraffin, sectioned at 5 µm thickness, stained with hematoxylin and eosin and green trichrome and studied with a routine light microscope.

Results

Grossly, the tumours were lobulated, grey-white, of variable sizes of 2.5 to 4.2 cm in dimensions, well circumscribed and of tough consistency. On transverse section the tumors were seen to consist of homogeneous, grey-white, glossy connective tissue covered by acanthotic and orthokeratotic parakeratosis epidermis.

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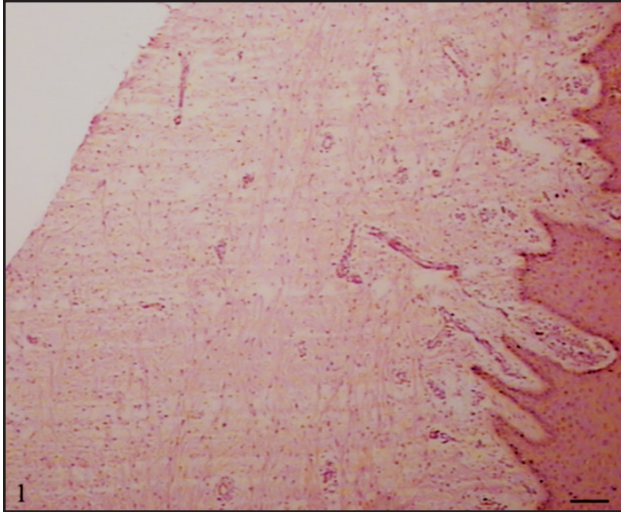


Fig 1. Cutaneous fibropapilloma in camel with proliferation of dermal fibroblasts and scattered fibrous connective tissue covered by a orthokeratotic hyperkeratosis epidermis. Hair follicles, sebaceous glands and other dermal adenexae disappeared and substituted with fibromatous mass (H&E, Bar = 200 μ m).

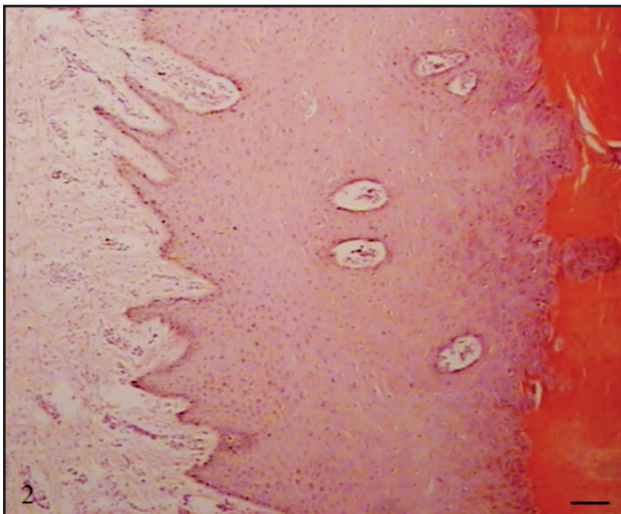


Fig 2. Cutaneous fibropapilloma of camel with abundant proliferation of fibrous connective tissue of dermis and absence of hair follicle, sebaceous glands and other adenexae of the dermis. Long rete ridges of the epidermal origin are deeply situated in the dermis. (H&E, Bar = 200 μ m).

Histopathologically, squamous papillomas with papillated epidermal hyperplasia and papillomatosis together with connective tissue and fibroblasts proliferation in the dermis and subcutaneous area were evident. The neoplastic proliferation of the connective tissue was so extreme that the lesion primarily appeared as fibroma, with a thick covering of the stratified squamous epithelium. The epithelium had finger like projections of epidermal pegs extending deep into the fibromatous tissue,

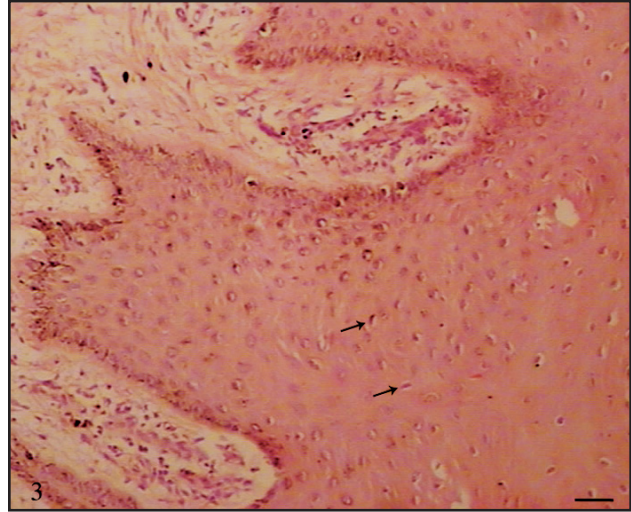


Fig 3. Superficial aspect of camelid fibropapilloma with epidermal hyperplasia. Typical koilocytes (arrows) are scattered in different layers of the epidermis particularly the stratum spinosum and stratum granulosum layers (H&E, Bar= 80 μ m).

giving the tumours a broad papillary pattern. In the epidermis, orthokeratotic hyperkeratosis, ballooning degeneration, many koilocytes with clumping of variably sized keratohyalin granules, and rare presence of basophilic intranuclear inclusion bodies were present. All layers of the epidermis were markedly thickened. The dermis consisted of densely packed proliferated irregular collagenous connective tissue with many fibroblasts. Hair follicles, sebaceous glands and other dermal adenexae were not present in the tumour.

Discussion

Camelid cutaneous fibropapillomas with histopathological features similar to equine sarcoids were diagnosed in 2 camels. Grossly, viral-associated fibropapillomas can recur, spread and occasionally regress spontaneously. They are lobulated, fungi form or cauliflower-like masses and fleshy. Those fibropapillomas that originate from the mucous membranes may be ulcerated and as a result of trauma exhibit a hemorrhagic and inflamed surface.

Secondary infection due to following spontaneous necrosis or trauma is common. In cross section, the mass is pink or greyish white with a glistening appearance, and the centre is some times greyish and softened due to necrotic changes (Formston, 1990; Hanna and Dunn, 2003; McGavin and Zachary, 2007).

Histopathologically, neoplastic proliferation of the connective tissue is so extreme that the lesion

appears like a fibroma, with covering of stratified squamous epithelium. The epithelium is often 10 to 50 cells thick and usually has finger like projections of epidermal pegs extending deep into the fibromatous tissue. However, the epidermal components may be minimal or absent in some tumours, especially those with extensive ulceration.

Epidermal orthokeratotic hyperkeratosis, acanthosis with presence of koilocytes which contain variably sized keratohyalin granules, and occasional observation of the intranuclear inclusion bodies are the characteristic features in fibropapillomas. However, the epithelial cells show hyperplasia but neoplastic changes in these cells are rare. The dermis consisted of densely packed irregular collagenous connective tissue containing many fibroblasts (Goldshmidt and Hendrick, 2002; Herbst *et al*, 1999; McGavin and Zachary, 2007; Sundberg and Nielsen, 1990).

Fibropapillomatosis is usually of great concern in valuable animals such as camel in competitive shows or overseas sales. Economic losses may occur through hide damage, secondary infection or myiasis, and carcass condemnation. In cattle, it has been stated that animals with papillomatosis affecting over 20% of their bodies have a poor prognosis (Hunt, 1984; Nooruddin and Das, 1984).

There is no scientific information on the benefits of vaccines in equine papillomatosis, ovine papillomatosis and caprine papillomatosis of the head, neck and fore and hindlegs. There have been no reports of successful treatment of equine sarcoids and fibropapillomatosis (Mullowney and Fadok, 1984; Thomsett, 1984). General therapeutic adjuvants in all cases of papillomatosis and fibropapillomatosis, when feasible, include isolation of affected animals from noninfected animals, reduction of cutaneous injuries associated with the environment, and disinfection of the environment with formaldehyde and lye (Theilen *et al*, 1985; Hunt, 1984).

In summary, these camelid cutaneous fibropapillomas share many clinicopathologic features with equine sarcoids and have a strong association with papillomavirus, suggesting a causal relationship.

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