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PJBS

ISSN 1028-8880

**Pakistan
Journal of Biological Sciences**

ANSI*net*

Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

Nodular Dermatofibrosis in a German Shepherd Dog: Case Report

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Abstract: An 7-year-old male German shepherd dog not neutered was attended presenting several cutaneous nodules ranging from 0.5-3 cm in diameter at least a one year history, located mainly in thoracic and pelvic limbs, with progressive weight loss over two months. Fine needle aspiration biopsy and pelvic and thoracic limbs nodules excision biopsy were performed. After histopathological diagnosis, nodular dermatofibrosis diagnosis was determined and abdominal ultrasound was performed for possible renal cysts evaluation. The animal received treatment to control secondary bacterial infection. It is necessary to carry out histopathological examination and ultrasound to identify possible renal cysts and for definitive diagnosis. There is no specific treatment for nodular dermatofibrosis.

Key words: Canine, paraneoplastic syndrome, renal cysts, nodules

INTRODUCTION

Nodular dermatofibrosis is a rare paraneoplastic syndrome of multiple collagenous nerves associated with renal and uterine tumors. It was first reported in 1983 in a German shepherd dog (Suter *et al.*, 1983) but there's a small number of reports in literature since then. Macroscopically, nodular dermatofibrosis is characterized by multiple dermis and subcutaneous nodules which in severe cases coalesce (Goldschmidt and Hendrick, 2002). These nodules are firm, well circumscribed, with 0.5-4.0 cm in diameter, symmetrically distributed around the limbs, neck, back and ventral trunk (Lingaas *et al.*, 2003). It is necessary to perform an ultrasound examination to identify renal cystic changes (Suter *et al.*, 1983). This report aims to describe the clinical, histopathological and ultrasound findings of a nodular dermatofibrosis in a German shepherd dog case.

CASE REPORT

A male German shepherd dog, 7 years old, not neutered was attended presenting several cutaneous nodules ranging from 0.5-3 cm in diameter (Fig. 1) at least a one year history, located mainly in thoracic and pelvic limbs, with progressive weight loss over two months. Blood samples, to perform blood counts and serum



Fig. 1: Right pelvic limb tarsal region after shaving. Note nodular proliferation on different sizes, with ulceration

chemistry profile (creatinine, alanine aminotransferase and urea) were collected. The blood count reference values, serum activity of ALT enzyme ($10-109 \text{ UI L}^{-1}$), creatinine ($0.5-1.7 \text{ mg dL}^{-1}$) and urea ($8-28 \text{ mg dL}^{-1}$) were within the reference range. Fine needle aspiration biopsy, culture, antibiogram and pelvic and thoracic limbs nodules excision biopsy were performed. The bacterial culture showed no growth. The nodule microscopic evaluation

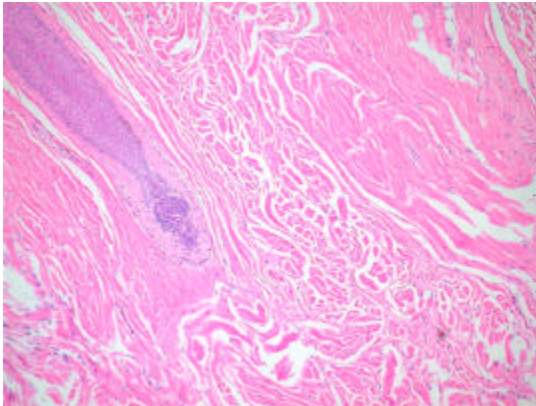


Fig. 2: Histopathological examination, HE staining, 20x. Hair follicle surrounded by collagen fibers proliferation. Note that there is no compression, displacement, or morphologic alteration of the same by collagen fibers

revealed poorly demarcated nodular dermis area of mature dermal collagen proliferation. The skin appendages were enveloped by collagen fibers proliferation and non-compressed, displaced or morphologically altered by them (Fig. 2). Some hair follicles presented infundibular hyperkeratosis. The lesion epidermis lining exhibits regular acanthosis and hyperpigmentation. Cellular atypia signs were not shown. After histopathological diagnosis, nodular dermatofibrosis diagnosis was determined and abdominal ultrasound was performed for possible renal cysts evaluation. The ultrasound exam revealed round structures with definite edges and anechoic content in both kidneys (three in the left kidney and one in the right kidney), the largest one measuring about 2, 5 cm in diameter (in the left kidney), consistent with renal cysts. The animal received treatment to control secondary bacterial infection.

DISCUSSION

The average age of affected dogs is eight years old (Lium and Moe, 1985). Dermatofibrosis, some authors described as an autosomal dominant hereditary syndrome with complete penetrance affecting some German shepherd dogs strains (Goldschmidt and Hendrick, 2002; Lingaas *et al.*, 2003). However, it has been reported in Golden Retrievers and Boxers (Goldschmidt and Hendrick, 2002). Some authors report mobile, not itchy nodules, on the dermis or subcutaneous area and, in the most cases, the epidermis is intact, although some lesions become inflamed and ulcerated (Suter *et al.*, 1983; Goldschmidt and Hendrick, 2002). The histopathological

findings associated with clinical signs were consistent with nodular dermatofibrosis. It is reported that the nodules formation is due growth factor beta 1 (Transforming growth factor-TGF-beta1) overexpression, a potent desmoplasia stimulator which was documented in human patients with cancer and severe nasal carcinoma. A recent study demonstrated an increased TGF-beta1 expression in kidney and skin (hair follicle and kidney tubules, respectively) of German shepherd dog with nodular dermatofibrosis when compared to the same breed dogs with no disease (Lium and Moe, 1985). The literature suggests that in male dogs, the nodular dermatofibrosis is associated with kidneys cancer (Lingaas *et al.*, 2003). This disease is a paraneoplastic syndrome that precedes the kidney cancer formation (Suter *et al.*, 1983; Atlee *et al.*, 1991). It was recommended to the animal's owner animal ultrasound control every two months and monthly renal function (urea, creatinine and urinalysis) evaluation. At the diagnosis, the animal was treated with Cephalexin and Clorexidine 2% bathing to control pyoderma. There is no specific treatment for this condition, due the bilateral nature of kidney cancer (Suter *et al.*, 1983; Lium and Moe, 1985). Once determinate the diagnosis, the animal must be monitored as the cyst renal size and renal function tests to detect renal failure. The nodular dermatofibrosis prognosis is unfavorable, once all of the animals develop kidney's cancer. Recent studies, in which researchers examined several nodular dermatofibrosis cases associated with kidney's cancer, showed that the average lifetime after skin changes diagnosis is three years and all of the dogs die due the uremia (Atlee *et al.*, 1991; Lingaas *et al.*, 2003). The histopathological diagnosis is essential to differentiate from keloids fibromas and nodular scars, once these changes have different prognosis and treatments (Goldschmidt and Hendrick, 2002).

CONCLUSION

The nodular dermatofibrosis is a rare paraneoplastic syndrome that primarily affects German shepherd dogs. It is necessary to carry out histopathological examination and ultrasound to identify possible renal cysts and for definitive diagnosis. There is no specific treatment for nodular dermatofibrosis.

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