

The histopathological changes at skin of *German shepherd* dogs associated with ringworm infection in directorate of K9 in Al-Diwanyia province.

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Abstract

The current study was conducted to exam the histopathological changes of skin of *German shepherd* dogs suffering from ringworm infection. It may be the first study on this breed of dog in the Al-Diwanyia province. Seven *German shepherd* dogs from directorate of K9 in Al-Diwanyia province suffering from skin lesion were used in this study. Highly contaminated fur of infected dogs was cultured on Sabouraud's dextrose agar (SDA). A five mm shaved biopsies of skin from all cases were taken from lesions present on shoulder region and after routine processes histological technique to evaluate the histopathological changes. The result were revealed that the colonies of *Microsporum canis* was flat, spreading, white to faint creamy-coloured with a dense buffy, granular to coarsely fluffy to hairy surface with radial grooves, and the histopathological exam of skin were showed presence of hyperkeratosis, spongiosis and marked dermal edema, skin bullae in the epidermal layer and accumulation of collagen fibers found of spores and hyphae of *Microsporum* in the stratum basale layer of epidermis and infiltration of eosinophils in the dermis layer directly beneath the basal layer of epidermis.

Key words: skin histopathological alterations, ringworm infection, *German shepherd* dog.

التغيرات النسجية المرضية في جلد الكلاب البوليسية (كلب الراعي الألماني) المصابة بالقوباء الحلقية في مديرية الكلاب البوليسية في محافظة الديوانية

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الخلاصة

أجريت الدراسة الحالية لفحص التغيرات النسجية المرضية للجلد في الكلاب البوليسية التي تعاني من عدوى القوباء الحلقية. ربما تكون هذه الدراسة هي الدراسة الاولى على هذه السلالة من الكلاب في محافظة الديوانية. واستخدمت في هذه الدراسة سبع كلاب من نوع (كلب الراعي الألماني) وهي كلاب بوليسية من مديرية الكلاب البوليسية في محافظة الديوانية (K9) كانت تعاني من آفات جلدية. جمعت العينات في وعاء داكن اللون، وأخذ بعض الشعر من خلال نتف خصلة من الشعر في منطقة الافة باستخدام الملقط. زرعت عينة الشعر الملوثة والتي جمعت مسبقاً من الكلاب المصابة على وسط السابرويد. وأخذت خزعات جلدية بحجم خمسة ملمتر من جميع الحالات من الآفات الموجودة على منطقة الكتف، وبعد اجراء عمليات التقانات النسجية الروتينية، لفحص التغيرات النسجية المرضية في الجلد. وظهرت نتائج الزرع على وسط السابرويد أن مستعمرات البوغاء الكلبية مسطحة ومنتشرة ذات لون مائل من الأبيض الخافت الى اللون القشدي، مع سطح محبب إلى رقيق يحتوي على مظهر مشعر مع اخاديد شعاعية، اما فيما يتعلق بالتغيرات النسجية المرضية للجلد فقد أظهرت وجود فرط القرن وانتفاخ في منطقة البشرة ووذمة ملحوظة في ادمة باطن الجلد، مع تراكم ألياف الغراوين كما وجدت خيوط و ابواغ الفطر في خلايا الطبقة القاعدية من البشرة مع ارتشاح خلايا الحمضات في طبقة الأدمة مباشرة تحت الطبقة القاعدية من ادمة باطن الجلد .

الكلمات المفتاحية: التغيرات النسجية المرضية للجلد، عدوى القوباء الحلقية، كلب الراعي الألماني.

Introduction

A police dog, in some areas referred to as a "K-9", is a dog that is specifically trained to assist police and other law-enforcement personnel in their work. In this context, *German shepherd* was the most

commonly used breed⁽¹⁾. A very large group of keratinophylic fungi are common inhabitants of the soil and shed from the hairs and skin cells of animals, as well as fall from animals and humans during the natural and continuous cycle of skin and coat

shedding, but only three genera, known as dermatophytes, are known to cause disease ("ringworm") in animals and humans, that include *Microsporum*, *Trichophyton* and *Epidermophyton*; the first two are most frequently found in animals while the third causes problems mainly in humans⁽²⁾. These three genera are very important because their particular ability to be transmissible to animals and humans and cause a worldwide health problem⁽³⁾. Dogs and cats can be infected with dermatophyte at any age, but most frequent in the young aged animals. Poor nutrition, crowding of animals, poor management and insufficiency or an adequate quarantine period for infected pets are most important risk factors in addition to age^(4,5). *Microsporum canis*, followed by *M. gypseum* and *Trichophyton mentagrophytes* are the most common fungus isolated from fur of dog and cat. Those three genera are the most reported dermatophytes found worldwide and so-called zoophylic strains⁽⁶⁾.

Materials and methods

Scraping: Seven German shepherd dogs from the directorate of K9 in Al-Diwanyia province suffering from skin lesions were used in this study. The skin scraping samples were taken from the edge of the lesion with a surgical blade. Scrapings were taken very superficially to avoid bleeding. Samples were collected on a container with dark background and some hairs were taken by plucking them off with forceps⁽⁶⁾.

1-Culturing:

A highly contaminated fur of infected dogs was cultured on Sabouraud's dextrose agar (SDA) (Himedia com. -India), that include 4% glucose, 1% peptone, 2% agar together with antibacterial agents a combination of penicillin, streptomycin and cycloheximide with an aerobic culture and incubation. The growth was occurring in about 4 to 7 days at 25 °C⁽⁷⁾.

2-Skin biopsies:

Skin biopsies were taken by method of Shave biopsies which are quick and do not require sutures for closure. A parallel held blade as used to shave a lesion from the skin surface⁽⁸⁾. 0.5 mm shaved biopsies of skin

from all cases were taken from lesion present on shoulder region and fixed in 10 % buffered formalin and sent for histopathological examination by using light microscopy to investigate the morphological alterations^(9,10).

Results and discussion

A flat, spreading, white to faint creamy-coloured colonies of *Microsporum canis* with a dense buffy, granular to coarsely fluffy to hairy surface with radial grooves. Bright golden yellow to brownish yellow colonies usually occur, but non-pigmented strains also appear. The results of histopathological study showed hyperkeratosis, spongiosis and marked dermal edema (figure: 1), some cases revealed criteria of chronic infection with *Microsporum canis* by formation of skin bullae in the epidermal layer and accumulation of collagen fibers (figures: 2 and 3) with diapedesis of spores and hyphae of *Microsporum* into the stratum basale layer of epidermis (figure 4) and infiltration of eosinophils in the dermis layer directly beneath the basal layer of epidermis (figure 4). The most frequent mycotic disease in carnivores was *Microsporia*⁽¹¹⁾, and in dog and cats the *M.canis* is the most common species, especially in cats⁽¹²⁾. Ringworm lesion occurs on the trunk, extremities and face, and characterized by single or multiple scaly annular lesions with a slightly elevated, scaly and or erythematous edge, sharp margin and central clearing, also, the edges of the lesion contain follicular papules, pustules or vesicles⁽¹³⁾. On SDA the characteristics of *Microsporum canis* colonies were indicated by many researchers that describe a flat, white, fluffy, spreading colony develops within 7 to 14 days, and the characteristic of deep yellow pigment may be observed on the reverse side of a colony on Sabouraud dextrose agar or Dermatophyte Test Media (DTM)⁽¹⁴⁾. Our histopathological results were in accordance with those indicate that histologic sections stained with hematoxylin-eosin showed a discrete neutrophilic infiltrate and dermal edema 24 h after *M. canis* inoculation into the skin of

guinea pigs, while five days after inoculation, skin fragments showed acanthosis, hyperkeratosis, spongiosis and marked dermal edema and even in sections stained with hematoxylin-eosin fungal spores and hyphae were observed in the stratum

corneum and inside the hair follicles⁽¹⁵⁾, while in our study the spores and hyphae were observed in the stratum basale layer. The formation of skin bullae either due to infection with *M.canis*⁽¹⁶⁾, or may be due to secondary bacterial infection.

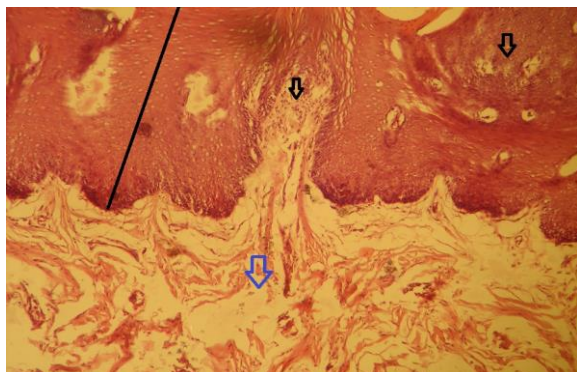


Figure (1): section of skin showed thickening of epidermal layer (black line) with formation of multifocal bullae in the epidermal layer (black arrows), while the dermis layer is edematous (blue arrow). H&S, 400X.

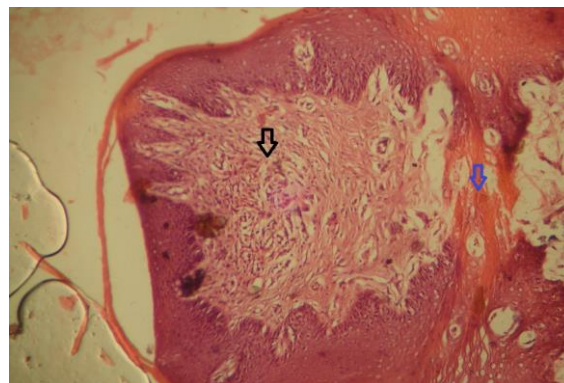


Figure (2): section of skin revealed formation of skin bullae in the epidermal layer of skin (black arrow) with deposition of collagen fibers (blue arrow). H&S, 400X.

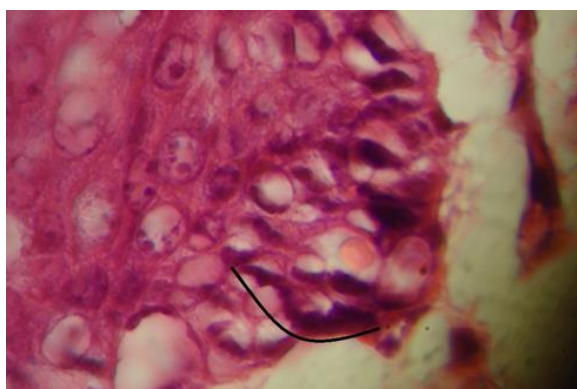


Figure (3): section of skin revealed presence of spores and hyphae (curved black line) between the cells of stratum basale layer of epidermis. H&E, 1000X.

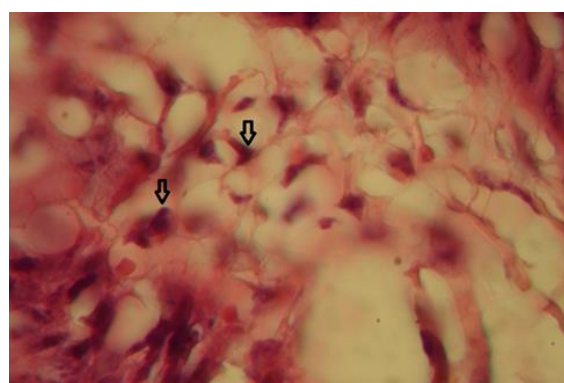


Figure (4): section of skin showed infiltration of eosinophilic cells in dermis layer beneath stratum basale layer. H&E, 1000X.

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