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 examine 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.

**التعابير النسيجية المرضية في جلد الكلاب البوليسية (كلب الراعي الألماني) المصاب بالقوباء الحلقية في مديرية الكلاب البوليسية في محافظة الديوانية**

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**الخاصة**

أجريت الدراسة الحالية لفحص التغيرات النسيجية المرضية للجلد في الكلاب البوليسية التي تعاني من خدوء القبواء الحلقية. ربما تكون هذه الدراسة الأولى على هذه السلالة من الكلاب في محافظة الديوانية. واستخدمت في هذه الدراسة سبع كلاب من نوع (كلب الراعي الألماني) هي كلاب بوليسية من مديرية الكلاب البوليسية في محافظة الديوانية (K9) كانت تعاني من آفات جلدية. جمعت العينات من آفات تلك الكلاب، وأخذ بعض الشعر من خلال نتف خصلة من الشعر في منطقة الافة باستخدام الملقط. زرعت عينة الشعر الملوثة وزيت عينة الشعر الملوثة والتي جمعت مسبقأ من الكلاب المصابة على وسط السابرويد. وأخذت زراعة عينة بحجم ملائمة من جميع الحالات من الأفاف الموجودة على منطقة الافة، وبعد أجراء عمليات التحالب النسيجية الروتينية، فحص التغيرات النسيجية المرضية في الجلد. وأظهرت نتائج الدراسة أن مستمرات البيولوجيا الكلبية ومستشرة ذات لون مائل من الأبيض الخافت إلى اللون الفاتح، مع سطح محبب إلى رقيق يحتوي على مظهر مشعر مع خلايا شعاعية، أما فيما يتعلق بالتغيرات النسيجية المرضية للجلد فقد أظهرت وجود فرط التقرن والاختلاط في منطقة البشرة ونوعية ملحوظة في敢مة باطن الجلد، مع تراكم أنابيب الخرازيم كما وجدت خيوط و أرواف الفطر في خلايا الطبقة القاعدية من البشرة مع ارتشاح خلايا الحمضات في طبقات الأدمة مباشرة تحت الطبقة القاعدية. تتراكم باطن الجلد.

**الكلمات المفتاحية:** التغيرات النسيجية المرضية للجلد، عدوى القبواء 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. A very large group of keratinophilic 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 transmissible to animals and humans and cause a worldwide health problem \(^{(3)}\). Dogs and cats can 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 factor 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 zoophilic strains \(^{(6)}\).

**Materials and methods**

**Scraping:** Seven German shepherd dogs from directorate of K9 in Al-Diwaynia 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 ºC \(^{(7)}\).

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 (figure4) 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\textsuperscript{(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 \textit{M. canis}\textsuperscript{(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.

References


