

CLINICAL AND THERAPEUTIC STUDIES ON DERMATOPHILOSIS OF SHEEP AND GOATS IN QUASSIM, KINGDOM OF SAUDI ARABIA

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ABSTRACT

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This study was conducted in Qassim region, central of Saudi Arabia to study the clinical signs associated with dermatophilosis in sheep and goats with therapeutic trials using two treatment regimes. Diagnosis of dermatophilosis was based on the appearance of the characteristic skin lesions on the affected animals and demonstrating the causal organism from the lesions beneath the scabs. Clinically, the examined diseased sheep and goats showed lesions in the form of exudative dermatitis and formation of thick greasy scabs. These lesions were mainly observed on the back of the infected animals. All cases were detected during November, December and January (2013 and 2014). Treatment of the infected animals using long acting oxytetracycline, 3 doses 3 days apart gave the same results as penicillin plus streptomycin administered for five consecutive days. From the technical point of view, it is recommend that long acting oxytetracycline, 3 doses 3 days apart are less demanding than penicillin plus streptomycin for five consecutive days.

Key words: Sheep; Goats, Dermatophilosis, Signs, Treatment.

INTRODUCTION

Dermatophilosis is an acute, subacute or chronic skin disease affecting primarily in cattle, small ruminants, equidae, humans and certain non-domesticated species. It is caused by a gram positive bacteria of the order of the Actinomycetales named *Dermatophilus congolensis* (*D. congolensis*). (Dickson *et al.*, 2010). The disease is non-pruritic, and is characterized by exudative, proliferative or hyperkeratotic dermatitis, accompanied by the production of crusts and folliculitis (Zaria, 1993). Several factors are involved in the pathogenesis of dermatophilosis; among them are mechanical injury to the skin, rainfall, tick infestation, concurrent diseases and/or stresses that compromise the host's immune system (Yeruham *et al.*, 1995; Amabrose, 1996).

Diagnosis of dermatophilosis is mainly based on the appearance of the characteristic skin lesions and confirmed by the demonstration of the causal organism from the lesions beneath the scabs (Gebreyohannes and Gebresselassie, 2013). From economic point of view, Poor quality hides (Woldemeskel, 2000 and Norris *et al.*, 2010), low meat production and decrease in milk production

(Dalis *et al.*, 2007) with losses of body condition (Wilkinson, 1979) are the major economic losses associated with dermatophilosis. Moreover, the disease plays a role in public health and can be transmitted to human (Harman *et al.*, 2001; Burd *et al.*, 2007; Dalis *et al.*, 2010 and Dickson *et al.*, 2010). The aims of the present study were to study the clinical signs of Dermatophilosis in sheep and goats located in Quassim, Saudi Arabia. and therapeutic trials of infected cases.

MATERIALS and METHODS

Animals and samples collection:

In Veterinary Teaching Hospital, Qassim University, Central of Saudi Arabia, 20 cases of *D. congolensis*—infected animals (10 sheep and 10 goats) were studied. They were come from different localities and are reared in flocks. Heavy scabs were collected in clean sterile petri-dishes for microscopic detection and isolation of *D. congolensis*. Parasitological and mycological examinations were also carried out for the collected samples.

Clinical examination:

All animals under study were subjected to careful clinical examination.

Skin scraping for parasitological examination:

Deep skin scrapings were collected from the edges of suspected active lesions of the affected skin was carried as described by Fowler (2010).

Mycological examination:

The scraped materials were divided into two parts; the first was subjected to direct microscopic examination for detection of dermatophytes spp. and the second for culture on Sabouraud Dextrose Agar Media (SDA) supplemented by chloramphenicol and cycloheximide. The media kept at 27°C for 3 - 4 weeks (Quinn *et al.*, 1994).

Bacteriological Examination for detection of *Dermatophilus congolensis*:

1 - Impression smears: Multiple impression smears were taken, prepared and stained by Giemsa stains and microscopically examined (Quinn *et al.*, 1994; OIE 2004).

2- Culturing of *D. congolensis*: It was collected samples were cultured on sheep blood agar using the procedures described by Haalstra (1965) and OIE (2004).

Therapeutic trials:

Diseased animals were divided into two main groups each of 5 sheep and 5 goats. The first group was treated using long acting oxytetracycline (Terramycin /LA®, Pfizer) 3 doses 3 days apart as deep intramuscular injection (1 ml/ 10 Kg B.W), each 1 ml. contains 200 mg oxytetracycline. Topical application of Povidone iodine 5% W/V (Iodosav spray, Saudi Pharmaceutical Industries) was sprayed daily for 10 days. The second group was treated using penicillin-streptomycin (Pen & Strep/ NorBrook Co.) administered by deep intramuscular once daily for 5 consecutive days at doses of 8 mg procaine penicillin and 10 mg dihydrostreptomycin sulphate per kg bodyweight achieved by administering 1ml Pen & Strep per 25kg bodyweight. Topical treatment was also sprayed as described. Heavy crusts were aseptically removed before treatment in both groups. Treated animals were moved to dry place. Ticks control was done in all groups and their environment using 200 µg /Kg BW Ivermectin (Ivomec, Merial) two subcutaneous injections, 15 days apart for the animals and 1/1000 Diazinon (Nucedol Ultra 60 EC,

Bioagripharm, Germany) two times, one week apart for the environment.

RESULTS

The results of parasitological and mycological examination of the examined skin scraping revealed no mites or dermatophytes. Also culturing on SDA media did not yield any fungal growth.

Bacteriologically, the characteristic colonies of *D. congolensis* was monitored post 24–48 hrs incubation as small, grey-yellow colour adhered to the surface of the agar. Three—days incubation, the colonies tend to become more wrinkled and the yellow pigmentation more intense. A zone of beta-hemolysis was observed around each colony. *D. congolensis* (Figure 1) had a characteristic microscopic appearance where it seen as septate, branching filamentous hyphae become longitudinally, as well as transversely, divided to form spherical cocci in multiple rows.

The observed clinical signs of diseased sheep and goats were illustrated in Figure 2a and 2b. The lesions may be localized or generalized according to the stage of the disease. Localized lesions mainly seen along the back of the animal from the withers to the rump and extend to the midlateral aspect. The lesions were in the form of exudative dermatitis and scabs formation. Wool or hairs were matted to each other to form paint brush appearance. Removal of these matted wool in the early stage of the disease revealed severe pain leaving bleed area beneath it but later and in old lesion, the wool were easily removed without pain. In generalized shin affection, the body condition of the animal was affected. All infected cases were occurred during November, December and January.

Concerning the efficacy of the therapeutic trials (Table 1), treatment using long acting oxytetracycline in addition to topical application of povidone iodine 5% gave the same cure rate as treatment using penicillin- streptomycin in addition to the same topical application. Clinical and bacteriological cures were achieved at the 4th week post treatment representing a 100% cure rate in both groups.

Table 1: Results of the treatment trials in the examined diseased animals

Treated group	No. treated animals	No. of cured animals at week (w)				Total No. of the cured cases	Cure (%)
		1 st (w)	2 nd (w)	3 rd (w)	4 th (w)		
First	10	1	4	2	3	10	100
Second	10	0	4	4	2	10	100

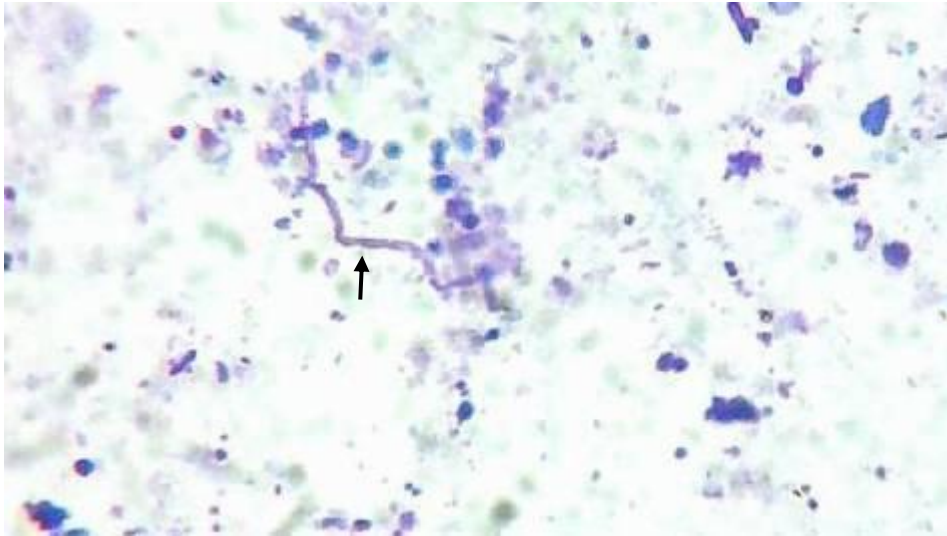


Fig. 1: Giemsa stained direct smear showing branched septated hyphae (The arrow) and zoospores of *Dermatophilus congolensis* (X 1000).



Fig. 2a (Goat) and 2b (sheep): Cutaneous lesions: remarkable exudative dermatitis with crusty wrinkled fissured skin lesion on head including ears (sheep) and dorsal view of goat particularly neck

DISCUSSION

In this study neither mites nor dermatophytes spp. were detected in the examined skin scraping of diseased animals. Also culturing on SDA media did not yield any fungal growth. Whereas, *D. congolensis* was detected in direct smears and identified via culturing on sheep blood agar with 10% CO₂ atmosphere. Similar colonial and microscopical characters were previously observed by Masters *et al.* (1997), Rapuntean and Rapuntean (2005), and Awad *et al.* (2008).

The observed clinical signs of diseased animals were exudative dermatitis and formation of thick greasy scabs. Similar lesions were observed previously by Gitao (1993), and Awad *et al.* (2008). In the epidermis, the bacterial hyphae that developed from the spores attack the hair sheath and produce an exudative inflammatory reaction, resulting in a bulging of the slow growing epidermis away from the corium, thereby allowing growth of a new layer of

epidermal cells (Seifert, 1992). Drying of the serous exudate forms a crust that is a distinguishing characteristic of this disease.

From epidemiological point of view, the development of dermatophilosis is facilitated by factors such as wetting and mechanical trauma of the skin by ectoparasites that reduce the defence barriers of skin (Zaria, 1993; Ambrose *et al.*, 1999). In the present study, all cases of the disease were observed during November, December and January months. This finding may be attributed to the heavy rains in Qassim region during this period. Similar results were previously reported by Zaria (1993) who mentioned that in the rainy season due to devitalizing effects of saturation on skin barriers, humidity has a remarkable influence in the maturation and motility of the infective zoospores and weather generally exerts complex biological effects on the prevalence and activity of the arthropod vectors. Also, the hyphae produce motile spores (zoospores) that are predominantly released during the rainy season and

are transmitted either by direct contact or by vectors (ticks, flies).

Therapeutically, treatment of the infected animals using long acting oxytetracycline was not differed significantly from treatment using penicillin-streptomycin. Clinical and bacteriological cures were achieved at the 4th week post treatment representing a 100% cure rate in both groups. Previously, Ilemobade (1984), Aning and Koney (1996), Awad *et al.* (2008), Nath *et al.* (2010) and Gebreyohannes and Gebresselassie (2013) reported the efficacy of long acting oxytetracyclines in the treatment of animal dermatophilosis. Also Gbodi and Ndife (1982), Rosyehuk (1989), Yeruham *et al.* (1995), Reed *et al.* (2004) and Aitken (2007) proved the efficacy of penicillin in the treatment of animal dermatophilosis.

Gebreyohannes and Gebresselassie (2013) mentioned that the topical treatment had limited efficacy in the treatment where these application did not penetrate the scab to the active lesion and were more appropriate for control. Also Dickson *et al.* (2010) reported that the application of topical antiseptics was of questionable value because the drug had no action on the hyphae found inside woolly follicles; nevertheless they do contribute to reduce the spread of the infection through the destruction of the organisms present in the crusts.

It is concluded that, dermatophilosis in sheep and goats showed lesions in the form of exudative dermatitis and formation of thick greasy scabs. Treatment using long acting oxytetracycline, 3 doses 3 days apart or penicillin-streptomycin for 5 days and keep treated animals in dry place gave 100% cure rate after 4 weeks. There were no differences between two drugs. From the technical point of view, it is recommend that long acting oxytetracycline, 3 doses 3 days apart are less demanding than penicillin plus streptomycin for five consecutive days.

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دراسات إكلينيكية وعلاجية عن داء المجتلدات في الأغنام والماعز بالقصيم - المملكة العربية السعودية

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تم إجراء هذه الدراسة بمنطقة القصيم بالمملكة العربية السعودية لدراسة الجوانب الإكلينيكية المتعلقة بداء المجتلدات في الإغنام والماعز بالإضافة إلى تقييم كفاءة بعض طرق العلاج. تم تشخيص هذا المرض عن طريق الأعراض الإكلينيكية المميزة للمرض تزامنا مع الكشف عن وجود الميكروب المسبب. تميزت الحالات المريضة بظهور التهابات جلدية مصحوبة بأفات جلدية دهنية سميكة لوحظت بشكل رئيسي على الجزء الخلفي من الحيوانات المصابة. كان ظهور معظم الحالات المرضية في خلال أشهر نوفمبر وديسمبر ويناير. أعطى عقار الأوكسي تتراسيكلين طويل المفعول نفس الكفاءة التي أعطتها عقار البنسلين والستربتومييسين في علاج الحيوانات المريضة. تقنيا، من المستحسن استخدام أوكسي-تتراسيكلين طويل المفعول لقلّة عدد الجرعات وبالتالي عدد أيام العلاج