

# CAMEL DERMATOPHILOSIS: CLINICAL SIGNS AND TREATMENT OUTCOMES

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## ABSTRACT

This study was conducted to study the clinical signs associated with dermatophilosis infection in 9 dromedary camels in addition to study some trials for treatment. Diagnosis of Dermatophilosis was done based on clinical appearance of the lesion on the affected animal and demonstrating the causal organism from the lesions beneath the scabs. Clinically, diseased camel showed lesions in the form of exudative dermatitis, thick greasy scabs and long hairs were collected to form paint brush in some areas. Removal of these hairs in the early stage of the disease revealed severe pain leaving bled area beneath it but later and in old lesion. All infected camels were heavily infested with ticks. Treatment of dermatophilosis using long acting oxytetracycline, 2 doses 3 days apart, in addition to oral administration of potassium iodide 10 gram daily for 10 days gave 100% cure rate, whereas camels treated with long acting oxytetracycline alone gave 66.67% cure rate. Tick control in infected animals and environment is indicated to minimise the risk of dermatophilosis. Also, vitamin A and mineral supplementation is necessary to obtain fast cure rate.

**Key words:** Dermatophilosis, dromedary camel, signs, treatment

*Dermatophilus congolensis* infection (dermatophilosis) is an acute, subacute or chronic skin disease affecting a wide range of species of animals and man. *Dermatophilus congolensis* is an aerobic, actinomycetes, gram-positive bacteria that produces motile zoospore which invades the skin and causes an acute, subacute or chronic skin disease known as dermatophilosis, resulting in an exudative epidermitis with scab formation (Zaria, 1993).

Dermatophilosis has worldwide distribution and the disease is reported most frequently in relatively low altitude areas with tropical and subtropical climates with high ambient temperature and torrential rain patterns. Diagnosis of dermatophilosis can be made based on clinical appearance of the lesion on the affected animal and demonstrating the causal organism from the lesions beneath the scabs (Gebreyohannes and Gebresselassie, 2013).

The economic losses of dermatophilus infection is attributed to the poor quality of hides (Woldemeskel, 2000), low meat production, decrease in milk production (Dalis *et al*, 2007) and decrease in lactation due to lesion on the udder and teats which ultimately affects the growth of suckling

calves (Edwards, 1985). In addition to its economic importance, 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).

The aim of the present study was directed to study the clinical signs associated with dermatophilosis in dromedary camels in addition to study some trials for treatment.

## Materials and Methods

A total of 9 dromedary camels, with exudative dermatitis of different ages and sexes submitted to Qassim University Veterinary Teaching Hospital, were used in this study. Heavy scabs were collected in clean sterile petri-dishes for isolation of *D. congolensis*, in addition to skin scrapings and hairs for parasitological examination and mycological examination.

All camels under study were subjected to clinical examination according to the method described by Rosenberger (1979).

Deep skin scrapings were collected from the edges of suspected active lesions of the affected skin with the help of a sharp scalpel in a Petri dish. It was carried out according to the method

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described by Fowler (2010). Briefly, each scraping was placed in a test tube with 5 ml of distilled water and KOH 15% and heated gently until hair and epidermal scales were completely dissolved. These were centrifuged at 10 g for 10 minutes; the sediment was suspended in distilled water, recentrifuged and the new sediment was suspended in saturated sucrose solution and centrifuged again. Mites were removed from the top of the solution and examined under a stereoscope microscope for the presence of various stages of mites

The scraped materials were divided into two parts; the first was subjected to direct microscopic examination for detection of dermatophytes spp. Fungal spores may be observed clinging to hairs when viewed microscopically at 100×, and irregular, septate hyphae may be identified. and the second for culture on Sabouraud Dextrose Agar Media (SDA) with chloramphenicol and cyclohexidine. The media kept at 27°C for 3 weeks.

### **Bacteriological Examination for detection of *Dermatophilus congolensis*:**

#### ***Impression smears:***

Small pieces were collected from the layers of skin beneath the scab and softened in few drops of sterilised normal saline on a clean microscope slide. Smears were then air-dried, fixed by heating or immersion in methanol for 5 minutes and stained by 1 in 10 dilution of Giemsa stain for 30 minutes (Quinn *et al*, 1994; OIE Terrestrial Manual, 2008).

#### **Culturing of *D. congolensis*:**

It was done according to the method described previously by Haalstra (1965). Briefly, a small amount of scab material was grinded up, placed in a screw capped bottle, moistened with one ml sterilised distilled water and allowed to stand open for 3 and half hours on the bench. Then the opened bottle transferred to candle jar with a candle was burned within the jar to obtain 10- 20% CO<sub>2</sub> tension (so the motile zoospores were chemotactically attracted to the CO<sub>2</sub> enhanced atmosphere and move to the surface of distilled water). After 15 minutes, the bottle was carefully removed and drop taken from the water surface with a bacteriological loop and seeded on sheep blood agar plates which incubated at 37°C in 20% CO<sub>2</sub> tension for 24 to 48 hours. Colonial morphology and growth characteristics of the organism were examined on blood agar plate grows aerobically at 37°C for 24 hours (OIE, 2004).

### ***Therapeutic trials:***

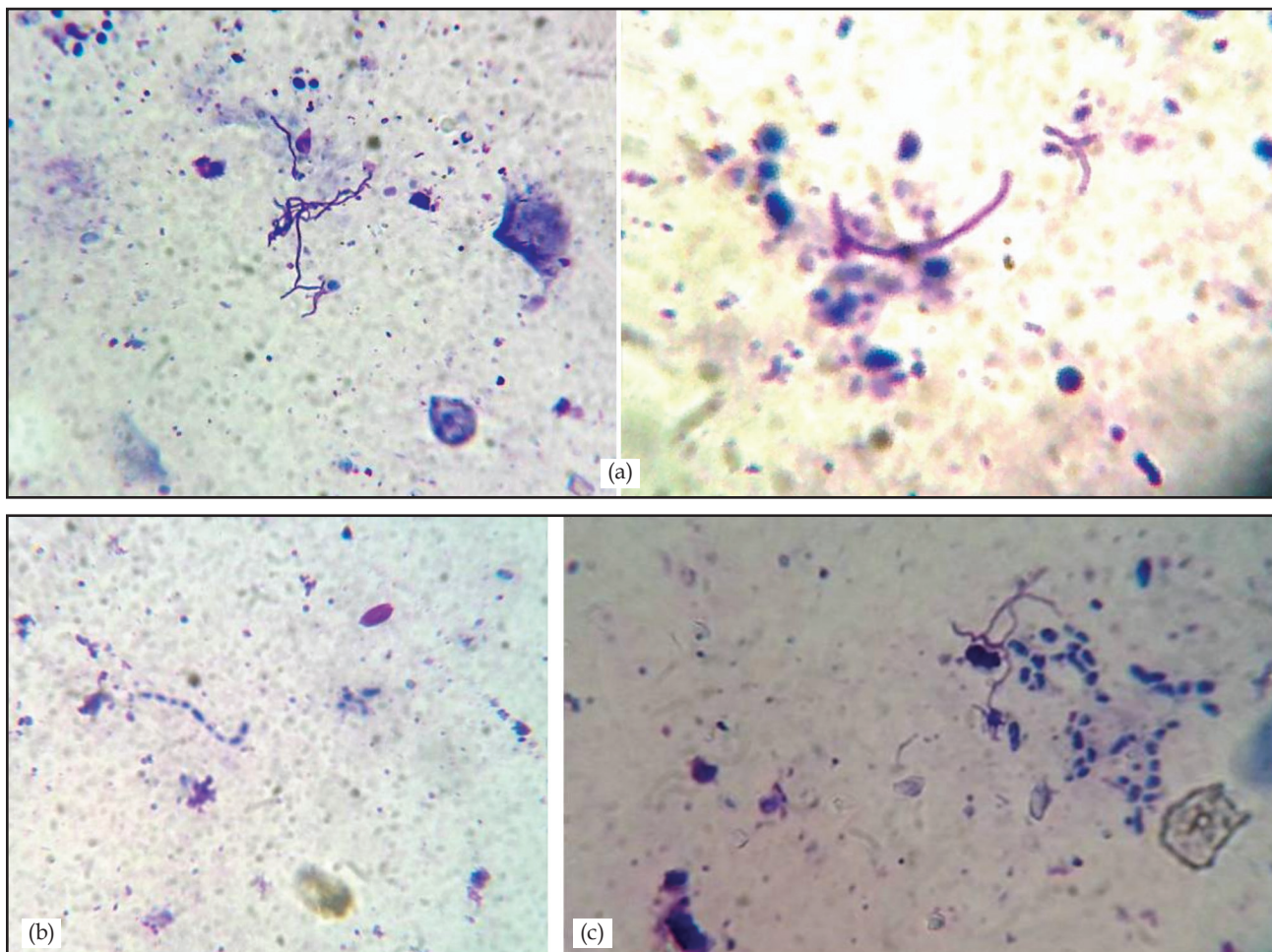
Diseased camels were divided into three main groups each of 3 animals. The first group was treated using long acting oxytetracycline (Terramycin /LA®, Pfizer) 2 doses 3 days apart as intramuscular injection (1 ml/ 10 Kg B.W. with maximum dose 30 ml/ animal), each 1 ml. contains 200 mg oxytetracycline, in addition to oral administration of potassium iodide 10 gram daily for 10 days. The second group was treated using long acting oxytetracycline alone. The third group was left without treatment as control group. In addition, all groups were supplemented with vitamin A (100.000 I.U./animal) 3 times as intramuscular injection one day apart in addition to mineral mixture as dietary additives for the length of the experiment. Also crusts were removed and hairs were clipped before treatment in both groups. Ticks control was done in all groups and their environment using ivermectin (Ivomec, Merial) and diazinone.

### **Results**

Concerning parasitological and mycological examination of the skin scraping, neither mites nor dermatophytes were detected. Also culturing on sabouraud dextrose agar media did not yield any fungal growth. Whereas, *D. congolensis* (Fig 1) had a characteristic microscopic appearance where it was seen as septate, branching filamentous hyphae become longitudinally, as well as transversely, divided to form spherical or ovoid cocci in multiple rows.

On sheep blood agar incubated at 37°C and 10-20% CO<sub>2</sub> atmosphere. The colonies of *D. congolensis* appeared within 24-48 hours as small, grey-yellow colour adhered to the surface of the agar. After incubation for 3-4 days the colonies tend to become more wrinkled and the yellow pigmentation more intense. A β-hemolytic zone was observed around the colonies.

Clinically as shown in Fig 2, all diseased camels showed lesions in the form of exudative dermatitis, thick greasy scabs and long hairs were collected to form paint brush in some areas. Removal of these hairs in the early stage of the disease revealed severe pain leaving bleeding area beneath it but later and in old lesion, the hairs were easily removed without pain. The lesion may be localised or generalised according to the stage of the disease. Untreated cases were characterised by generalised spread of the lesions. Body condition was affected by the disease. Appetite of the animals was not affected. All infected calves were heavily infested with ticks (Fig 3).



**Fig 1.** Giemsa stained direct smear from underneath a scab of a dromedary showing branched septate hyphae (a), clustering (b) and zoospores (c) of *Dermatophilus congolensis* (X 1000).

Concerning treatment efficacy (Table 1), out of the treated three camels infected with dermatophilosis using long acting oxytetracycline, 2 doses 3 days apart as intramuscular injection (1 ml / 10 Kg B.W. with maximum dose 30 ml / animals), in addition to oral administration of potassium iodide 10 gram daily for 10 days, three camels were cured clinically and bacteriologically at the 4th week post treatment representing a 100% cure rate.

In the second group which treated using long acting oxytetracycline alone, two camels were cured clinically and bacteriologically at the 4th week post treatment representing a 66.67% cure rate.

**Table 1.** Results of the treatment trials in diseased camels.

Treated group	No. of treated animals	No. of cured animals at week no.				Total cured animals	% of total cured animals
		1	2	3	4		
First	3	0	1	1	1	3	100
Second	3	0	0	1	1	2	66.66
Third (control)	3	0	0	0	0	0	0

## Discussions

Dermatophilosis is considered one of the most common three diseases affecting camel (*Camelus dromedarius*) dairy farm in Al-Qassim region, central part of Saudi Arabia (18.7%) after mange (22.6%) and camel mastitis (20.9%) (Agab, 2006).

Dermatophilosis occurs primarily in cattle, small ruminants, equidae, humans and certain non-domesticated species such as the zebra and red deer. Dermatophilosis is transmitted to man by contact with infected animals (Dickson *et al*, 2010).

In this study neither mites nor dermatophytes were detected in the examined skin scraping of



Fig 2. Dermatophilosis in dromedary camel showing crusts, exudates and matted hairs.



Fig 3. Camel heavily infested with ticks (Different stages of life cycle).

the diseased camels. Also culturing on sabouraud dextrose agar media did not yield any fungal growth. Whereas, *Dermatophilus congolensis* was detected in direct smears and identified via culturing on sheep blood agar with 10% CO<sub>2</sub> atmosphere. Similar colonial and microscopical characters were previously observed by Masters *et al* (1997); Rapuntean and Rapuntean (2005), Radostits *et al* (2007) and Awad *et al* (2008).

The clinical signs observed were exudative dermatitis, thick greasy scabs and long hairs form paint brush in some areas. Similar signs were recorded previously by Gitao *et al* (1990), Gitao (1992), Gitao (1993), Radostits *et al* (2007) and Awad *et al* (2008). The hyphae developing from the spores in the epidermis attack the hair sheath. This causes 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. The crusts can be removed, revealing a wet reddish area that secretes

a thick, blood contaminated exudate (exudative dermatitis) (Losos, 1986). 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).

Treatment of dermatophilosis using long acting oxytetracycline, 2 doses 3 days apart, in addition to oral administration of potassium iodide 10 gram daily for 10 days gave 100% cure rate, whereas, camels treated with long acting oxytetracycline alone gave 66.67% cure rate. Ilemobade (1984) reported 90% efficacy of oxytetracycline in the treatment of dermatophilosis. Aning and Koney (1996) recorded high efficacy of oxytetracycline /LA for the treatment of bovine dermatophilosis. Tetracycline (5mg/kg body weight (bw)) repeated weekly as required is recommended and long acting oxytetracycline (20mg/kg bw) in one injection is recommended (Radostits *et al*, 2007). Awad *et al* (2008) found that the treatment of bovine and ovine dermatophilosis using 2 doses of oxytetracycline LA with one day apart revealed 85.7% and 100% cure rates, respectively, whereas using single dose of oxytetracycline /LA revealed 71.4% and 80% cure rates, respectively. Also, topical application of povidone-iodine and parental injection of oxytetracycline revealed 100% and 66.7% cure rates, respectively for treatment of equine dermatophilosis. Nath *et al* (2010) found that long acting oxytetracycline and alum combined therapy is very effective than the other treatment in case of dermatophilosis. Gebreyohannes and Gebresselassie (2013) mentioned that parenterally administered antibiotics such as long acting oxytetracyclines are usually effective in the treatment of animal dermatophilosis.

All infected calves were heavily infested with ticks. Similar results were recorded by Kassaye *et al*

(2003); Admassu and Alemu (2011) who recorded an association between ticks and *Dermatophilus congolensis* infection. Msami *et al* (2001) involved the mechanical injury to the skin and tick infestation involved in the pathogenesis of *Dermatophilus congolensis* infection. So, with the disease that occurs in tropical areas and associated with tick infestation parenteral treatment with antibiotics, can be used and should be used in conjunction with acaricides (Stewart, 1997).

It has been observed that in herds or areas where tick control measures are effective, the disease either does not occur or its incidence and severity are diminished (Samui and Hugh-Jones, 1990; Koney and Morrow, 1990). This observation is additional evidence of the involvement of ticks in the transmission and the spread of the disease. But, in contrast no significant reduction was observed in the incidence of the disease on a farm in Nigeria where tick control measures were in practice (Oduye, 1976). On the other hand, in Cameroon, it was observed that the incidence of the disease varied according to tick control and a significant reduction was noted in the incidence of the disease through tick control in rainy season but not in dry season (Tanya and Sallah, 1985).

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).

A severe, progressive, chronic form of the disease in cattle is associated with infestations of the ixodid tick *Amblyomma variegatum* (but not with other *Amblyomma* species), as indicated by the similar seasonal occurrence (Norval, 1986; Koney *et al*, 1994).

Zaria (1993) mentioned that in the rainy season due to devitalising 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.

In addition, all groups were supplemented with vitamin A (100.000 I.U./animal) 3 times as intramuscular injection one day apart in addition to mineral mixture as dietary additives for the length of the experiment. Also crusts were removed and hairs were clipped before treatment in both groups. Tick control were done in both groups their environment using ivermectin and diazinone.

Finally it can be concluded that dermatophilosis in dromedary camels is better treated using long acting oxytetracycline, 2 doses 3 days apart, in addition to oral administration of potassium iodide 10 gm daily for 10 days. Also, vitamin A and mineral supplementation is necessary to obtain fast cure rate. Moreover, tick control in infected animals and their environment is indicated to minimise the risk of the disease.

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