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DERMATOPHYTOSIS IN A NOMADIC CIRCUS CAMEL AND ITS MANAGEMENT WITH MICONAZOLE THERAPY

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ABSTRACT

The present study reports the incidence of dermatophytosis in a circus dromedary aged about 2.5 years with emphasis on clinical signs, laboratory examination and treatment. Camel had skin problem persisting for a month. Skin scrapings were collected from the affected camel and examined by direct microscopy method and cultural examination for isolation and identification by standard protocols. It documented the presence of superficial dermatophyte - *Trichophyton* spp skin infection in the affected camel. The camel was treated with Miconazole topical therapy combination and it resulted in an initiation of recovery by 7th day and complete recovery was reported by fourth week.

Key words: Dromedary camel, dermatophytosis, miconazole therapy

Skin diseases contribute to one of the major problems in camel, having various causes such as bacteria, viruses, parasites, fungus, yeast, tumour and allergies (Shokri and Khosravi, 2011). Among them fungal, i.e. infection, dermatophytosis caused by dermatophytes, is considered to be one of the most important contagious and zoonotic disease (Ghoke *et al,* 2006) that can spread among animals via direct physical contact with infested animal and indirectly through contaminated fomites (Ganguly *et al,* 2017b). Mohammadpour *et al* (2020) reported that camels are one of the important carriers and source of infection for human, livestock and wildlife in Iran.

Dermatophytes are keratolytic fungi which invade keratinised *Stratum corneum* of the epithelial skin layers and its appendages like hair, feather, horn and nail, causing mild to severe, localised and/or diffuse infections (Sabra and Al-Harbi, 2015). The infected animals usually have roughly circular patch with hair loss and the skin becomes thickened, flaky, crusty and greyish in colour (Wisal *et al,* 2010). Dermatophytes infection is more prone in immune compromised animals where the incidence is high in young camels less than three years of age (Wisal *et al,* 2010, Ganguly *et al,* 2017a). The long haired skin of the camel gives proper habitat for the growth of dermatophytes (Baghza *et al,* 2016). Though camels are often potential carriers of these microorganisms, for which little information has been documented (Ganguly *et al,* 2017a). The present study documented the incidence of dermatophytosis in nomadic circus camel and its effective management using Miconazole topical therapy.

Materials and Methods

Case history and clinical examination

A male nomadic circus camel aged about 2.5 years was presented to the Large Animal Medicine Referral Clinic of the Veterinary College and Research Institute, Orathanadu, with the history of skin disease since last 30 days. There were crusty hairless areas distributed over the head, neck, shoulder, flank, limbs and perineal region. The camel was having its normal feed intake, rumination, defecation, and urination. Dermatological examination revealed dry, odourless, greyish-white, round, circular to irregular patches of hair less areas, which were little raised above the skin and were seen with powdery scales

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on the skin (Fig 1). Cotton swabs soaked in 70% alcohol were used to sterile the infected area prior to sample collection. Skin scrapings were collected from the lesions by using sterile scalpel blade in Petri dish. Blood samples were collected through jugular vein in vials containing EDTA as an anticoagulant. Haematological parameters were assessed as per the standard methods (Coles, 1986).

Mycological Evaluation

a. Direct microscopic examination

A part of the collected skin scrapings in 20% Potassium Hydroxide (KOH) was placed on a clean glass slide to digest the keratin material. This was then covered with a clean glass and gently heated for one minute without boiling. This was stained with lactophenol-cotton blue and microscopically examined under a light microscope using low and high power magnifications, for the presence of fungal elements of arthropores and hyphae.

b. Mycological culture

A part of the skin scrapings was inoculated with Sabouraud's dextrose broth and incubated at 35°C for 72 hours and then streaked onto Sabouraud's dextrose agar containing Chloramphenicol (0.05mg/ml) and Actidione (0.5mg/ml) by spread plate method of culturing, to obtain colonical structure (Weitzman and Summerbell, 1995; Enany *et al,* 2013). Isolated dermatophytes were identified on the basis of the rate of growth and gross morphology of the colony and on the microscopic features of the fungal isolates as per standard protocols (Frey *et al*, 1979). Briefly, a drop of lactophenol cotton blue stain was placed on a clean glass slide with a portion of mycelium and the cover slip was placed and examined under low and high power magnifications. The culture plates were discarded after incubation at 27°C for four weeks as described by Robert and Pihet (2008).

Clinical Management

The camel was treated with the topical application of a cream containing 2% of Miconazole nitrate (Globe Miconozole nitrate 2% cream Antifungal, Hargraves online Health care), 10% Iodine ointment along with Zinc oxide ointment on alternate days for four weeks. These were applied after removal of skin crusts in the affected areas. Additional supplementation of Vitamin A and mineral mixtures were administered orally daily for four weeks. The animal showed uneventful recovery after four weeks.

Results and Discussion

In present study the direct examination of clinical specimens in 20% potassium hydroxide (KOH) under light microscope revealed delicate blue hyphae with fruiting structure in pale blue background morphologically to dermatophytes (Fig. 2). The fungal colonies were obtained on Sabouraud's dextrose agar with Chloramphenicol and Actidione, and it revealed the presence of characteristic colonies of *Trichophyton* spp. with white to gray coloured, small and button shaped colonies with incubation at 35°C for 72 hours (Ganguly *et al,* 2017a). This confirmed the diagnosis in this study. Haematology values showed no significant abnormalities. The results of this study found that the *Trichophyton* fungus is the causative agent of this camel's skin problem. This was in accordance with the previous reports which observed that the Trychophyton spp. is the most common dermatophyte that affects camels (Wisal *et al,* 2010; Baghza *et al,* 2016;

Fig 1. Greyish-white, round, circular to irregular patches on the neck region of nomadic camel.

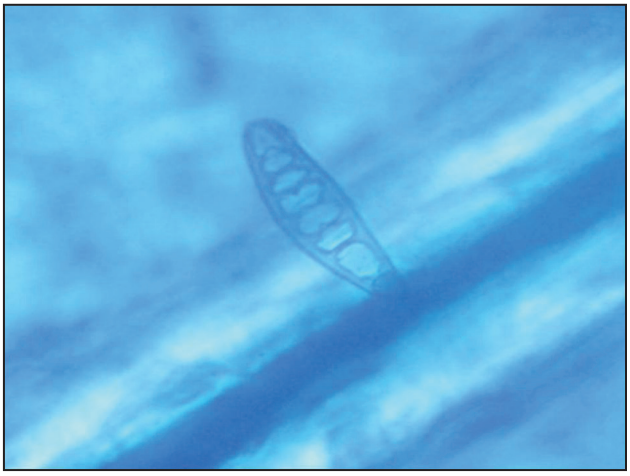

Fig 2. Hyphae of *Trichophyton* spp.

Almuzaini *et al* (2016)). Kuttin *et al* (1986) reported that *Trichophyton* fungi were responsible for the majority of camel's infection since the camels' hair are presented with a suitable substrate for the growth of Trychophyton spp. as compared with human and bovine hair. The main clinical symptoms observed in the affected camel were dry, grayish-white, thick crusty lesions perceptibly raised above the skin on head, neck shoulder, flank and perineal regions. These observations were in accordance with Kuttin *et al* (1986) and Baghza *et al* (2016) who observed that majority of the animals had rounded dark skin lesions on the head, neck and shoulder of the body. Tuteja *et al* (2013) reported the lesions of ring worm with *Trichophyton* spp. which were comparatively dry, hard, crusty, granulomatous and larger in size.

The treatment of this camel with Miconozole cream, 10% Iodine ointment and Zinc oxide ointment along with nutritional supplementation with vitamin A and minerals resulted in early recovery by 7th day of therapy and an uneventful recovery was observed by fourth week. Similar treatment strategies were recorded earlier by Almuzaini *et al* (2016) who reported that *Trichophyton* infected camels were effectively treated with 10% topical iodine ointment and vitamin A supplement. Fowler (2010) also reported that mineral and vitamin supplementation could be administered for effective treatment of ringworm infection. However, use of Miconazole in camels was not reported so far. Possibly the early recovery observed by 7th day of therapy could possibly be due to the inclusion of Miconazole in the treatment. In previous studies the recovery was reported to occur from 20 to 40 days.

In this study the *Trichophyton* was identified from a young camel which was below three years of age. This finding was in concurrence with Al-Ani *et al* (1995), Wisal *et al* (2010) and Ganguly *et al* (2017a) who isolated *Trichophyton* from young camels and observed that they were at greater risk for dermatophytosis. Abdella (2019) reported *Trichophyton verrucosum* is the most common dermatophytes species isolated from camel. Abbas and Omer (2005) quoted that dermatophytosis occurs commonly in young camels while camels above four years of age are apparently immune. The susceptibility of this young camel is probably due to the low immunity of young camels coupled with stress due to its nomadic lifestyle based survival. Naturally camels are exposed to severe stress conditions which render them susceptible to many diseases including fungal disease (Almuzaini *et al,* 2015) and hence in this study, the stress due to continuous usage for performing in circus, frequent transportations and environmental stress, all could have added it. The warm and humid climate prevailing in the study area could also have favoured the growth of these fungal spores. This was in accordance with Shokri and Khosravi (2011) who reported that warm-humid climates are good conditions for sporulation of the fungi and their consequent spread in the environment. Mixed infection with sarcoptic mange is also a predisposing factor for occurrence of dermatophytosis in camel (Al-Salihi *et al,* 2013).

There is very limited number of studies available on dermatophytosis in nomadic camels (Pal, 2016). As dermatophytes has been confirmed as a common cause of ringworm infection in human (Weitzman and Summerbell, 1995), animal handlers may be infected through a direct contact with such infected camel or indirectly through contaminated materials. This needs to be effectively addressed while handling such affected camels.

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