

# CUTANEOUS ALTERNARIOSIS IN DROMEDARY CAMEL

F.C. Tuteja, S.K. Ghorui and S.D. Narnaware

National Research Centre on Camel, Jorbeer, Shivbari, P.B. 07, Bikaner 334001, Rajasthan, India

## ABSTRACT

Cutaneous alternariosis is an infectious disease mainly of camel calves of approximately one year of age and the incidence decreases with the advancement of age. Survey in densely camel populated areas revealed that the disease is present in all seasons with increase in rate towards the end of autumn and early winter. The disease occur more frequently in semi arid than arid region of the state. Lesions of the disease are found anywhere on the body including the lips and udder. This disease may be quite confusing with other dermatophyte infections. Repeated culture of skin scrapings lead to isolation of *Alternaria alternata*. As ethnoveterinary treatment either sulphur in mustard oil or leather ash in ghee (butter fat in India) is applied by the farmers. After removal of skin scrapings, topical application of an ointment containing sulphur, salicylic acid and mustard oil gave encouraging results.

**Key words:** Alternariosis, camel, cutaneous

Three skin infections are often observed in the field, are locally termed as *Thikria*, *Tat ki bimari* and *Kharas*. Further survey work also revealed the regular occurrence of these skin infections in camels. In previous study on skin candidiasis was described in dromedary camel calves (Tuteja *et al*, 2010). Since during early winter when camel start growing fur and Tat ki Bimari disease starts, in which skin resembles tat that is why farmers call it as tat ki bimari\*.

Cutaneous alternariosis is an infectious disease mainly of camel calves of approximately one year of age and the incidence decreases with the advancement of age. Disease is present in all seasons with increase in rate towards the end of autumn and early winter and occurs more frequently in semi arid than arid region. Lesions of the disease are found anywhere on the body including the lips and udder. Culture of skin scrapings lead to isolation of *Alternaria alternata*. There are records documenting the ringworm in camels (Connole, 1975; Fadlelmula *et al*, 1994 and Alhendi *et al*, 1998). Kuttin *et al* (1986) found that more than 25 per cent of younger camels suffer from dermatomycosis. As grossly observed condition in field camels this disease was briefly investigated and observations were recorded.

## Materials and Methods

Survey work was carried out in four thickly camel populated districts viz. Bikaner, Jaisalmer, Hanumangarh and Udaipur of Rajasthan state.

\*Vernacular word 'Tat' means 'a fibre carpet', 'Ki' means 'of' and 'bimari' means 'disease'.

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Information was recorded regarding prevalence and type of disease and the relevant practices adopted by the farmers. Clinical samples for diagnosis of various infectious diseases were also collected.

## Collection and processing of skin samples

Skin tissue samples were collected from 12 infected camels. Lesions were first cleaned properly to remove all the debris, and then the site was wiped with swabs soaked in 70 per cent alcohol. Skin tissues from peripheral active site of the lesion were cut with sterilised scissors and scalpel. These samples were collected in sterile vials meant for sterile collection of clinical samples. Then these samples were transferred to the laboratory in thermocol box packed with brine packs. While collecting samples lesions were also observed for colour, consistency and thickness of necrosed tissue.

Direct microscopic examination was performed by placing the scrapings on a glass slide with two or three drops of 20% potassium hydroxide and placing a cover slip over it. The sample was warmed for five minutes over a flame and was then carefully examined microscopically for the presence of hyphae and/or arthroconidia. Each scraping was cultured onto Sabourauds dextrose chloramphenicol agar. The plates were incubated at 28°C for up to four weeks and were observed daily for fungal growth. Fungal isolates were subcultured onto plates of Sabouraud's dextrose



Fig 1. Hyperkeratinised lesions on abdomen (1), thighs (2), neck (3), lips (4), udder (5) and colony of *Alternaria* on SDA (6).

chloramphenicol agar. The isolates were examined visually and microscopically for morphology of fungi using lactophenol cotton blue stain.

### Treatment

Four severely affected cases of calves of approximately one year of age were selected at the farmers field. Initially entire dead tissue was removed by scraping, then an ointment containing sulphur- 6 gm, salicylic acid- 3 gm and mustard oil 100 ml was applied on the affected skin daily for seven days.

### Results and Discussion

Lesions of the disease were observed throughout the body including the lips and udder. Lesions initially starts as small raised areas which gives roughness of the affected skin then there appears a slight whiteness at the top of the raised area. Lesions may enlarge to more than 10 cm in size, enlargement of the lesions occur in centrifugal manner and later the lesions may coalesce. During development of the lesions necrosis



Fig 2. Microscopy of *Alternaria alternata* (40x lacto phenol cotton blue stain).

follows alopecia. The general presentation is a regular and circular alopecia with erythematous margin and a thick desquamation. Finally the lesions are observed as white dry areas. Scraping the lesion with scalpel reveals skin necrosis just like a layer of granular

lime deposit about half centimetre in thickness. In untreated cases it causes itching, uneasiness and may lead to bleeding and ulceration which results in weakness and debility of calves (Fig 1)

Survey in thickly camel populated areas revealed the more prevalence of this disease in semi arid climatic conditions (Udaipur and Hanumangarh) whereas this disease is rarely observed in arid climatic conditions (Bikaner and Jaisalmer). The disease was recorded in all seasons with increase in incidence towards the end of autumn and early winter. It causes morbidity in young calves in terms of reduced weight gain.

Repeated culture of skin scrapings on Sabouraud's dextrose chloramphenicol agar from 12 infected calves lead to isolation of *A. alternata* (Fig 2).

As ethnoveterinary treatment either sulphur mixed with mustard oil (1:10) or leather ash mixed with butter fat India (1:1) is applied by the farmers, after completely scraping the lesions with knife. Farmers claim these treatments to be very effective.

Incorporating the ethnoveterinary knowledge of the farmers for the treatment of this condition, treatment of camel calves was done by initially scraping the lesions and then applying ointment containing sulphur, salicylic acid and mustard oil resulted in complete recovery of the lesions.

*Alternaria* species are ubiquitous in nature and are commonly considered saprophytic contaminants. Thus, cultural examination of scrapings requires cautious evaluation. Grossly *alternaria* grows rapidly and matures within five days. The colony of *A. alternaria* is flat, downy to cottony and may eventually be covered by greyish, short, and aerial hyphae. The reverse side is typically brown to black due to pigment production. Microscopically *alternaria* has septate, dark hyphae. Conidiophores are also septate and sometimes have a zigzag appearance. They bear simple or branched large conidia (8-16 x 23-50 µm) which have both transverse and longitudinal septations. These conidia may be observed singly or in acropetal chains and may produce germ tubes. They are ovoid to obclavate, darkly pigmented, muriform, and smooth or roughened. The end of the conidium nearest the conidiophore is round while it tapers towards the apex. This gives the typical beak or club-like appearance of the conidia. Khosravi *et al* (2008) recorded 6.8% of external ear canal of camel harbouring *A. alternata*. Cutaneous infections caused by *Alternaria* species are often associated

with debilitating diseases or conditions. Cabanes *et al* (1988) reported a phaeohyphomycotic infection caused by *A. alternata* in a 5-month-old Spanish mare. Salkin and Stone (1974) reported isolation of *A. alternata* from a subcutaneous infection in the ear of a white-tailed deer (*Odocoileus virginianus*). Reddy *et al* (1974) experimentally exposed rabbits and guinea pigs to *A. alternata* by intradermal and intraperitoneal injection and by scarification. It caused superficial mycosis when inoculated by scarification. Direct intraperitoneal inoculation of *A. alternata* into animals has been reported to be either lethal (Ohashi, 1960) or harmless (Reddy *et al*, 1974). Dye *et al* (2005) developed an indirect ELISA for the detection of anti-*Alternaria* immunoglobulin G (IgG) antibodies in serum to determine the prevalence of *alternaria* exposure in domestic cats. The cats with disease caused by *alternaria* infections did not have significantly higher concentrations of antibody than the healthy cats or cats with other diseases. Dvovich (1981) observed zoonotic significance of *A. alternata*. In one case a horse was infected when eating clover infected with this fungus. The horse showed symptoms of dermatomycosis on the chest and belly. The same horse transmitted infection to his owner who showed similar symptoms on his hands. *A. alternata* have been isolated from human cutaneous or subcutaneous infections (Singh *et al*, 1990; De Hoog and Vitale, 2007; Mbata and Nwajagu, 2007).

First line therapy is usually the azoles. Itraconazole or fluconazole are the drugs of choice. Ketoconazole is generally felt to be less effective and has more side effects, so is only advocated when cost is an issue (Moriello and DeBoer, 1991). Alternative treatments include amphotericin-B and terbinafine hydrochloride. Terbinafine, a highly lipophilic allylamine antifungal, is a relatively new drug in terms of veterinary use. It is fungicidal and is concentrated in the skin, nails and fat following oral dosing, making it a good choice for dermatological infections, particularly ringworm (Mancianti *et al*, 1999) and side effects are thought to be rare. Intravenous liposomal amphotericin B administration is the mainstay of treatment for human systemic fungal infections (Sorensen *et al*, 2006). This drug has been rarely used in veterinary medicine because it is prohibitively expensive and in its cheaper desoxycholate form but it is highly nephrotoxic. However, reduced nephrotoxicity has been described using subcutaneous administration making it a more practical option (O'Brien *et al*, 2006).

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