

Effectiveness of the Local Application of 1% Tioconazole in the Treatment of Bovine Dermatophytosis

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Summary

This study consisted of twenty-five dermatophytotic cattle, aged 1.5-11 months obtained from Kars province and its surrounding, diagnosed as dermatophytosis following clinical and microbiologically. All animals were divided into two groups; trial group (n=15) and control group (n=10). The skin lesions of the trial animals were treated using a pomade containing 1% tioconazole once daily for a period of 5 days. In 12 of the trial animals the amount of keratinized tissue found in the dermatophytosis lesions decreased significantly following the 3rd application and had disappeared completely after the 5th application. On the other hand, the remaining 3 animals in the trial group were applied the medicament seven times due to the persistence of keratinized tissue in the lesions. In all of the animals administered with tioconazole, new hair growth in the site of the lesions resumed in the 3rd-4th weeks and complete recovery occurred within 7-8 weeks. In conclusion, 1% tioconazole, used for the first time for the treatment of bovine dermatophytosis in this study was found to be rather effective owing to its ease of application and strong therapeutic effect.

Keywords: Cattle, Dermatophytosis, Tioconazole

Sığır Dermatofitozisinin Tedavisinde %1'lik Tiokonazol'ün Lokal Kullanımının Etkinliği

Özet

Çalışma materyalini, Kars ve çevre köylerinden sağlanan, 1,5-11 aylık yaşta, klinik ve mikrobiyolojik olarak dermatofitozis tanısı konulan 15 deneme ve 10 kontrol olmak üzere, toplam 25 sığır oluşturdu. Deneme grubundaki hayvanların derilerindeki lezyonların üzerine %1 tiokonazol içeren kremden 5 gün boyunca günde 1 kez sürüldü. Deneme grubundaki hayvanlardan 12'sinde 3. uygulamayı takiben, dermatofitoz lezyonlarındaki keratinize dokuların büyük oranda azaldığı, 5. uygulama sonunda ise tamamen kaybolduğu görülürken 3 hayvanda keratinize doku dökülmediği için 7. uygulamaya gidildi. İlaç uygulanan tüm hayvanlarda lezyonlu bölgelerde 3-4. haftalarda kılınmanın başladığı, 7-8. haftalarda ise tamamen iyileştiği görüldü. Sonuç olarak, sığırlarda dermatofitozis olgularının tedavisinde ilk olarak denenen %1'lik tiokonazol'ün, kullanımının kolay olması ve tedavi edici etkisinin yüksek olması nedeniyle, sığırlarda dermatofitozis olgularının sağaltımında oldukça etkili bulunmuştur.

Anahtar sözcükler: Sığır, Dermatofitozis, Tiokonazole

INTRODUCTION

Dermatophytosis, otherwise known as ringworm, is a fungal disease of keratinized tissues, including the skin, hair and nails, caused by dermatophytes. These ubiquitous agents cause infections of varying severity in both humans and animals^{1,2}. The dermatophyte most frequently en-

countered in cattle and sheep is *Trichophyton verrucosum*, but dermatophytosis cases arising from infection with pathogenic agents, including *T. equinum*, *Microsporum gypsum*, *M. nanum*, *M. canis* and *Epidermophyton sp.* have also been reported³⁻⁸.



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Dermatophytes cause alopecia, scurf and crust formation on the skin, down grading of the hide and skin, and growth retardation. As an enzootic disease of zoonotic nature, dermatophytosis leads to high treatment costs, which together with the restriction of the trade of infected animals, results in major economic loss^{3,4,6}.

Predisposing factors in the development of the disease include poor lighting and high humidity of animal shelters, high stocking density in animal production, and prolonged confinement of animals. The infectious agents may remain active for several years in contaminated animal shelters and on equipment. The occurrence of the disease is also closely related to the susceptibility and immunocompetence of animals^{4,9}. Compared to adults, dermatophytosis is observed more frequently in young animals. As the development of the immune system advances, the possibility of the occurrence of the disease decreases. Weather conditions are also influential on the occurrence of this illness. The number of dermatophytosis outbreaks tend to increase during winter as well as during the humid spring and autumn seasons, whilst animals infected with trichophytes recover spontaneously during summer².

Tioconazole is a synthetic antifungal preparation that contains imidazole as the active substance. It is a topical preparation known to be safe and strongly effective against certain opportunistic yeasts and dermatophytes^{10,11}. It shows fungicidal effect by causing direct damage to the membrane of fungi¹².

Various pharmaceutical products and vaccines are used for the treatment of bovine dermatophytosis^{3,6,13-15}. In the present study, the objective was to investigate the effectiveness of the local application of 1% tioconazole in the treatment of bovine dermatophytosis.

MATERIAL and METHODS

Twenty-five cattle of varying sex and breed, which were 1.5-11 months of age, raised in Kars province and its surrounding villages and diagnosed with dermatophytosis, constituted the material of the present study. This study was conducted between december 2011 and march in 2012. Of these animals, 15 were allocated to the trial group, and 10 were maintained for control purposes and not subjected to any treatment.

In the trial and control groups, the site of lesions, which were sampled, were first cleansed with 70% ethyl alcohol. Subsequently, skin scrapings and hair specimens were taken from the periphery of the keratinized regions into sterile petri dishes¹⁶. After treated with 10% potassium hydroxide, the samples were observed under the microscope. Furthermore, inoculations were performed onto Sabouraud Dextrose Agar and petri dishes were incubated at 32°C for a period of 2-6 weeks. At the end of

the incubation period, the slides prepared from the grown cultures were examined microscopically for the presence of hyphae, mycelia, spores, Chlamydia spores, and macro- and microconidia^{17,18}.

The skin lesions of 12 of the animals included in the trial group were applied a pomade containing 1% tioconazole (Dermo-Trosyd krem, 1% Pfizer®) for 5 days, in accordance with the instructions for use. On the other hand, the remaining 3 animals of the trial group were administered with the pomade for a period of 7 days due to the persistence of keratinized tissue in the skin lesions. The control animals were not subjected to any kind of treatment throughout the study period. Following the cease of treatment, the recovery of the animals included in the trial group was monitored at one-week intervals during two months.

RESULTS

Clinical Results

The clinical examination of the animals included in the study demonstrated that the localization site of the dermatophytosis lesions was the head in 10 (Fig. 1a), the head and neck region in 8, the neck in 5, and various body parts in 2 of the cattle. Although the general condition of the animals appeared normal, the body condition scores of 8 cattle were poor.

In 12 of the animals included in the treatment group, keratinized tissue in the skin lesions was observed to have reduced significantly after 3 applications and to have disappeared completely after the 5th application. In the remaining 3 animals included in the trial group, the persistence of keratinized tissue in the skin lesions required 7 applications to be made.

Post-treatment controls performed at 1-week intervals in the animals administered with tioconazole revealed that new hair growth resumed as from weeks 3-4 and that complete recovery was achieved by the 7th-8th weeks (Fig. 1b). On the other hand, no change was observed in the dermatophytosis lesions of the control animals, which were not subjected to any treatment throughout the study period.

Mycological Results

T. verrucosum was isolated from the microbiological culture prepared from the skin scrapings and hair specimens taken from the skin lesions of all animals included in the study. No microbial growth was observed in the samples collected post-treatment.

DISCUSSION

Dermatophytosis is very prevalent in calves and may



Fig 1. a- Appearance of cattle prior to treatment with tioconazole, b- Appearance of cattle after the treatment with tioconazole

Şekil 1. a- Sığırın tiokonazole ile tedavisinden önceki görünümü, b- Sığırın tiokonazole ile tedavisinden sonraki görünümü

also be observed in adult bovine animals. This skin disease frequently develops during the weaning period in calves older than 2 months. Although the illness causes superficial damage to the skin, it results in major economic losses due to decreased body weight, poor hide quality, growth retardation and treatment costs^{3,4}. In agreement with previous literature reports, the cases investigated in the present study were all observed in young animals and although the general condition of 8 of the animals was good, their body condition scores were poor. The resistance of dermatophytes to environmental conditions helps them survive for prolonged time periods and brings about the possibility of animals becoming infected over long time periods^{2,13}. Anamnesis revealed that dermatophytosis outbreaks occurred every year in the holdings the animals were obtained from, which confirmed that these infectious agents survived for long time periods.

Inappropriate housing conditions, and in particular, animals being raised at high stocking density for prolonged periods, as well as high humidity levels of the air circulating in the animal shelter, favour and accelerate the development and spread of dermatophytosis^{4-6,9}. In the present study, it was observed that the shelters the animals were raised in were humid and had poor air circulation and that

the animals were housed at high stocking density. Due to the cold climate and long winter season of Kars province and its vicinity, animals are confined for prolonged time periods, which results in the disease being encountered frequently in the region.

The fungal species isolated most commonly in bovine dermatophytosis cases is reported as *T. verrucosum*^{1,3,5,6,13}, yet cases caused by pathogenic agents such as *T. equinum*, *M. gypseum*, *M. nanum*, *M. canis* and *Epidermophyton* sp. have also been reported^{2-4,7,8}. In the present study, *T. verrucosum* was isolated from all of the infected animals.

Various pharmaceutical products and vaccines are used for the treatment and control of dermatophytosis, which is prevalent in Turkey and across the world^{3,6,13-15}. In this study, a pomade containing 1% tioconazole, used locally in human medicine for the treatment of fungal infections owing to its effectiveness against certain fungal species was applied to the skin lesions observed in cattle with an aim to determine its effectiveness in the treatment of bovine dermatophytosis. This treatment regimen resulted in recovery by the 5th application in 12 and by the 7th application in 3 of the animals included in the trial group. The local application of tioconazole resulted in the elimination of keratinized tissue and eventually, the healing of skin lesions within a short period of time. Based on these results, it was concluded that 1% tioconazole was rather effective in the treatment of bovine dermatophytosis cases caused by *T. verrucosum*. Accordingly, it is suggested that 1% tioconazole may be used as an alternative to other treatment methods. Furthermore, the results of the present study bear significance in that they are the first to be obtained on the use of 1% tioconazole in the treatment of bovine dermatophytosis.

In conclusion, it has been determined that, owing to its ease of use and strong therapeutic effect, 1% tioconazole is very effective in the treatment of bovine dermatophytosis caused by *T. verrucosum*.

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