

## Short Communication / Kısa Bilimsel Çalışma

# Cutaneous candidiasis in two guinea pigs

Mehmet ŞAHAL<sup>1</sup>, Serkal GAZYAĞCI<sup>2</sup>, Kerem URAL<sup>3</sup>, Hakan YARDIMCI<sup>4</sup>

<sup>1</sup>Ankara University Faculty of Veterinary Medicine, Department of Internal Medicine, <sup>4</sup>Department of Microbiology, Ankara, <sup>2</sup>Kirikkale University Faculty of Veterinary Medicine, Department of Internal Medicine, Kirikkale, <sup>3</sup>Adnan Menderes University Faculty of Veterinary Medicine, Department of Internal Medicine, Aydin, Turkey.

**Summary:** Two approximately 6-month-old guinea pigs were admitted to the Department of Internal Medicine, Faculty of Veterinary (DIMFV), University of Ankara because of lethargy of several weeks' duration, anorexia, bilateral alopecia, and itching. *Candida albicans*, was isolated from the skin lesions. Both patients were treated with ketoconazole (10 mg/kg PO every 12 h) and topical clotrimazole. The female guinea pig died during the seventh day of the treatment period.

Key words: *Candida albicans*, guinea pig, clotrimazole, ketoconazole

### İki kobayda Kutanöz Kandidiyazis

**Özet:** Yaklaşık 6 aylık iki kobay haftalardır süren letarji, iştahsızlık, çift taraflı tüy dökülmesi ve kaşıntı şikayetiyle Ankara Üniversitesi Veteriner Fakültesi İç Hastalıkları Anabilim dalına getirildi. Derideki yaralardan yapılan izolasyonda *Candida albicans* tespit edildi. Her iki kobaya tedavi olarak oral ketokonazol (10mg/kg, 12 saat arayla) ve topikal klotrimazol verildi. Dişi kobay tedavinin 7. gününde öldü.

Anahtar sözcükler: *Candida albicans*, kobay, ketokonazol, klotrimazol.

*Candida albicans*, an opportunistic fungal pathogen of humans, has been described to cause systemic infections in immuno-compromised patients (2).

The presence of *C. albicans*, is widespread in healthy person's mucous membranes. Adhesion, penetration and morphologic transition are the mechanisms that relates with the pathogenesis of *Candida spp.* Human body protects itself from *Candida* invasion with the nonspecific defence mechanism and additionally spesific immune response (17). The present article indicates that cutaneous candidiasis in two guinea pigs and also in the owner of the guinea pigs. To the authors' knowledge, this is the first report in Ankara, Turkey and exotic animals may be one source of the Candidiasis because of the close interactions they have with the owners.

Two approximately 6-month-old guinea pigs were admitted to the Department of Internal Medicine, Faculty of Veterinary (DIMFV), University of Ankara because of lethargy of several weeks' duration, anorexia, bilateral alopecia, and itching. The owner had initially noticed that, prior to the onset of clinical sings the owner had direct contact with the female guinea pig (guinea pig 1) and slept together at nights for the preceding weeks. According to the owner clinical signs were first noticed 3 weeks previously for 1 of the guinea pigs (female guinea

pig 1) and 2 weeks previously for the other guinea pig (male guinea pig 2) and also admitted that the owner had a complaint of itching and bilateral alopecia in her ear margins. These guinea pigs had always been fed a commercially available diet of cereals and pellets formulated for this species. The guinea pigs were not given fresh food or a mixture of fresh vegetables and there were no history of dietary indiscretion. On admission to the DIMFV, guinea pig 1 had skin lesions involving the ear margins, dorsal lumbosacral area, nose, head and neck, and vaginal discharge with exudate, licking of the vulva and perianal region. There was marked alopecia of the ears and nose with extensive and generalized skin eruptions with erythema, vesicles and scaling which were strongly suggestive of Candidiasis (Fig. 1).

Fungal cultures were made from lesions occurring in the ear margins of the guineapigs; The samples were cultured on Sabouraud's dextrose agar containing antibacterial antibiotics (20 I.U.penicillin and 40 µg/ml streptomycin) at 25 °C and 37 °C for two weeks. The identification of the yeast species was made considering the assimilation and fermentation properties with different biochemical sources. Germ-test tube was also performed (8). *Candida albicans* (*C.albicans*) was

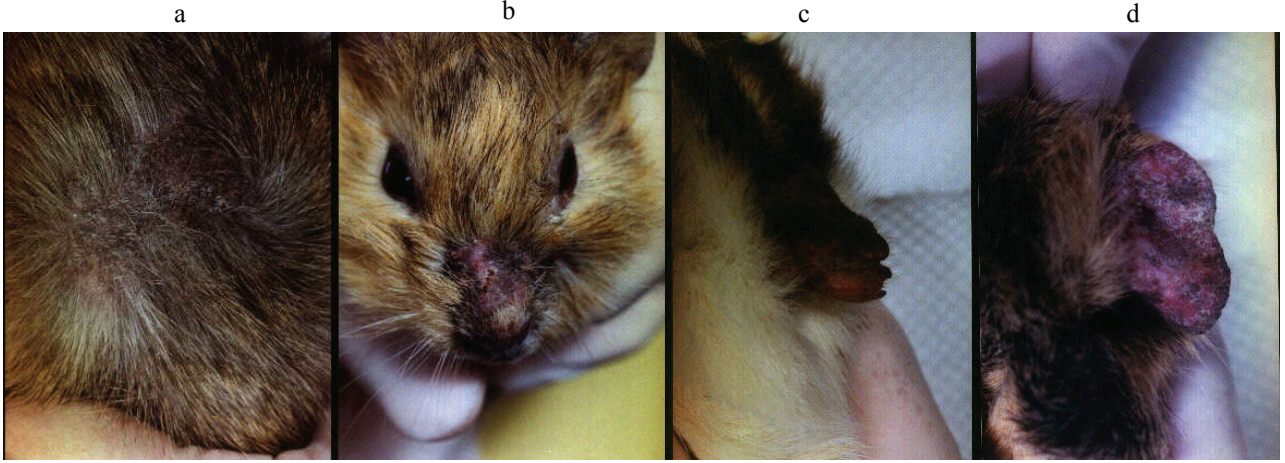


Fig.1. The guinea pig 1:Extensive and generalized skin eruptions with erythema, vesicles and scaling on the dorsolumbosacral area (a), nose (b) and The guinea pig 2:ear margins (c-d).  
Şekil 1. Kobay 1 de: dorso lumbal bölgede (a) ve burunda(b) Kobay 2 de: kulak kenarlarında yoğun ve yaygın eritem, vezikül oluşumu ve pullanma şeklinde görülen deri yıkımlanması.



Fig.2. The dermatitic changes on the ear margin in the owner of the guinea pigs: Squamous desquamation on the erythematous base.  
Şekil 2: Kobay sahibinde kulak kenarlarında görülen dermatik değişiklikler: skuamatöz deskuamasyon ve bazal eritematoz.

isolated from the skin lesions of both guinea pigs and the owner (Fig. 1 and 2). In an attempt to identify the microscopic evidence of candidiasis, biopsy from the lesional parts was discussed with the owner, who declined further evaluation. Examination of the oral cavity revealed no abnormality. Fecal analysis were unremarkable. Radiography revealed increased bronchial and a miliary intersitial markings. For guinea pig1, routine haematology revealed neutrophilic-leucocytosis, neutrophils (71%) and lymphopenia (25%). Serum

biochemistry testing were unremarkable except for hyperglycemia (blood glucose levels; 184 mg/dl and 193 mg/dl, for guinea pig 1 and 2).

The 6-month old male guinea pig (guinea pig 2) had skin lesions around the ear margins similar to guinea pig 1 (Fig 1 c-d). The guinea pig was afebrile and there was a moderate discomfort at respiration. Radiography was unremarkable.

Both guinea pigs of this report had cutaneous Candidiasis and guinea pig 1 had also pneumomycosis

due to *C. albicans*. Both patients were treated with ketoconazole (10 mg/kg PO every 12 h for five weeks) and topical clotrimazole solution and vitamin C 30 mg/kg i.m daily. The owner had noticed that the guinea pig 1 was dead 1 week after initial examination. This may be due to the fact that there was severe pneumomycosis in the guinea pig 1. The guinea pig 2 was still alive 2 months after diagnosis and is still well at the time of writing.

Contact sensitivity to *Candida* antigen has an important role in the formation of skin lesions in humans who are predisposed to *C. albicans*. It has been reported that in humans contact sensitivity to Candidiasis occurs during later life (19). However the owner of the guinea pigs of this report, who also had Candidiasis, was 18-year-old and had no history of a particular infection in the past or any other systemic disease. In a previous study in guinea pigs and in humans dermatitic changes has been induced even on normal skin with a highly concentrated antigen solution (19) As in the present report, to the author's knowledge the actual cutaneous Candidiasis in the guinea pigs has been generated by this procedure and the owner of the guinea pigs began to show contact sensitivity to *C. albicans* antigen with the development of hypersensitivity reactions. Although the underlying inflammatory process that facilitates the contact sensitivity interacted between the owner and the guinea pigs of this report was not certain and fortuitous, it seems more likely that the guinea pigs may be the source of the infection.

In guinea pigs described in the present report blood parameters are in accordance with those published by Laird (7) and Quillec et al. (15), except for neutrophilic-leucocytosis (71%) and lymphopenia (25%) on guinea pig 1. To the authors' knowledge severe stress and/or a secondary bacterial infection may be associated with the latter changes. Considering the serum biochemical changes, serum biochemical profile was unremarkable except for hyperglycemia in both of the present guinea pigs. However diabetes mellitus was ruled out in the present cases as the causes of hyperglycemia. This may be due to the fact that diabetes mellitus is a rare condition in guinea pigs with the exception of colonies prone to genetic conditions or unidentified infectious agent (4).

In a previous report with albino guinea pigs experimentally infected with *C. albicans*, one of the animals presented extensive pneumonia due to *C. albicans* and *B. bronchiseptica* (23). For the guinea pigs report, vaginitis evident on initial examination and the radiological changes were unusual in cutaneous candidiasis. These radiological changes in the guinea pig 1 of this report, although non-specific, are crude means of pneumomycosis in agreement with the latter report.

In guinea pigs, vitamin C deficiency has been reported to be the most commonly disorder affecting

bone metabolism (3,14). Low levels of dietary ascorbic acid increase susceptibility to Candidiasis (16). Therefore in the present article although the guinea pigs had always been fed a commercially available diet with enough vitamin C levels, it was considered that treatment should include vitamin C supplementation as signs of conjunctivitis or upper respiratory disease should evoke deficiency (4).

Experimental cutaneous *C. albicans* infection in guinea pigs have been reported previously (9-11,18,20,24). It has been reported that the rate of translocation of *C. albicans* increases with the thermal injury in guinea pigs (5). However in guinea pigs of our report, thermal injury was ruled out as there was no history of burn injury. Kitabatake et al. (6) described that exposure to NO<sub>2</sub> or SO<sub>2</sub> increases bronchopulmonary reactions in guinea pigs induced by *Candida albicans*. However the guinea pigs described in the present report had no history of exposure to NO<sub>2</sub> or SO<sub>2</sub>. Experimental cutaneous Candidiasis were produced in prednisolone-induced infections in guinea pigs (11). Prednisolone treatment was not associated with the Candidiasis in the present report since the guinea pigs had not received such therapy.

Therapeutic efficacies of various antimycotic agents such as; itraconazole, ketoconazole, neticonazole, Sch 39304, itroconazole in systemic and experimental Candidiasis of guinea pigs have been described by previous studies (11-13,20-23). It has been reported that itroconazole is a potential prophylactic therapy agent against fungal infections, and also admitted that profilactic efficacy increases as its dosage increases (21). In combination therapy with nystatin and zinc oxide, the latter agent has been described to have some protective effects against local masseration in cutaneous candidiasis (1). In a previous study evaluating the efficacy of orally and topically administrated ketoconazole, oral route has been found to be efficacious (19). Both guinea pigs of this report had been treated with oral ketoconazole and *C. albicans* was eradicated from the guinea pig 2 after administration of ketoconazole. To the authors' knowledge the guinea pig 1 of this report died because of severe pneumomycosis although guinea pig 2 responded to therapy.

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**Adress of the correspondence:**

Assist. Prof. Dr. Serkal Gazyağcı  
Kirikkale University, Faculty of Veterinary Medicine,  
Department of Internal Medicine,  
71450, Yahsihan, Kirikkale, Turkey.  
E-mail: gazyagciserkal@gmail.com