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ORIGINAL ARTICLE/ARTICLE ORIGINAL

Ocular fungal flora from healthy horses in Iran



Flore fongique oculaire de chevaux bien portants en Iran

A.R. Khosravi^{a,*}, D. Nikaein^a, A. Sharifzadeh^a, F. Gharagozlou^b

^a Mycology Research Center, Faculty of Veterinary Medicine, University of Tehran, Tehran 14155-6453, Iran

^b Department of Clinical Science, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

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MOTS CLÉS

Cheval ;
Flore fongique ;
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Summary

Objective. – This study was carried out in order to isolate and identify the normal conjunctival fungal flora from Caspian miniature, Thoroughbred, Turkmen and Persian Arab breeds in Tehran, Iran.

Materials and methods. – A total of seventy-two adult healthy horses were studied. Ocular samples were collected from right and left eyes by using sterile cotton swabs; samples were cultured on Sabouraud dextrose agar and incubated at 30 °C for 7–10 days. Molds and yeasts were identified using macro and micro-morphological and physiological characteristics.

Results and conclusion. – Number of fungal colonies per eye varied between 0 and 123 colony forming units (CFUs). The most predominant fungal isolates were *Aspergillus* (19.9%), *Rhizopus* (15.9%) and *Penicillium* (15.1%). No significant differences were observed between types of eye fungal floras in different breeds. Caspian miniature horses had significantly the highest number of fungal isolates in compare with other breeds ($P < 0.001$), however no significant difference was observed among other breeds under study. The fungal isolates were almost the same as with studies performed in other countries, although differences in species isolated could be related to geographic and climate difference.

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Résumé

Objectif. – Cette étude a été réalisée afin d'isoler et d'identifier la flore fongique conjonctivale normale de chevaux : race Caspienne miniature, pur-sang, Turkmènes et Arabes Persan à Téhéran, en Iran.

Matériels et méthodes. – Un total de 72 chevaux adultes sains ont été étudiés. Les échantillons oculaires ont été recueillis sur les yeux droits et gauches à l'aide de cotons-tiges stériles, les

* Corresponding author.

E-mail address: khosravi@ut.ac.ir (A.R. Khosravi).

Aspergillus ;
Rhizopus

échantillons ont été cultivées sur gélose de Sabouraud glucose et incubés à 30 °C pendant 7–10 jours. Les moisissures et les levures ont été identifiées à l'aide de macro et micro-caractéristiques morphologiques et physiologiques.

Résultats et conclusion. – Le nombre de colonies de champignons par oeil varie entre 0 et 123 unités formant colonies (UFC). Les isolats fongiques prédominants étaient *Aspergillus* (19,9 %), *Rhizopus* (15,9 %) et *Penicillium* (15,1 %). Aucune différence significative n'a été observée entre les types de flore fongique oculaire dans les différentes races. Les chevaux miniatures Caspiens avaient significativement le plus grand nombre d'isolats fongiques en comparaison avec d'autres races ($p < 0,001$), mais aucune différence significative n'a été observée chez les autres races étudiées. Les isolats fongiques étaient presque les mêmes que ceux des études réalisées dans d'autres pays, même si les différences dans les espèces isolées pourraient être liées à des différences géographiques et de climat.

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Introduction

Fungi and bacteria can be inhabitants of humans and animals eye microflora [1,2]. These organisms remain as mycoflora in a balance with immune condition of the host. The resident microbial flora aids in maintaining the ocular surface health by preventing overgrowth of potentially pathogenic agents [3,4]. However, when the ocular defense barriers are weakened, this normal flora may become pathogen and cause infection. Therefore, characterization of normal flora of conjunctiva may be useful in treating eye infections. Bacterial and fungal flora of normal eye has been reported in different mammals including dogs [4,5], cats [5–7], sheep [8], cows [5,9], camels [10], pigs [11], horses [5,12–14] and rabbits [15]. The knowledge of the fungal microbiota is of great importance due to the reduced number of studies reported in the literature and also to the large occurrence of ocular alteration, mainly keratomycosis, in horses [16]. Most reports of normal ocular flora in horses show a predominance of nonpathogenic, mainly Gram-positive organisms. However Gram-negative and fungal species are also found as well [1,14]. Therewith, microbiota of the ocular surface depends on season of sampling, geographic location, housing conditions and the age of the animal [17]. Fungal flora usually includes non-pathogenic opportunistic fungi and is thought to be transient [1]. Some environmental factors such as geographical location, climate, season, type and source of bedding, feed and husbandry can affect eye fungal flora in horses [1,18,19]. *Aspergillus* spp., *Cladosporium* spp., *Alternaria* spp. and *Penicillium* spp. have been predominantly isolated from healthy horse conjunctiva and cornea in most studies [1,12,14,17,20,21]. *Fusarium* spp. and yeasts also have been isolated commonly from equine eyes in some areas [17].

Horses have relatively large, prominent eyes, which are susceptible to be damaged by straw or dirt from the environment and therefore, ocular infection is observed more frequently in them than in other domestic animals [18]. Keratomycosis is a common infection in equines caused by saprophytic filamentous fungi and yeasts [1,17,21]. Immunologic, metabolic and antimicrobial mechanisms as well as physical tissue barriers protect conjunctiva and cornea from fungal infection. Tear film macrophages and IgA, qualitative and quantitative integrity of the tear, intact corneal

epithelium, and the presence of conjunctival bacteria all protect the eye from fungal invasion and colonization of cornea [17]. Keratomycosis usually happens following corneal injury. When corneal abrasion occurs resident and transient microbes infiltrate the corneal stroma and lead to corneal infected ulcer; however keratomycosis is not always a consequence of corneal injury which introduce fungi from the environment through a trauma; it can also result from development of opportunistic fungi localized in the conjunctival fornices after application of local treatments or other causes [17,18]. Since infected corneal ulcers are difficult to treat and if vision loss appears it can be career ending for the horse, recognition of fungal flora helps better understanding of epidemiology of equine keratomycosis, diagnosis and selecting suitable drug for initial treatment [1,19]. Fungal flora of equine eye has not been studied in Iran, particularly in Caspian miniature horse. The aim of this study was to investigate the presence of fungal flora in four horse breeds in Tehran, Iran.

Materials and methods

Animals

This study was conducted on 72 healthy horses including Caspian miniature horse, Thoroughbred, Turkmene and Persian Arab horse breeds from three farms in Tehran province. Horses under study had no history/clinical signs of eye disorders and ophthalmic examination showed no evidence of ocular inflammation or infection.

Specimen collection

Samples were taken during March to June 2012. Both right and left eyes were examined using different swab for each eye in all animals. Eye specimens were obtained by retro-pulsing each eye through the closed upper lid and running a sterile dry cotton swab along the surface of ventral conjunctival fornix. Special care was taken not to contaminate the swab with contact to vibrissae, eyelids, or eyelashes. After collection, each swab was placed in a sterile tube and transferred to Mycology Research Center, Faculty of Veterinary Medicine at the University of Tehran under cool condition (beside ice) as soon as possible.

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