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ORIGINAL ARTICLE/ARTICLE ORIGINAL

Oral microflora and their relation to risk factors in HIV⁺ patients with oropharyngeal candidiasis

La microflore orale et sa relation avec les facteurs de risque de candidose oropharyngée chez des patients VIH⁺

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KEYWORDS

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Candida;
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HIV infection;
CD₄⁺

Summary

Objective. – The purpose of this study was to determine the prevalence of oral microflora and association of oral candidiasis and multiple risk factors in HIV⁺ patients.

Patients and methods. – The present study included 100 HIV-infected patients participated in Imam Khomeini Hospital, Tehran, Iran for Oropharyngeal candidiasis (OPC) and HIV. We assessed the presence or absence of OPC, and samples were obtained from the oral cavity and direct microscopic examination, gram staining and culture on standard microbiological media were performed in all patients. CD₄⁺ cell count/CD₄⁺ percentage were also calculated.

Results. – The demographic characteristics showed that the patients had a mean age of 32.3 years old, 78% male and 22% female. Patients belonging to 'O⁺' blood group (27%) were more prone to develop OPC. A total of 460 bacterial colonies were obtained and *Streptococcus mutans* (15.4%) was the most frequently isolated species in the HIV⁺ patients, followed by *Staphylococcus epidermidis* (12.8%) and *Corynebacterium* (8.7%). In addition, 254 yeasts (from four different genera) were isolated from the patient under study. *Candida* species (94.4%) were the most frequently obtained genera, followed by *Saccharomyces* (2.4%), *Kluyveromyces* and *Cryptococcus* (1.6% for both) species. *Candida albicans* (37.2%) was the most common species isolated from HIV⁺ patients with OPC and its frequency was significantly higher than that of other

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MOTS CLÉS

Microflore orale ;
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Candida species ($P < 0.05$). *Candida glabrata*, *C. dubliniensis*, *C. tropicalis*, *C. parapsilosis*, *C. krusei*, *C. lusitaniae*, *C. guilliermondii* and *C. norvegensis* were also identified. Forty percent of the patients had angular cheilitis as the most frequent clinical variant. The mean CD₄⁺ cell counts were 154.5 cells/μL, with a range of 8 to 611 cells/μL. Thirty percent patients had a CD₄⁺ cell count between 101 and 200 cells/μL (28.7% of total yeasts isolated). Yeast and bacteria counts did not differ statistically among HIV⁺ patients' subgroups with different levels of CD₄⁺ cells counts.

Conclusion. — Our results showed that yeasts of the genus *Candida* were isolated at a comparable rate from the oral cavity of HIV⁺ patients and there was no significant difference of the variables CD₄⁺ cell count and yeast counts. The findings of this study would be helpful in any further study, which, if done prospectively on a large cohort, can be confirmatory.

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Résumé

Objectif. — Le but de cette étude était de déterminer la prévalence de la microflore orale en relation avec les facteurs de risque de candidose oropharyngée chez des patients VIH⁺.

Patients et méthodes. — La présente étude a inclus 100 patients infectés par le VIH à l'hôpital Imam Khomeini, Tehran (Iran). Nous avons évalué la présence ou l'absence d'OPC et des prélèvements obtenus de la cavité buccale, examen microscopique direct, coloration de Gram et culture sur milieu standard chez tous les patients. Le nombre et le pourcentage de CD₄⁺ ont été aussi calculés.

Résultats. — Les caractéristiques démographiques ont montré que les patients avaient un âge moyen de 32,3 ans avec 22 % de femmes et 78 % d'hommes. Les patients appartenant au groupe sanguin O⁺ (27 %) étaient plus prédisposés pour développer OPC. Un total de 460 colonies bactériennes a été obtenu et *Streptococcus mutans* (15,4 %) était l'espèce le plus souvent isolée, suivie par *Staphylococcus epidermidis* (12,8 %) et *Corynebacterium* (8,7 %). De plus, 254 levures (de quatre genres différents) ont été isolées. Les *Candida* (94,4 %) étaient le genre le plus souvent obtenu, suivi par *Saccharomyces* (2,4 %), *Kluyveromyces* et *Cryptococcus* (1,6 % pour tous les deux) les espèces. *Candida albicans* (37,2 %) était l'espèce la plus communément isolée chez les patients VIH⁺ les patients avec OPC et sa fréquence était de façon significative plus forte que celle d'autres espèces de *Candida* ($p < 0,05$). *Candida glabrata*, *C. dubliniensis*, *C. tropicalis*, *C. parapsilosis*, *C. krusei*, *C. lusitaniae*, *C. guilliermondii* et *C. norvegensis* ont été aussi identifiées. Quarante pour cent des patients avaient chéilite angulaire comme la forme clinique la plus fréquente. Le nombre de cellule CD₄⁺ moyen était de 154,5 cellules/μL, avec une gamme de 8 à 611 cellules/μL. Trente pour cent avaient un compte de cellule CD₄⁺ entre 101 et 200 cellules/μL. Le dénombrement des bactéries et des levures n'ont pas différé statistiquement parmi les sous-groupes de patients VIH⁺ avec différents niveaux du nombre de cellules CD₄⁺.

Conclusion. — Nos résultats ont montré que les levures du genre *Candida* ont été isolées à un taux comparable dans la cavité buccale des patients VIH⁺ et qu'il n'y avait pas de différence significative dans le nombre de CD₄⁺ et le nombre de levures. Les conclusions de cette étude seraient utiles dans une nouvelle étude prospective sur une grande cohorte.

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Introduction

The microbial flora of the oral cavity is rich and extremely diverse. It has been approved that in some local and systemic conditions, the microflora of the oral cavity are going to change and it may be invaded by these microorganisms. Oropharyngeal candidiasis (OPC) is considered an opportunistic infection caused by a ubiquitous fungal organism that is routinely seen as normal oral flora. The transition from commensal to invasive infection of the oral mucosa is caused by local changes in the microflora or by an inefficient host response system, which results in the overgrowth and invasion of *Candida* species. The prevalence of OPC remains high and continues to increase, because the population of compromised hosts continues to expand [43]. The most common cause of mucosal candidiasis is *Candida albicans* account for

at least 80% of clinical infections, whereas the proportion of non-*C. albicans* species has increased over time up to 20% before the advent of highly active antiretroviral therapy (HAART). The most notable predisposing factor for non-*C. albicans* species is prior exposure to azole antifungals [22].

Underlying conditions associated with a greater prevalence of the presence of microflora include prematurity, ill-fitting dentures, xerostomia, radiation of the head and neck, uncontrolled diabetes mellitus, hematologic and solid organ malignancies, oral or inhaled corticosteroid use, antimicrobial therapy, and HIV infection [42]. The prolonged course of HIV infection predisposes these patients to recurrent episodes of oral infections that can increase in frequency and severity during the course of HIV disease progression [13].

Clinical evidence and experimental data have indicated that both the innate and adaptive immune systems regulate

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