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Research Article

Analysis of Biofilm-Related Genes and Antifungal Susceptibility Pattern of Vaginal Candida albicans and Non-Candida albicans Species

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Background. Vulvovaginal candidiasis caused by Candida species is a prevalent fungal infection among women. It is believed that the pathogenesis of Candida species is linked with the production of biofilm which is considered a virulence factor for this organism. The aim of this study was molecular identification, antifungal susceptibility, biomass quantification of biofilm, and detection of virulence markers of Candida species. Methods. We investigated the molecular identification of 70 vaginal isolates of Candida species, antifungal resistance to amphotericin B, fluconazole, and voriconazole according to CLSI M27-A3 and M27-S4, biofilm formation, and frequency analysis of biofilm-related ALS1, ALS3, and HWP1 genes. Results. Our findings showed that the most common yeast isolated from vaginal discharge was C. albicans (67%), followed by the non-Candida albicans species (33%). All C. albicans complex isolates were confirmed as C. albicans by HWP-PCR, and all isolates of the C. glabrata complex were revealed to be C. glabrata sensu stricto using the multiplex PCR method. FLC resistance was observed in 23.4% of C. albicans and 7.7% of C. glabrata. The resistance rate to ITC was found in 10.6% of C. albicans. The frequency of ALS1, ALS3, and HWP1 genes among Candida species was 67.1%, 80%, and 81.4%, respectively. Biofilm formation was observed in 54.3% of Candida species, and the highest frequency detected as a virulence factor was for the ALS3 gene (97.3%) in biofilm-forming species. Discussion. Our results showed the importance of molecular epidemiology studies, investigating antifungal susceptibility profiles, and understanding the role of biofilm-related virulence markers in the pathogenesis of Candida strains.

1. Introduction

Vulvovaginal candidiasis (VVC) is a common fungal infection in young women, and several factors such as age, diabetes, pregnancy, taking estrogen-containing birth control pills, antibacterial therapy, and the use of intrauterine devices have been identified as risk factors [1]. Vaginal candidiasis is associated with discharge, inflammation, burning, and redness. Candida albicans is the most important causative agent of VVC, followed by non-Candida albicans species [2]. The diagnosis of vulvovaginal candidiasis is often based on clinical signs and symptoms, and fluconazole is mostly used to treat Candida vaginitis. However, variable levels of resistance against antifungals may emerge in Candida species due to empirical administration or overuse of antimycotic agents [3, 4]. In recent decades, drug resistance has been increasing due to the overuse of antifungals [5, 6]. Therefore, understanding the antifungal susceptibility profiles of Candida species is key in guiding the selection of appropriate treatment for vulvovaginal candidiasis [6]. On the other hand, the pathogenicity of Candida species is increased with factors such as the ability to produce hyphae, binding and adhesion,

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