

Major Article

Relationship between antifungal susceptibility profile and virulence factors in *Candida albicans* isolated from nail specimens

Faezeh Mohammadi^[1], Zeinab Ghasemi^[2], Behnaz Familsatarian^[3], Eelham Salehi^[2], Somayeh Sharifynia^[4], Ameneh Barikani^[5], Monirsadat mirzadeh^[6] and Mohammad Ali Hosseini^[7]

[1]. Medical Microbiology Research Center, Qazvin university of Medical Science, Qazvin, Iran.

[2]. Medical Mycology of Razi Hospital, Tehran, Iran.

[3]. Cellular and Molecular Research Center, Qazvin University of Medical Sciences, Qazvin, Iran.

[4]. Clinical Tuberculosis and Epidemiology Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

[5]. Children Growth Research Center, Qazvin University of Medical Science, Qazvin, Iran.

[6]. Metabolic Disease Research Center, Qazvin University of Medical Sciences, Qazvin, Iran.

[7]. Student Research Committee, Qazvin University of Medical Sciences, Qazvin, Iran.

Abstract

Introduction: The aim of this study was to evaluate some virulence factors in *Candida albicans* isolates from patients with onychomycosis and determine the correlation between these factors and the antifungal resistance profile. **Methods:** Seventy species of *C. albicans* were confirmed using polymerase chain reaction amplification of the *HWPI* gene. According to the Clinical & Laboratory Standards Institute guidelines, the susceptibility profile of four antifungal agents was investigated, and the production of aspartyl protease, phospholipase, haemolysin, and biofilm was determined. The correlation between these profiles was also investigated. **Results:** The isolates indicated different levels of resistance and production of virulence factors. Significant correlations were observed between the minimum inhibitory concentration (MIC) of fluconazole/itraconazole and biofilm production, between phospholipase production and fluconazole/itraconazole MIC, and between fluconazole MIC and hemolytic activity in *C. albicans* isolates. The results also showed significant correlations between phospholipase activity and biofilm production. **Conclusions:** Our findings will contribute to a better understanding of the pathogenesis of *C. albicans* and characterize the relationship between virulence factors and antifungal resistance, which may suggest new therapeutic strategies considering the possible involvement of the virulence mechanism in the effectiveness of treatment.

Keywords: *Candida albicans*. Virulence factors. Biofilm. Antifungal agents.

INTRODUCTION

Candida species are opportunistic fungi that are involved in a wide range of superficial to systemic diseases. Among non-invasive infections, onychomycosis, which is a fungal nail infection caused by *Candida* species, is the most common cause of onychomycosis following dermatophytes^{1,2}. Due to the increase in the number of patients with immunodeficiency, as well as changes in fungal

pathogenicity and antifungal resistance, *Candida* species have gained considerable attention as important pathogenic organisms³.

Secretory proteinases, as *Candida* virulence factors, can improve the potential of fungal organisms to colonize and penetrate into the host tissue and disrupt the immune system⁴. Phospholipase production is another major virulence factor of *C. albicans*, which binds the fungus to the target tissue and generates a pathway to enter the tissue following the hydrolysis of phospholipids and degradation of cell membranes⁵. In addition, haemolysin, as another extracellular enzyme, contributes to the invasion of yeasts through absorption of iron⁶.

Biofilm formation, which is another virulence factor of *C. albicans*, plays a pivotal role in the pathogenesis of fungi through

Corresponding author: Faezeh Mohammadi, PhD.

e-mail: esf.mohamadi@gmail.com

☎ 0000-0002-9822-2626

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