Molecular identification and antifungal susceptibility testing of fungal agents isolated from patients with idiopathic pulmonary fibrosis(IPF) in Tehran, Iran

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Objectives

Idiopathic pulmonary fibrosis (IPF) is a chronic and progressive lung disease. Fungal colonization in patients with lung tissue damage cause of persistent infection. Fungal infections had been studied as causative agents in cases with cystic fibrosis (CF) previously. It is expected there is an association between fungal agents and etiology of IPF. This study aimed to investigate the isolation and molecular identification of fungal agents in IPF patients for the first time in Iran.

Methods

Forty nasopharyngeal (NP) swabs or bronchoalveolar lavage (BAL) samples were obtained from patients that were diagnosed by sophisticated practitioner from April 2015 to March 2016. Direct examination by hydroxide potassium (KOH) carried out for the presence of fungal elements. The samples cultured on Sabouraud dextrose agar (SDA) medium. Conventional methods, Polymerase Chain Reaction (PCR) and Sequencing were used for identification of fungal species. Antifungal susceptibility testing for yeast isolates which was conducted as standardized by Clinical Laboratory Standards Institute (CLSI M27-S3 and S4).

Results:

Of 40 IPF patients, 22 (55%) were female and 18 (45%) were male. 7 (17.5%) of IPF patients were positive for fungal agents as following; 4 (10%) *Candida albicans* (*C. albicans*), 2 (5%) *Candida glabrata* (*C. glabrata*) and 1 (2.5%) *Aspergillus fumigatus* (*A. fumigatus*) were identified using conventional methods (culture), PCR and

sequencing technique. It was found the significant correlation between *C. albicans* colonization in upper respiratory system tract and presence underlying disease in IPF patients ($P < 0.05$). Antifungal susceptibility testing showed, all *C. albicans* isolates were resistant to itraconazole and it is found 3 (75%) *C. albicans* were resistance to amphotericin B, Whereas 3 (75%) and 1 (25%) *C. albicans* isolates were susceptible dose dependant and resistant to fluconazole respectively. Moreover, *C. glabrata* isolates were resistant to fluconazole, itraconazole and amphotericin B.

Conclusions:

Taken together, Fungal agents were detected in 17.5% of Iranian IPF patients. Regarding the high resistance *Candida* isolates against antifungal drugs, isolation and identification of fungal agents, as well as antifungal susceptibility testing is urgent necessity in IPF patients. Also clinician should be notice the antifungal prophylaxis in susceptible IPF cases, However the causes of IPF require more investigation.

Keywords: IPF, *Candida*, *Aspergillus*, Antifungal susceptibility testing