

Distribution and antifungal resistance of *Candida* species isolated from intensive care units

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To the Editor,

The frequency of invasive fungal infection caused by yeasts in intensive care units (ICUs) is increasing. Impairment of the skin and mucosal barrier in the ICUs (catheters, surgery, intubation etc.), renal failure, parenteral nutrition, steroid therapy, and use of broad-spectrum antibiotics are risk factors for invasive candidiasis (1,2). Identification of the strains is important for treatment, prediction of the prognosis, and performing infection control measures to prevent *Candida* infections (3). In the present study, we aimed to demonstrate retrospectively the distribution and antifungal susceptibilities of *Candida* strains isolated from the ICU of our hospital.

One hundred and twenty-one *Candida* isolates obtained from the ICU between January 2010 and May 2014 were evaluated retrospectively. Recurrent strains obtained from the same materials in the same patient and isolates unidentified as to species were not included in the study. A germ tube test was performed on yeast fungi and the identification was performed by VITEC 2 Compact (BioMérieux) system. Susceptibilities of 47 strains to amphotericin B, flucytosine, fluconazole, voriconazole, and caspofungin were investigated by VITEC 2 Compact (BioMérieux) system. Since antifungal susceptibilities of the strains were studied by using various antifungal susceptibility test cards of the VITEC 2 automated system, each antifungal agent was not studied in all strains. We used VITEC breakpoints for testing the antifungal susceptibility of *Candida* species.

A total of 121 *Candida* strains (65 urine samples, 33 blood samples, 18 deep tracheal aspirate samples, 3 wound samples, and 2 catheter samples) were isolated. Distribution of the strains was as follows: 82 *Candida albicans* (67.8%), 20 *Candida parapsilosis* (16.5%), 8 *C. tropicalis* (6.6%), 6 *C. glabrata* (5%), 3 *C. famata* (2.5%), and 2 *C. krusei* (1.7%). *C. albicans* was the most commonly

isolated *Candida* species in all sample groups. The second leading strain is *C. parapsilosis* in all sample groups. All of the *Candida* strains were found to be susceptible to amphotericin B, caspofungin, and voriconazole. Rates of resistance to flucytosine and fluconazole were 3.7% and 2.1%, respectively. Intermediate susceptibility (4.3%) to fluconazole was determined in only *C. tropicalis* isolates among all of the strains.

In terms of the distribution of *Candida* species, *C. albicans* was the most commonly isolated strain in our study. In a study including 1122 *Candida* strains performed by Sav et al., *C. albicans* was the most common strain, similar to our findings (4). When the *Candida* growth in blood cultures in our study was evaluated, the most commonly isolated strain (42.4%) was *C. albicans*. *C. parapsilosis* (30.3%) was the second leading isolated strain in our blood cultures. The rate of *C. parapsilosis* ranged between 12% and 32% in studies reported from Turkey about candidemia (5). Non-*albicans Candida* species were isolated in 57.6% of our blood cultures. The frequency of non-*albicans Candida* species isolated from blood cultures in our ICU suggests that knowing the distribution of *Candida* species in each hospital is important regarding infection control measures and antifungal treatment. The presence of different susceptibilities of species to antifungal agents can be seen with non-*albicans Candida* species; this shows that in vitro antifungal susceptibility tests are very important.

Fluconazole resistance was determined at a rate of 1.4% in 20,576 *C. albicans* strains and at a rate of 3% in 2406 *C. parapsilosis* strains (6). The fluconazole resistance rate was 2.1% in our study, and all *Candida* strains were found to be susceptible to voriconazole, caspofungin, and amphotericin B. In a previous study reported from Turkey, caspofungin, voriconazole, and amphotericin B resistance was not determined in any *Candida* isolates (7).

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In conclusion, voriconazole, caspofungin, and amphotericin B resistance was not determined in *Candida* strains isolated from our ICU. Fluconazole resistance was not seen in the other strains except *C. krusei*. *C. albicans* is the most commonly encountered *Candida* strain in our ICU

and fluconazole resistance was not determined. However, since the distribution of *Candida* species can change over time, identification of the isolates and susceptibility tests for antifungal agents should be performed to enable the development of resistance to be followed.

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