

Epidemiology and Antifungal Susceptibility of *Candida* Species Isolated from Urinary Tract Infections: A Study from an Intensive Care Unit of a Tertiary Care Hospital

Sir,

Nowadays, we see a change in the epidemiology and antifungal susceptibility of various *Candida* spp. isolated from urine samples. In many centers, worldwide, non-*albicans* *Candida* spp. which appear to be better adapted to the urinary tract environment have now replaced *Candida albicans* as the predominant pathogen in nosocomial urinary tract infections (UTIs).^[1] In addition, because of increased resistance to antifungal agents and changing epidemiology of the *Candida* species implicated in UTIs, there is importance of speciation of *Candida* strains before initiating the antifungal treatment.^[2]

In this prospective study, conducted in the multidisciplinary Intensive Care Unit (ICU) of our hospital, the urine samples from critically ill patients were collected using proper aseptic technique in leak-proof sterile containers. The patients with urinary catheter for at least 72 h with previous urine culture sterile for *Candida* spp. were included in the study. To rule out the colonization from true infection, the following observations were considered significant, consistent with true candiduria:

- A pure colony of *Candida* spp. on culture with a colony count of $\geq 10^4$ CFU/ml
- Presence of pus cells on wet mount examination
- Growth of *Candida* spp. on repeat urine culture after catheter removal.^[3]

The *Candida* isolates were speciated by germ tube test, carbohydrate assimilation, and fermentation tests, testing on corn meal agar and CHROM Agar *Candida* (HiMedia-HiCrome™ *Candida* Differential Agar).^[3] The antifungal susceptibility testing of the *Candida* isolates was performed to fluconazole, itraconazole, flucytosine, and amphotericin B by the microbroth dilution method.^[4]

A total of 664 urine samples were received from 340 patients admitted in ICU during the study period and were processed following standard microbiological procedures. Out of all the samples, the growth of pure *Candida* spp. was observed in 75 urine cultures obtained from 60 patients (17.64%). In 15 patients, the same strain of *Candida* species was isolated on repeat urine culture. The most common species isolated was *C. albicans* 58.7% (44) followed by *Candida tropicalis* 24% (18) and *Candida parapsilosis* 17.3% (13). Drug resistance to fluconazole was observed in 62.7% strains of *Candida* spp., among which non-*albicans* *Candida* spp. showed more than 80% fluconazole resistance while 45%

drug resistance was observed in *C. albicans*. Resistance to flucytosine and amphotericin B was seen in 6.67% and 2.67% strains, respectively, of all *Candida* spp.

A study from Mangalore, India, reported a rate of 2.27% candiduria in both out- and inpatients, while another Indian study done in critically ill patients found the rate to be as high as 21.96%.^[2]

The role of species other than *C. albicans* as emergent pathogens of UTI has been well emphasized. Mishra *et al.* in their respective studies reported *C. albicans* as the most common *Candida* spp. implicated in UTIs followed by non-*albicans* *Candida* spp., the finding similar to our study.^[2] Similar resistance has been seen in a study by Mishra *et al.* and Yashavanth *et al.*, respectively.^[2,5]

In conclusion, it is important to differentiate colonization from true infection by clinical signs and microscopic evidence of inflammation. Due to the risk of invasive candidiasis, aggressive management is needed to prevent mortality in these cases. Antifungal resistance in *Candida* is adding another challenge for the intensivist.

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Conflicts of interest

There are no conflicts of interest.

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