

**Original article:**

## **Species distribution and antifungal susceptibility profile of *Candida* isolated from urine samples**

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**Abstract:**

**Introduction:** *Candida* species are unusual causes of urinary tract infections in healthy individuals, but common in hospital settings or among patients with predisposing diseases and structural abnormalities of the kidney and collecting system. Incidence of *Candida* has been on rise worldwide. Species identification of *Candida* is important as non albicans *Candida* species are increasing in number and more resistant to antifungal drugs. Aim and objective of the study was to find out the frequency of *Candida* from urine, their speciation and to determine the susceptibility to antifungal drugs of *Candida* species isolated from urine.

**Material and Methods:** A total of 109 *Candida* spp. isolated from urine samples were included in the study. Speciation of *Candida* was done by conventional methods and colony color on HICHRON *Candida* agar. Antifungal susceptibility testing of the isolates was performed by disc diffusion method on glucose methylene Mueller- Hinton agar (GM-MH).

**Results:** In both the sexes maximum patients belong to age group >50 years. Urinary catheterization, use of broad spectrum antibiotics and diabetes mellitus were the major risks. Isolation of NAC spp. was more. Maximum resistance was seen to fluconazole.

**Conclusion:** The present study reiterates the incidence of *Candida* species among UTIS and their antifungal susceptibility pattern. Incidence of non *Candida* albicans was more than *Candida* albicans. non *Candida* albicans species shows increasing resistance to antifungal drugs. So the species identification of *Candida* isolates along with their antifungal susceptibility pattern can help the clinicians better in treating candiduria.

**Key-Words:** Antifungal Susceptibility; Non- Albicans *Candida* Species; *Candida*.

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**Introduction**

*Candida* species account for almost 10-15% nosocomial UTIs [1, 2]. Candiduria not properly diagnosed and treated has been a source of morbidity and mortality [3]. The emergence of drug resistant *Candida* species, which is largely attributed to use of prolonged and inappropriate empirical therapy, has further complicated the patient management [4]. Anatomic defects of urinary tract, indwelling urinary drainage devices, abdominal surgery, ICU stay, broad spectrum

antibiotic therapy, diabetes mellitus, increased age and female sex are risk factors associated with candiduria.[5] isolation of *Candida* spp. from urine may give rise to variety of interpretation, from procurement contamination of sampling to renal infection and collection system to life-threatening, invasive *Candidacies*.[6] In recent years with the advent and increasing use of fluconazole, the emergence of non-albicans *Candida* (NAC) spp. is noted.[7]

**Materials and methods**

In the present study total number of 109 *Candida* species was isolated from urine.

Quantitative cultures with *Candida* colony counts of  $> 10^4$  colony forming unit (CFU)/ ml in patients without indwelling urinary catheter and of  $\geq 10^3$  CFU/ ml of urine in patients with indwelling urinary catheter were considered significant. Contamination was differentiated from infection by obtaining second urine sample. Only when the second specimen showed the growth of *Candida*, the further mycological workup was done.

Species identification of *Candida* isolates was done by conventional techniques a colony color on HiChrome *Candida* agar. [8] Antifungal susceptibility of the isolates for fluconazole, ketoconazole, itraconazole and amphotericin B was done by disc diffusion method on glucose methylene Mueller- Hinton agar (GM-MH)[9] The antifungal discs were procured from Himedia Laboratories Pvt. Limited, Mumbai. The zone diameters were interpreted as per the approved Clinical and Laboratory Standards Institute (CLSI) (formerly known as National Committee for Laboratory Standards (NCCLS)) M44-A

guidelines. [10] *C. albicans* (ATCC 90028) and *C. krusei* (ATCC 6258) were used as control strains.

**Results**

In the present study, candiduria was more common in females. In both the sexes maximum patients belong to age group  $>50$  years( table-1) Urinary catheterization followed by the use of broad spectrum antibiotics and diabetes mellitus were the major risks for the development of candiduria.

Out of 109 isolates, 40 (36.6%) were *C. albicans* whereas 69 (63.3%) belonged to NAC spp. Among NAC spp. *C. tropicalis* followed by *C. glabrata* were the major isolates. Table 2 shows the antifungal resistance pattern of *Candida* isolates out of 40 isolates of *Candida albicans* 16 (40% ) showed maximum resistance to fluconazole followed by ketoconazole . 41(37.6%) of the isolates were resistant to fluconazole. Fluconazole resistance was more in *C. tropicalis* (40%) followed by *C. albicans* (40%) and *C. kefyr* (38.4%). Resistance to ketoconazole was common in *C.krusei* (44.4% ) followed by *Candida albicans* (37.5% ).Amphoteresin B resistance was maximum in *Candida kefyr*

**Table 1**-Age/gender wise distribution of *Candida* isolates.

Age groups	Male	Female	Total
1-15	06	10	16
16-30	05	15	20
31-45	10	12	22
46-60	10	20	30
>60	10	11	21
No of isolates	41(37.6%)	68(62.3%)	109

**Table 2-**Antifungal resistance pattern of Candida isolates.

Candida sp.	Fluconazole.	Itraconazole	Ketoconazole	Amp.B	Total
C albicans	16(40%)	14(35%)	15(37.5%)	03(7.5%)	40
C tropicalis	10(40%)	10(40%)	7(28%)	2(8%)	25
C glabrata	5(33.3%)	6(40%)	4(26.6%)	1(6.6%)	15
C kefyr	5(38.4%)	4(30.7%)	4(30.7%)	5(38.4%)	13
C krusei	3(33.3%)	3(33.3%)	4(44.4%)	-	09
C.parapsilosis	1(25%)	1(25%)	1(25%)	-	04
C guilliermondii	1(33.3%)	1(33.3%)	1(33.3%)	-	03
<b>Total</b>	41(37.6%)	39(35.7%)	36(33.2%)	11(10.09%)	109

**Discussion:**

The Incidence of candiduria caused by the species other than C. albicans was surprisingly high in the present study. In the last few years various factors like immunocompromised status, immunosuppressive therapy, prolonged hospital stay, prolonged antibiotic therapy, and cauterization have all contributed for increase in number of cases of candiduria [11-13]. Catheterization process increases chances of UTIs by allowing migration of the organisms into the bladder from external periurethral surface. The indiscriminate, inadequate use of antifungal drugs, especially azole group have all contributed for increase in emergence of resistance strains of Candida [14]. In our study candiduria was common in female patients(62.3%) as Candida species is a frequent colonizer of vagina and may ascend to bladder and to the kidneys. Similar observations were seen in the study done by Payam Behzadi et al (15). In our

study Candida isolates showed maximum resistance to fluconazole as compare to other antifungal agents. The resistance to fluconazole in Candida is of significant concern as it is useful drug because of high concentration active drug in urine and better tolerability. In our study isolation rate of non albicans Candida was 69 (63.3%) which is higher than C albicans (36.6%), this finding correlates with the study of Iman et al.(16)

**Conclusion**

Candiduria is becoming an important nosocomial infection, incidence of non Candida albicans was more than Candida albicans. This shift towards NAC species as a causative agent has generated the concern. NAC species are more resistance to antifungal as compared to C albicans. Therefore species identification of Candida isolates along with their antifungal susceptibility pattern can help the clinicians better in treating candiduria.

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