

INCIDENCES OF *CANDIDA ALBICANS* AND NON-ALBICANS AMONG CATHETER-ASSOCIATED URINARY TRACT INFECTION PATIENTS OF AKOLA CITY

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## ABSTRACT

**Objective:** *Candida* spp. is the third leading cause of catheter-related infections. *Candida* species is a part of human microflora and it becomes pathogenic when certain conditions are present and cause an opportunistic infections. The present study was undertaken to determine incidences of *Candida albicans* and non-albicans among catheterized urinary tract infection (UTI) patients of Akola city.

**Methods:** A total 60 catheter urine samples were collected from patient of all the age group and both sex who had indwelling urinary catheter. The collected catheterized urine samples of patients from various hospitals of Akola city were used for isolation using HiCrome *Candida* differential agar.

**Results:** It was found that highest frequency of isolation of *Candida* spp. was from age group 61-70 years. The predominance of male candidate was more than female having *Candida* spp. in catheter-associated UTI (C-UTI). Among the *Candida* spp. *C. albicans* (64.81%) was predominant over non-albicans spp. while in non-albicans *Candida krusei* and *Candida glabrata* were predominant showing 11.11% incidences. It was followed by *Candida tropicalis* (9.2%) and *Candida parapsilosis* (3.7%).

**Conclusion:** The incidences of *C. albicans* and non-albicans were high among catheter-associated UTI patients.

**Keywords:** *Candida* spp., Catheter-associated urinary tract infection, Non-albicans

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## INTRODUCTION

*Candida* species are the most common cause of fungal infections worldwide. *Candida* species are normal microbiota within the gastrointestinal tracts, respiratory tracts, vaginal area, and the mouth and it is sexually transmitted diseases. *Candida* is a yeast growth present in all females and is normally controlled by bacteria. *Candida* species differ in their antifungal susceptibility and virulence factors. The genus is composed of a heterogeneous group of organisms, and more than 17 different *Candida* species are known to be etiological agents of human infections. The yeast begins to invade and colonize the body tissues by releasing powerful chemicals into the bloodstream causing such varying symptoms as lethargy, chronic diarrhea, yeast vaginites, bladder infections, muscle and joint pain, menstrual problems, constipation, and severe depression. The medical term for this overgrowth is candidiasis. Candidiasis is responsible for 90% of the cases of infectious vaginites [1].

*Candida* species is a part of human microflora and it becomes pathogenic when certain conditions are present and cause an opportunistic infections [2]. The major etiological agent is *Candida albicans*, whereas different *Candida* species can cause a variety of infections including *Candida tropicalis*, *Candida dubliniensis*, *Candida parapsilosis*, *Candida krusei*, *Candida guilliermondii*, *Candida glabrata*, and *Candida kefyer* which represent many clinical forms of candidiasis. Some of these species are encountered as secondary infections to another species, for example; *Candida parapsilosis* is secondary infection only when *C. albicans* as a cause of *Candida* endocarditic. Still other species of *Candida* have been occasionally isolated from clinical isolates such as *Candida catenulate*, *Candida intermedia*, *Candida lambica*, and *Candida zeylanoides*. These species are therefore not considered as agents of opportunistic infections [3].

*Candida* spp. is the third leading cause of catheter-related infections after coagulase-negative Staphylococci and *Staphylococcus aureus*. It is associated with high rates of crude mortality *C. albicans* and *C. parapsilosis* are the most frequent fungi in hospitalized patients and in hospital environments. They are also the species that most commonly produce biofilm, a characteristic that facilitates persistent infections, such as catheter-related candidaemia [4]. In view of this present study was undertaken to determine incidences of *C. albicans* and non-albicans among catheterized urinary tract infection (UTI) patients of Akola city.

## METHODS

## Collection of urine sample

Urine sample was collected from patients in different private and government hospital of Akola city. A total 60 catheter urine samples were collected from patient of all the age group and both sex who had indwelling urinary catheter. Samples were collected by puncturing the catheter tubing with a long-term indwelling catheters. About 2 ml urine samples were collected in a sterile urine container from catheterized patients and transported immediately to the laboratory.

Isolation of *Candida albicans* and non-albicans

The urine sample which was collected then each urine sample was inoculated on to the HiCrome *Candida* differential agar, medium by four-way streaking, and the plates were incubated 37°C for 24-48 hrs and next day colonies were observed.

## Identification of isolates

Gram staining and microscopic study was performed for the isolation of yeast culture from HiCrome *Candida* differential agar plates. Identification of isolates obtained in pure culture was based on gram

staining, morphology, growth characteristics on selective media biochemical test, and germ tube.

**RESULTS**

The majority of the fungal catheter-associated UTIs (C-UTI) are caused by *Candida* spp. hence the present study was under taken to highlight the presence of *Candida* in urine and possibility of infection of C-UTI. Candiduria brings morbidity and mortality if they are not properly diagnosed and treated.

In this prospective analysis study, a total of 60 clinical catheterized urine samples were collected. Species were isolates from 54 samples while 6 samples showed absence for any *Candida* species. The cultural, morphological, and biochemical characteristics of the isolates was determined by standard conventional methods. Apart from *C. albicans* among non-albicans, *C. tropicalis*, *C. krusei*, *C. glabrata*, and *C. parapsilosis* was probably identified.

Distribution of *Candida* spp. among different age groups was studied as shown in Table 1. It was found that age group of 61-70 years had the highest frequency of *Candida* spp. with a total of 15 (27.77%), followed by the age group 41-50 years with total of 13 (24.07%), then followed the age group of 51-60 years with total of 12 (22.22%), and then, followed the age group of 31-40 years with total of 8 (14.81%), and least in age group of 21-30 years were recorded which was 6 (11.11%).

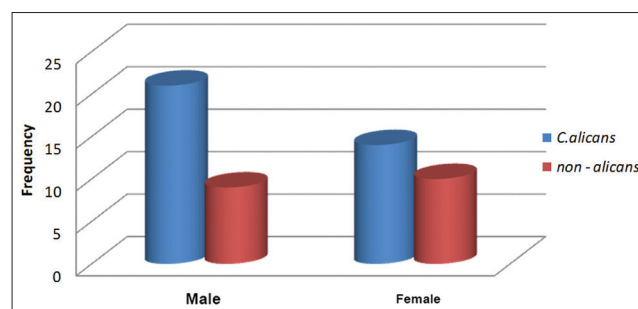
The gender-wise distribution of occurrence of *C. albicans* and non-albicans was also studied (Table 2 and Fig. 1). In our present investigation, it was found 30 (55.55%) *Candida* species were isolated from male. Occurrence of *Candida* infection due to albicans and non-albicans among male was more, while in female the occurrence was less as only 24 (44.44%) *Candida* species were isolated. In the present study, it was found that incidences of *C. albicans* among UTI patient was more as total 35 (64.81%) *C. albicans* were isolated. While only total 19 (35.18%) non-albicans spp. were found to be isolated (Fig. 2). The prevalence of *C. albicans* and non-albicans was also studied it was found that *C. albicans* was predominant over non-albicans. The prevalence of *C. albicans* was 64.81%. Among non-albicans, *C. krusei*, and *C. glabrata* was predominant showing 11.11%. It was followed by *C. tropicalis* which showed 9.2% prevalence and least by *C. parapsilosis* which showed 3.7% (Table 3).

**DISCUSSION**

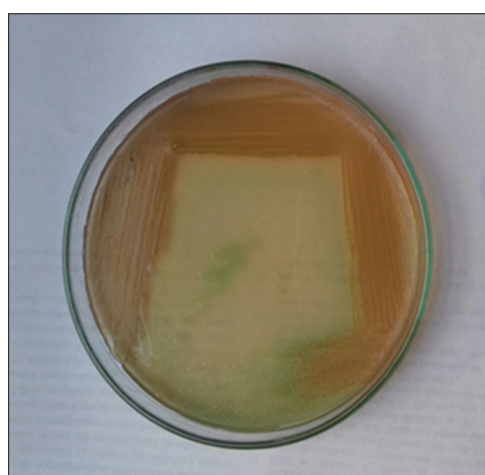
In the present study, a total of 54 *Candida* species were isolated from 60 urine samples collected from catheterized patients from various hospitals of Akola city. The age group-wise distribution of the *Candida* species isolated was studied (Fig. 3). It was found that more no of *Candida* species were isolated from age group 61-70 which were 15 (27.77%) while least were isolated from age group 21-30 years in which only 6 (11.11%) *Candida* species were encountered. This is in agreement with who reported highest isolation rate of *Candida* in age group above 60 years [5]. They also reported people above 40 years of age were highly infected with *Candida* species [6]. This finding however contradicted earlier research which reported higher frequency of *Candida* species (57%) within age group 26-35 years [7]. The reported *C. albicans* to be the most incriminated yeast isolates in UTI [8]. This finding however contradicted the earlier report of Okungbowa *et al.*,

who reported 54% incidence rate within age bracket 20-30 years in Northern Nigeria. 35% incidence rate was reported within age group 26-36 years in Benin City [9].

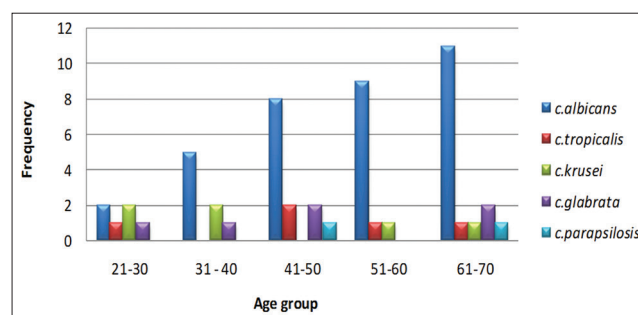
Among the *Candida* species isolated gender-wise distribution was also determined in the present study (Table 2). It was found that more



**Fig. 1: Gender-wise distribution of *Candida albicans* and non-albicans**



**Fig. 2: *Candida albicans* and non-albicans on HiCrome *Candida* differential Agar**



**Fig. 3: Isolation of *Candida* species from different age group**

**Table 1: Isolation of *Candida* spp. from different age group**

S. No.	Age group	<i>C. albicans</i>	<i>C. tropicalis</i>	<i>C. krusei</i>	<i>C. glabrata</i>	<i>C. parapsilosis</i>	Total (%)
1	21-30	2	1	2	1	0	6 (11.11)
2	31-40	5	0	2	1	0	8 (14.81)
3	41-50	8	2	0	2	1	13 (24.07)
4	51-60	9	1	1	0	1	12 (22.22)
5	61-70	11	1	1	2	0	15 (27.77)
	Total	35	5	6	6	2	54

*C. albicans*: *Candida albicans*, *C. tropicalis*: *Candida tropicalis*, *C. krusei*: *Candida krusei*, *C. glabrata*: *Candida glabrata*, *C. parapsilosis*: *Candida parapsilosis*

**Table 2: Gender-wise distributions of *C. albicans* and non-albicans**

Gender	Number of <i>Candida</i> spp. (%)		
	<i>C. albicans</i>	Non-albicans	Total
Male	21 (38.88)	9 (16.66)	30 (55.55)
Female	14 (25.92)	10 (18.51)	24 (44.44)
Total	35 (64.81)	19 (35.18)	54 (90)

*C. albicans*: *Candida albicans*

**Table 3: Prevalence of *C. albicans* and non-albicans from urine sample**

S. No.	Name of isolate	Total (%)
1	<i>C. albicans</i>	35 (64.81)
2	<i>C. tropicalis</i>	5 (9.2)
3	<i>C. krusei</i>	6 (11.11)
4	<i>C. glabrata</i>	6 (11.11)
5	<i>C. parapsilosis</i>	2 (3.7)

*C. albicans*: *Candida albicans*, *C. tropicalis*: *Candida tropicalis*, *C. krusei*: *Candida krusei*, *C. glabrata*: *Candida glabrata*, *C. parapsilosis*: *Candida parapsilosis*

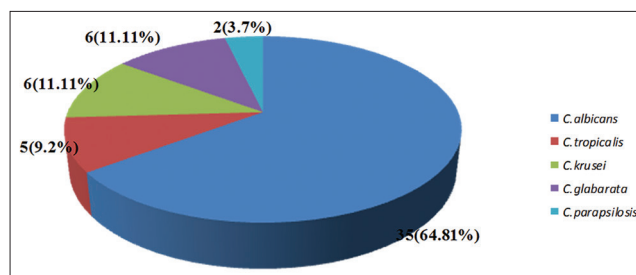
no of *Candida* species were observed among male than female which showed similarity with other [12]. Among male and female both gender *C. albicans* was more predominant. This in concordance with the findings of Goyal *et al.*, [5], and Ponmudi *et al.*, [10] who reported rate of isolates of *Candida* species were more in females than in males.

The cultural, morphological, and biochemical identification of isolates reveals that the isolates were belongs to *C. albicans*, *C. tropicalis*, *C. krusei*, *C. glabrata*, and *C. parapsilosis* (Fig. 4). Among the distribution of *C. albicans* and non-albicans, it was found that *C. albicans* were predominant than non-albicans. Mehta and Date [11] also reported more no of *C. albicans* than non-albicans from the urine samples from Tamil Nadu, India. Taffeng *et al.* [7] also reported similar high incidences of *C. albicans* (63.9%). Okungbowa *et al.* [8] also reported *C. albicans* to be the most incriminated yeast isolate in UTI. This finding however not supported by some studies who reported *C. glabrata* as the most common *Candida* species [9]. The increased incidences of non-albicans among UTI patients also reported non-albicans *Candida* species is a matter of concern [5].

Among the non-albicans *Candida*, *C. tropicalis* (9.2%) was the most common. This is similar to the findings [5] who also reported the same. Among the non-albicans *Candida*, *C. krusei* (11.11%) and *C. glabrata* (11.11%) was the most common. This is similar to the finding of who was also reported the same. Then, the non-albicans *Candida*, *C. parapsilosis* (3.7%) was the most common. This is corresponding to the other finding [12].

## CONCLUSION

The incidences of *C. albicans* and non-albicans were high among catheter-associated UTI patients. The UTI due to *Candida* species was more in old age and among male. The *C. albicans* was the emergent

**Fig. 4: Prevalence of *Candida albicans* and non-albicans isolates from urine sample**

pathogen of C-UTI than non-albicans species. The further study of species identification along with their antifungal susceptibility pattern can be helpful for better treatment.

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## REFERENCES

- Ryan KJ, Ray CG. Sherris Medical Microbiology, An Introduction to Infectious Disease. 4<sup>th</sup> ed. New York: McGraw-Hill, - McGraw Hill Professional; 2004. p. 661-3.
- Al-Oebady MA. Isolation and identification of *Candida* species from vaginal, urine and oral swabs by chromagar *Candida*. Int J Adv Res 2015;3(1):948-56.
- Emilio B, Jesus G, Maria G. The role of antifungals against *Candida* biofilm in catheter-related Candidemia. J Antibiot 2015;4:1-17.
- Goyal RK, Sami H, Mishra V, Bareja R, Behara R. Non-albicans candiduria: An emerging threat. J Appl Pharm Sci 2016;6(3):048-50.
- Rajeswari P, Vijayalakshmi P, Jegadeeshkumar D. Prevalence of biofilm producing MDR *Candida albicans* and non - *Candida albicans* isolate from medical device. Int J Appl Biol Pharm Technol 2012;3(4):254-63.
- Akortha EE, Nwaugo VO, Chikwe NO. Antifungal resistance among *Candida* species from patients with genitourinary tract infection isolated in Benin City, Edo state, Nigeria. Afr J Microbiol Res 2009;3(11):694-9.
- Taffeng YM, Agba MI, Nwobu GO, Agbonlahor DE. *Candida albicans* in urinary tract or seminal sac. Online J Health Allied Sci 2004;2(4):4-5.
- Okungbowa FI, Isikhuemhen OS, Dede AP. The distribution frequency of *Candida* species in the genitourinary tract among symptomatic individuals in Nigerian cities. Rev Iberoam Micol 2003;20(2):60-3.
- Bukhary ZA. Candiduria: A review of clinical significance and management. Saudi J Kidney Dis Transpl 2008;19(3):350-60.
- Ponmudi R, Uma C, Sivagurunathan P, Aruljothi S. Occurrence and antifungal susceptibility pattern of candiduria isolates among diabetic patients. Int J Pharm Rev Res 2015;5(4):345-9.
- Mehta A, Date VS. Determine of incidence of different *Candida* species in clinical specimens and characterization of *Candida* species isolates. Indian J Microbiol Res 2016;3(4):342-51.
- Saranya S, Moorthy K, Sakthivel S, Malar AS, Punitha T, Vinodhini R, et al. Prevalence and antifungal susceptibility pattern of *Candida albicans* from low socio-economic group. Int J Pharm Pharm Sci 2014;6:158-62.