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Original Research Paper

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# URINARY TRACT CANDIDIASIS: ALBICANS AND NON-ALBICANS

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**ABSTRACT**

**BACKGROUND:** Urinary candidiasis is one of the most confusing forms of candidiasis since the differentiation between colonization and real infection is difficult to make.

**MATERIAL AND METHOD:** A total 1270 urine samples were collected and processed over a period of one year. Candida isolated were further identified and characterized using standard techniques on the basis of Gram staining, Germ Tube Test, Culture on CHROM agar.

**RESULT:** Out of 1270 urine samples, Candida was grown in 13%. Growth of C.*albicans* was observed in 61.81%.Most common age group involved was more than 60 years. Among the culture positive samples 55.15% were males and 44.85% were females. Germ tube test was approximately 87% accurate in comparison with the CHROMagar for identifying C.albicans.

**CONCLUSION:** The precise (species-level) identification of Candida spp. may become necessary in complicated cases to aid the decision on antifungal therapy.

**KEYWORDS :** Candiduria, C. Albicans ,germ Tube Test, Chrom Agar.

## INTRODUCTION

The most common yeasts that infect humans are the *Candida* species and *Cryptococcus* species. In the last few years, there has been a significant rise in the occurrence of infections due to Candida species. Lately, this increase has been more commonly seen in urinary tract infections. *Candida albicans* is a commensal resident of the human gastrointestinal and genital tracts. The ability of *C. albicans* to grow as long filamentous hyphae is critical for its pathogenic potential as it allows the fungus to invade the underlying substratum

The presence of *Candida* in urine is referred to as candiduria. The majority of patients with candiduria suffer a completely benign process.[1]Urinary candidiasis is one of the most confusing forms of candidiasis since the differentiation between colonization and real infection is difficult to make. Isolation of *C. albicans* in urine is believed to represent colonization or contamination.[2]

The infection may involve bladder and kidneys. It is reported in association with disseminated candidiasis, diabetes mellitus, pregnancy and prolonged administration of antibiotics and use of unclean catheters and immunoco mpromised host.

## MATERIAL AND METHODS

A total 1270 urine samples were collected from January 2019 to December 2019 in our laboratory. It was an observational study without intervention, so an ethical committee statement was not needed.

## INCLUSION CRITERIA

Male and female patients of all age groups were considered for our study. Both outpatients and inpatients who presented with signs and symptoms of urinary tract infections were included. Pure growth of yeast isolates with significant colony count was included in the study.

## EXCLUSION CRITERIA

The urine samples, where *Candida* species was isolated in the absence of pyuria, *Candida* with colony count ≤ 1000 CFU/ml and mixed growth (poly-microbial growth) were excluded from analysis.

Urine wet mount examination was done to look for the presence of pus cells, red blood cells, casts, crystals or any bacterial or fungal elements or yeast cells..

In the laboratory, the urine sample was processed as for bacterial culture. The culture plates were incubated aerobically at 37°C for 24 to 48 hours. *Candida* species isolated on culture plates with colony count >10000 CFU/ml were considered significant.[3,4]

The loopful of urine sediment was applied on Sabouraud's dextrose agar.Growth obtained were further identified and characterized using standard techniques on the basis of Gram staining, Germ Tube Test(GTT/Reynold's Braude phenomenon), Culture on CHROM agar.

Chromagar Candida selective and differential agar (Chrom agar, France) was used for detection and quantif ica tion of Candida species in the samples. After inoculation on to CHROM agar, the plates were incubated for 24-48 hours at 30°C and the results were read according to the standard instruction from the manufacturers. Species were presumptively identified based on colony colour light green colonies as C.albicans; metallic to dark blue colonies with or without a purple halo as C.tropicalis ; pink and rough spreading colonies with pale edges as C.krusei, dark pink/mauve colonies with pale edge as C.glabrata, and white or gray colonies as unidentified species. Results thus collected were analysed for the relevance of this study.

## RESULTS

Of the 1,270 samples, 165(13%) were found to be positive for Candida. Growth of *C.albicans* was observed in 61.81%. Among the non Candida albicans C.tropicalis, C.pa rap silo sis, C.glabrata and C.krusei were 16.96%, 8.48%,7.88% and 4.85% respectively. Among the culture positive samples

55.15% were males and 44.85% were females. Most common age group involved was more than 60 years.

**Table 1: Comparison on the basis of GTT and CHROMagar**

| | Germ Tube Test(GTT) | CHROMagar |
|---|---|---|
| C.albicans | 89 | 102 |
| Non Candida albicans | 76 | 63 |
| Total | 165 | 165 |

**Table 2: Age and Gender-wise distribution of isolates**

| Age group(years) | Males | Females | Isolates (%) |
|---|---|---|---|
| 0-15 | 7 | 6 | 13(7.87%) |
| 16-30 | 12 | 8 | 20(12.12%) |
| 31-45 | 21 | 19 | 40(24.24%) |
| 46-60 | 22 | 19 | 41(24.84%) |
| >60 | 29 | 22 | 51(30.09%) |

## DISCUSSION

In the present study the prevalence of Candida was found to be 13% which is in concordance with the study conducted by Rashmi et al[5], Zeiri et al[6] and Ahmed et al[7]. Males were more in the present study as compared to females which is supported by the study done by Yashwanth R. et al[8] and Rashmi et al[5].

Similar to the present study, the study conducted by Yashwanth R. et al[8] and Rahul et al[9] also observed that the most common age group affected was more than 60 years.

In the present study we have found that C.albicans was more common as compared to non-albicans Candida which is in accordance with Chuan Hun Ding et al[10] , Bushra Jamil et al[11], Fraser et al[12], Richet H. et al[13], Ariff S. et al[14], Passos et al[15], Binelli et al[16] and Elza et al[17].

C.tropicalis in our study was 16.96% which is similar to the study conducted by Fraser et al[12], Elza et al[17]and Rahul et al[9]. C.parapsilosis and C.glabrata in the present study were 8.48% and 7.88% respectively which is in concordance with the study done by Fraser et al[12], Elza et al[17] and Shibata et al[18]. In our study the prevalence of C.krusei was 4.85% which is in accordance with the study by Shibata et al[18] and Rashmi et al[5].

**Table:3 Comparison of the present study with other studies**

| | C.albicans | C.tropicalis | C.parapsilosis | C.glabrata | C.krusei |
|---|---|---|---|---|---|
| Present Study | 61.81% | 16.96% | 8.48% | 7.88% | 4.85% |
| Fraser et al[12] | 63% | 17% | 6.5% | 13% | - |
| Elza et al[17] | 56% | 20% | - | 11% | - |
| Shibata et al[18] | - | - | 11% | 8.8% | 6.6% |
| Rahul et al[9]. | | 20.6% | | | |
| Yashwanth R. et al[8] | | | | 9.09% | |
| Chuan Hun Ding et al[10] | | | | 9.4% | |
| Passos et al[15] | 70% | | | 7% | |
| Rashmi et al[5] | | | | | 3.79% |

In our study, out of 165 Candida isolates 89 were found positive for germ tube test while 102 were positive by CHROMagar. Germ tube test in our study was approximately 87% accurate in comparison with the CHROMagar for identifying C.albicans.

## CONCLUSION

The presence of candiduria represents therapeutic challenge for physician and should be verified by the second clean catch urine culture. The precise (species-level) identification of Candida spp. may become necessary in complicated cases to aid the decision on anti-fungal therapy.

## LIMITATIONS

Some limitations of this study must be acknowledged. Firstly, the presence and nature of symptoms of the patients are unknown, which would be a critical parameter in the differe ntiation of contamination(although in these cases 105 CFU/ml is rare) colonization and true infection.[19] In addition, due to the inability to access the medical records of the individual patients affected, the correlation between the existence of relevant risk underlying illnesses (e.g., Type 2 diabetes, recent courses of broad-spectrum antibiotics, iatrogenic or disease related immunosuppression) and candiduria could not be assessed.[20] Furthermore, antifungal susceptibility testing of the isolated Candida species was not performed, therefore no information is presented regarding the resistance trends in the isolated fungal strains.[21]

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