OPEN ACCESS
Saudi Journal of Pathology and Microbiology
Abbreviated Key Title: Saudi J Pathol Microbiol
ISSN 2518-3362 (Print) |ISSN 2518-3370 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: http://scholarsmepub.com/sjpm/

Original Research Article

Prevalence of Candiduria and Characterisation of *Candida* Species in Tertiary Care Center

V. C. Abishek[1*], Kalyani Mohanram[2], R. Preethy[3]

[1]Under graduate, Second year MBBS, Department of Microbiology, Saveetha Medical college and Hospital, Thandalam, Chennai, India
[2]Professor & Head, Department of Microbiology, Saveetha Medical College and Hospital, Thadalam, Chennai, India
[3]Post graduate, Department of Microbiology, Saveetha Medical College & Hospital, Thandalam, Chennai, India

DOI:10.21276/sjpm.2019.4.7.18 | **Received:** 20.07.2019 | **Accepted:** 27.07.2019 | **Published:** 30.07.2019

***Corresponding author:** V. C Abishek

Abstract

Introduction: *Candida* is a genus of yeast which is the most common cause of fungal infection. *Candida albicans* is most important fungal opportunistic pathogen. The candiduria refers to the presence of yeast in urine either by the microscope observation of budding pseudohyphae, or by the growth of fungi in culture. ***Aim:*** To find the prevalence of candiduria in tertiary care Centre. ***Materials and Method:*** This was a study conducted at Saveetha medical college from January 2018 to December 2018, the total number of urine sample collected were 10194 out of which 2500 showed various microbial growth, out of which 50 *Candida* strains were isolated. Speciation was done according to standard protocol. ***Result:*** The prevalence of candiduria caused by *Candida non-albicans* species (1.24%) is more than that caused by *Candida albicans* species (0.76%). The prevalence is more in female (66%) than male (34%). Among the age group the prevalence is more in the age group between 21-30 years (50%). Candiduria cases are common among the NON-ICU cases with 92%. Candiduria is prevalent among the non-diabetic patients with 92%. ***Conclusion:*** Urinary tract candidiasis is known as the most frequent nosocomial fungal infection worldwide. *Candida albicans* is the most common cause of nosocomial fungal urinary tract infections; however, a rapid change in the distribution of *Candida* species is undergoing. Simultaneously, the increase of urinary tract candidiasis has led to the appearance of antifungal resistant *Candida* species.

Keywords: *Candida*; Candiduria and Characterisation; NON-ICU cases.

INTRODUCTION

Candida is a genus of yeast which is the most common cause of fungal infection. The total number of species are 150 among which 20 species are causing infection in humans [1].*Candida albicans* is the most important fungal opportunistic pathogen [2]. It usually resides in the gastrointestinal and genitourinary tracts and in the oral and conjunctival flora. However, it causes infection when the host becomes debilitated or immunocompromised.C.*tropicalis,C.glabrata,*C.*parapsilosis,*C.*dubliniensis,*C.*lusitaniae,*C.*krusei are the other Candida species* [1].

The candiduria refers to the presence of yeast in urine either by the microscope observation of budding pseudo hyphae not, or by the growth of fungi in culture. Urinary candidiasis is the most confusing form of candidiasis as the differentiation between colonization and the real infection is difficult to make. Candiduria may also be a sign candidemia or invasive renal candidiasis. It may also cause candidemia during invasive urological procedures.

Candida albicans the most common yeast isolated in patients with urinary tract infection [8]. However, there is changing pattern with a rising in prevalence of *non albicans candida.* The permanent resistance of non-*albicans Candida* to fluconazole is well recorded, making it necessary for the speciation of *Candida* in patients with UTI for initiation of appropriate therapy [5]. The classification and identification of yeast in urine is essential to identify the etiology, since the pathogenicity and the susceptibility pattern to antifungal present variations according to species.

Distinguishing contamination of true infection is not easy in spite of existence of reliable diagnostic criteria for significant candiduria. Several predisposing factors such as use of indwelling urinary devices, diabetes mellitus, extremes of ages and female sex, prior antibiotic use, prolonged hospitalized stay have been identified as being associated with increase of *Candida* growth in urine [3]. Human infection by

Candida species is endogenous but it can be acquired exogenously through contaminated health care worker, infuscate and biomaterials [4].

For instance, about 20% have fungal lesions in their small and large intestine [6]. Though the association between the *Candida* and colonization had been well recorded, recently it was further clarified, candidiasis is mostly seen in the solid tumours of the gastrointestinal tract of cancer patients, if metastasis is present [7]. Thus, this study may provide data on the prevalence of urinary tract infections caused by different species of *Candida*, as well as the evaluation. The present study has as its primary justification to reveal the incidence of major species of *Candida sp.*in the studied population, as well as its susceptibility profiles to the antifungal most commonly used in therapy, as a way of contributing to local medical professionals.

MATERIALS AND METHODS

This Retrospective study conducted at Saveetha medical college from January 2018 to December 2018 included Urine sample of 10194 patients of various departments of which 2500 had various growth, from which 50 *Candida* strains were isolated. Continuous sample collection technique is used. Patient's clinical and demographic detail along with risk factor and co-morbid conditions were collected. Continuous sample collection technique is used.

After initial direct Gram staining, urine samples were streaked by calibrated loop (0.01 ml) on Cled plates and incubated at 37ºC over night and read on next day. Any significant growth showing growth of yeast cells on Cled agar plate with significant colony count of $>10^5$ colony forming units/ml and presence of yeast cells on direct microscopy confirm the presence of candiduria in urine. The amount of 100 CFU/ml, representing a single colony of yeast on a plate was regarded as a detection limit. *Candida* species were identified by germ tube formation in fetal calf serum at 37ºC. Chrome agar was used to differentiate among different species of candida. Urine samples with other bacterial growth were excluded from the study

The basic culture media used in isolating *Candida* are Cled agar, Chrome agar,blood agar, potato dextrose broth, sabouraud dextrose agar, yeast nitrogen base and yeast potato dextrose broth and cornmeal agar. Other media that can be used as a selective or differential media are *Candida* select 4 [21]. Since *C.albicans* and *C.dubliniensis* are related species which are difficult to differentiate phenotypically, cultivation on Bird seed agar was found to be fast, sensible and reliable method to discriminate these two species [22].

RESULT

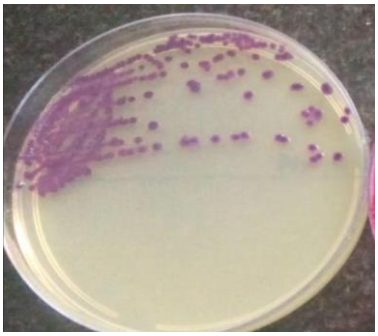


Fig-1: shows the growth of *C.krusei* on chrome agar plate

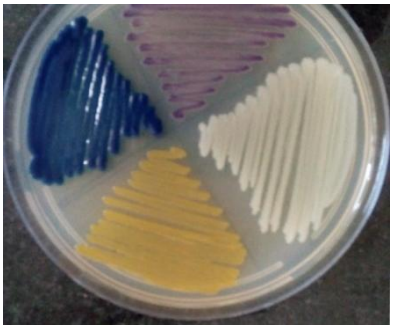
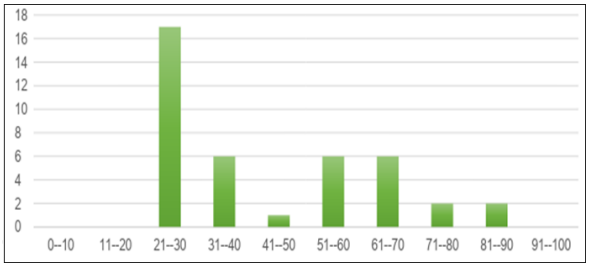


Fig-2: Shows the Growth of *C.albicans* (white colony) and *C.tropicalis* (navy blue colony)

Tabulation-1: Shows Age wise distribution of *Candida* species. Candiduria is more common in patients between the age group 21-30 years about 50% followed by the age group of 31-40, 51-60 and 61-70



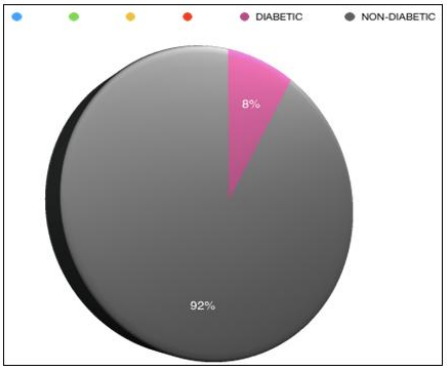


Fig-3: Represents the candiduria case distribution among the diabetic and non diabetic patients. The result interprets candiduria is prevalent among the non diabetic patients with 92% (46 patients) than the diabetic patients with 8%. (4 patients)

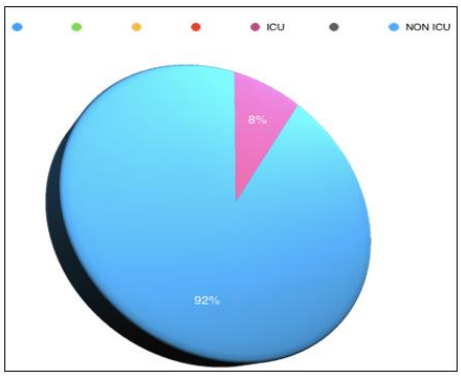


Fig-4: Represents the candiduria distribution among ICU and NON ICU (ward patients'). Candiduria cases are common among the NON ICU with 92% (46 patients) than the ICU cases with 8% (4 patients)

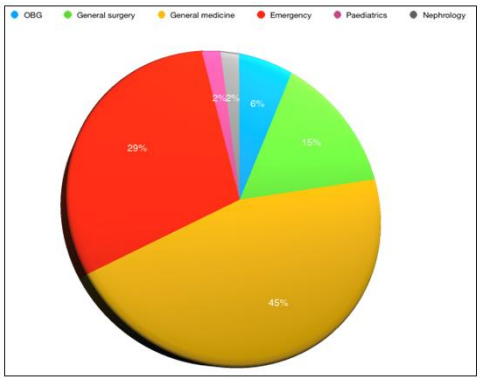


Fig-5: Represents distribution of candiduria cases in various wards. Candiduria is more common among the general medicine department (45%) followed by Emergency department 29%), General surgery (15%)

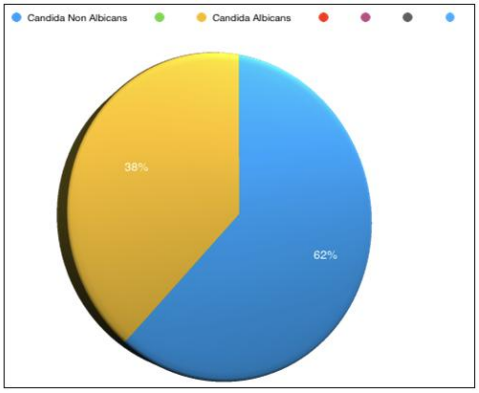


Fig-6: Represents the prevalence of *Candida* species among the candiduria cases. The result interprets the *Candida non albicans* with 62% (31 patients) is more than the *Candida albicans* with 38% (19 patients)

DISCUSSION

This was a Retrospective study conducted at Saveetha medical college from January 2018 to December 2018 included Urine sample of 10194 patients of various departments of which 2500 had growth, from which 50 *Candida* strains were isolated under the guidance of microbiology Department. The finding of candiduria in a patient with or without symptoms should be neither dismissed nor hastily treated, but requires a careful evaluation. The recent survey reports show that the candiduria is more common in women is more than men [9]. *Candida albicans* and *C.non albicans* species are considered important parts of microbial normal flora in the oral cavity, alimentary canal and vagina in a vast range of the healthy people. Furthermore, they colonize on the external side of the urethral opening in premenopausal and healthy females and may convert into opportunistic pathogenic microorganisms creating candidal UTIs in the host [5, 6, 8-12] Compared to bacterial urinary tract infection (UTI), fungal UTIs are relatively uncommon and so the corresponding susceptibility profile is not as well characterized .We observed male:female ratio in our series is 17:33 in accordance to study by Paul *et al*., [10]. In our study candiuria were more prevalent in age range 21-40 years (46%) followed by 50-60 years (18%), 60-70 years. Nayman Alpat *et al*., [11] had considered that long duration of Hospital stay and ICU increase the prevalence of candiduria in patients.

In addition, candiduria in ICU patients is marker of increased mortality [12].In our study candiduria cases in ICU is only 8%, which shows a decreased mortality in our hospital. Candiduria occurring in critically ill patients should be regarded as a marker for the possibility of invasive candidiasis. Seminal studies by Louria *et al*., showed that the kidney becomes infected in ~80% of patients when candidemia occurs and that candiduria is a common result of this hematogenous infection. One must always consider invasive candidiasis and candidemia in ill patients with candiduria. *C.albicans* is the major agent of candiduria until present day [11, 13, 19, 20], however several reports show that *C.non-albicans* species, especially *C.tropicalis* and *C.glabrata* now predominate in many regions [14, 15]. Non-albicans species accounted for 71% and 64.4% of isolates in Paul *et al*., [10] and Kobayashi *et al*., [16] reports, respectively. In our study the percent of *C.non albicans is about* 62%, which is in accordance with the recent studies done. Management had been inconsistent due to lack of information about the natural history of candiduria, that had not been studied properly [8, 12, 17, 18].

CONCLUSION

Urinary tract candidiasis is known as the most frequent nosocomial fungal infection worldwide. *Candida albicans* is the most common cause of nosocomial fungal urinary tract infections; however, a rapid change in the distribution of *Candida* species is undergoing. Simultaneously, the increase of urinary tract candidiasis has led to the appearance of antifungal resistant *Candida* species. According to the Infectious Diseases Society of America (IDSA) guidelines, asymptomatic candiduria in patients with no risk factors may be improved either spontaneously or via elimination of indwelling catheters. However, in patients with high risks, the oral use of fluconazole is necessary and unavoidable for preventing invasive

candidiasis. Additional study is warranted to differentiate host factors and differences in virulence among *Candida* species and to determine the best therapeutic regimen**.**

Conflict of Interest

There is no conflict of interest.

ACKNOWLEDGEMENT

I, Abishek. V. C. of Second year M.B.B.S, sincerely thank Saveetha Medical College and Hospital, Thandalam for their continued support in procurement of the data. I also extend heartfelt gratitude to the Dr. Kalyani Mohanram, Head of Microbiology Department and Dr. R. Preethy, post graduate in microbiology who done immense help in collecting data and be as a guide.

Funding: Nil

Ethical Approval: This study was approved by institutional ethical committee.

REFERENCES

1. Pfaller, M. A., & Diekema, D. J. (2004). Rare and emerging opportunistic fungal pathogens: concern for resistance beyond *Candida albicans* and Aspergillus fumigatus. *Journal of clinical microbiology*, *42*(10), 4419-4431.
2. Sobel, J. D. (2006). The emergence of non-albicans Candida species as causes of invasive candidiasis and candidemia. *Current infectious disease reports*, *8*(6), 427-433.
3. Sobel, J. D. (2002). Controversies in the diagnosis of candiduria: what is the critical colony count. *Curr Treat Opt Infect Dis*, *4*, 81-83.
4. Khatib, R., Clark, J. A., Briski, L. E., & Wilson, F. M. (1995). Relevance of culturing Candida species from intravascular catheters. *Journal of clinical microbiology*, *33*(6), 1635-1637.
5. Gubbins, P. O., Piscitelli, S. C., & Danziger, L. H. (1993). Candidal urinary tract infections: a comprehensive review of their diagnosis and management. *Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy*, *13*(2), 110-127.
6. Eras, P., GOLDSTEIN, M. J., & SHERLOCK, P. (1972). Candida infection of the gastrointestinal tract. *Medicine*, *51*(5), 367-380.
7. Pasqualotto, A. C., Rosa, D. D., Medeiros, L. R., & Severo, L. C. (2006). Candidaemia and cancer: patients are not all the same. *BMC infectious diseases*, *6*(1), 50-57.
8. Kauffman, C. A., Vazquez, J. A., Sobel, J. D., Gallis, H. A., McKinsey, D. S., Karchmer, A. W., ... & Mosher, A. (2000). Prospective multicenter surveillance study of funguria in hospitalized patients. *Clinical Infectious Diseases*, *30*(1), 14-18.
9. Kobayashi, C. C. B. A., Fernandes, O. D. F. L., Miranda, K. C., de Sousa, E. D., & Silva, M. D. R. R. (2004). Candiduria in hospital patients: a study prospective. *Mycopathologia*, *158*(1), 49-52.
10. Paul, N., Mathai, E., Abraham, O., Michael, J. S., & Mathai, D. (2007). Factors associated with candiduria and related mortality. *Journal of Infection*, *55*(5), 450-455.
11. Nayman, S. A., Özguneş, I., Ertem, O. T., Erben, N., Doyuk, E. K., Tözun, M., & Usluer, G. (2011). Evaluation of risk factors in patients with candiduria. *Mikrobiyoloji bulteni*, *45*(2), 318-324.
12. Sobel, J. D., Fisher, J. F., Kauffman, C. A., & Newman, C. A. (2011). Candida urinary tract infections—epidemiology. *Clinical Infectious Diseases*, *52*(suppl_6), S433-S436.
13. Weinberger, M., Sweet, S., Leibovici, L., Pitlik, S. D., & Samra, Z. (2003). Correlation between candiduria and departmental antibiotic use. *Journal of Hospital Infection*, *53*(3), 183-186.
14. Jain, N., Kohli, R., Cook, E., Gialanella, P., Chang, T., & Fries, B. C. (2007). Biofilm formation by and antifungal susceptibility of Candida isolates from urine. *Appl. Environ. Microbiol.*, *73*(6), 1697-1703.
15. Lagrotteria, D., Rotstein, C., & Lee, C. H. (2007). Treatment of candiduria with micafungin: a case series. *Canadian Journal of Infectious Diseases and Medical Microbiology*, *18*(2), 149-150.
16. Kobayashi, C. C. B. A., Fernandes, O. D. F. L., Miranda, K. C., de Sousa, E. D., & Silva, M. D. R. R. (2004). Candiduria in hospital patients: a study prospective. *Mycopathologia*, *158*(1), 49-52.
17. Wong-Beringer, A., Jacobs, R. A., & Guglielmo, B. J. (1992). Treatment of funguria. *Jama*, *267*(20), 2780-2785.
18. Johnson, J. R. (1993). Should all catheterized patients with candiduria be treated?. *Clinical infectious diseases*, *17*(4), 814-816.
19. Storfer, S. P., Medoff, G., Fraser, V. J., Powderly, W. G., & Dunagan, W. C. (1994). Candiduria: retrospective review in hospitalized patients. *Infectious Diseases in Clinical Practice*, *3*(1), 23-29.
20. Rivett, A. G., Perry, J. A., & Cohen, J. (1986). Urinary candidiasis: a prospective study in hospital patients. *Urological research*, *14*(4), 183-186.
21. Gaschet, F., & Lacour, C. (2008). *Métropolisation et ségrégation* (No. hal-00154463).
22. Pasligh, J., Radecke, C., Fleischhacker, M., & Ruhnke, M. (2010). Comparison of phenotypic methods for the identification of Candida dubliniensis. *Journal of Microbiology, Immunology and Infection*, *43*(2), 147-154.