Original Article

Prevalence of Candiduria in Patients Admitted in Tertiary Care Hospital in Western Maharashtra

Jyoti Ajagunde[1], Aarushi Parashar[2], Rajashri Patil[3], Nageswari R Gandham[4], Chanda R Vyawahare[5]

Abstract

Background : Viral pneumonia frequently results in bacterial and fungal infections, particularly in individuals who are critically ill. Prolonged ICU stay is a risk factor for the development of nosocomial candidemia. Candida spp. account for almost 10-15% of nosocomial Urinary Tract Infections (UTIs). The most frequent illness linked to healthcare is nosocomial UTI. Candida species are becoming a more significant cause of nosocomial urinary tract infections.

Aims and Objectives : (1) The prevalence of Candiduria in COVID-19 and non-COVID-19 patients. (2) Age wise and gender wise distribution and antifungal susceptibility pattern of yeast isolates and (3) To compare the prevalence of Candiduria between COVID-19 positive and negative patients.

Materials and Methods: The sampling frame consisted of all isolates in COVID-19 positive and negative patients admitted in ICU with signs of UTIs. After getting Ethics committee approval, patients were screened for presence of COVID-19 using RT-PCR and candiduria by performing urine culture.

Results/Observations : In a total of 100 COVID-19 positive ICU patients, 58% and 42% patients were tested COVID positive and negative respectively, 68% were men. Average age was 49±17.8 years. Gender, age and isolate wise no significant difference was found between COVID positive and negative patients. Study reported, each ICU admitted patient had one of the eleven isolates. The common Isolates present in the study population and in COVID population were Tropicalis (37 /23), Albicans (34 /17), Parasitosis (16/12). The pandemic has highlighted the possible variability of prevalence of Candiduria fungal infection.

Conclusion : Hospital acquired infections are of great concern in hospital infection prevention and control. The presence of bacterial and or fungal secondary infection or coinfection is likely an important factor affecting mortality. Screening the ICU admitted COVID patients for UTI will help in early diagnosis of isolates and are valuable in guiding treatment of COVID-19 to control co-infection/superinfection. It would serve in controlling Catheter Associated Urinary Tract Infection (CAUTI) which is more common in COVID patients because of long ICU stay, indiscriminate use of antibiotics, overuse of steroids and the disease itself.

Key words : Nosocomial Infections, Candida albicans, Candiduria.

Maharashtra state in India had maximum number of COVID-19 cases (8142059) and maximum number of deaths (148435) compared to all other states in India[1]. The most frequent source of secondary infections in COVID-19 is bacterial infections; however, new reports from India have raised concerns about an increase in systemic fungal infections, especially invasive mold[2]. Up to 8% of COVID-19 patients have bacterial and fungal co-infections[3]. Candiduria or presence of Candida spp. in the urine is very uncommon in healthy individuals. Because hospitalized patients have a number of predisposing conditions, the prevalence of true infection has dramatically grown in recent years. Urinary tract instrumentation, previous antibiotic usage, extended hospitalization, extremes of age, diabetes mellitus, female sex and immuno-suppressive medication use

Editor's Comment :

- Hospital acquired infections are of great concern in hospital infection prevention and control. In this era of emerging non albicans candida group, screening the ICU admitted patients for UTI will help in early diagnosis of isolates and are valuable in guiding treatment to control co-infection/superinfection.

Department of Microbiology, Dr D Y Patil Medical College, Hospital and Research Centre, Pune, Maharashtra 411018
[1]MBBS, MD (Microbiology), Associate Professor and Corresponding Author
[2]MBBS, Third year student
[3]MD, Associate Professor
[4]MD, Professor and Head
[5]MD, Professor
Received on : 15/07/2024
Accepted on : 13/11/2024

How to cite this article : Prevalence of Candiduria in Patients Admitted in Tertiary Care Hospital in Western Maharashtra. Ajagunde J, Parashar A, Patil R, Gandham NR, Vyawahare CR. *J Indian Med Assoc* 2025; **123(8):** 43-6.

are predisposing variables commonly linked to candiduria. Many experts have noted that a more aggressive therapy is necessary because candiduria in the presence of risk factors predisposes the patient to widespread candidiasis.

Candida spp. account for almost 10-15% of nosocomial Urinary Tract Infections (UTIs)[4]. Explicit research has not been done on the prevalence of urinary tract co-infections in COVID-19 patients. Pneumological co-infections were the subject of most of the reviewed publications. Nonetheless, several of the evaluated studies allow for the extrapolation of the prevalence of UTI co-infections in COVID-19 patients. According to a recent study, UTIs were likely overdiagnosed in over 60% of patients hospitalized with COVID-19 and urinary tract co-infections. Therefore, it appears that the actual prevalence of UTI linked to COVID-19 is quite modest.

Researchers have looked at the risk factors for candiduria. According to Carol Kauffman, Increased age, female sex, use of antibiotics, urinary drainage devices, previous surgical procedures, and diabetes mellitus are risk factors for candiduria. Further it is observed that Candiduria due to either species (Candida glabrata or Candida albicans) was associated with female gender, Intensive Care Unit (ICU) prolonged stay and antibiotic use[6]. Microbiologist Rasmi Chaudhari says, caution has to be maintained in reporting candida from urine and advices not to ignore Candiduria, since it may even be a marker of disseminated candidiasis[7]. Further she stated, isolation of C albicans in urine represents contamination. Candiduria can also be a sign of invasive renal candidiasis or candidemia. Renu Yadav's, "Study of candiduria in neonates" is one of the few studies to report incidence of candiduria. The study was conducted with neonates in ICU. After collecting and analyzing urine samples, 3.25 percent of people had candiduria. The most commonly isolated species from the newborn samples in the wards was Candida albicans, while Candida tropicallis was from the infants in ICU (43%)[8]. Many studies have looked at candidemia in non-COVID-19 and some in COVID-19 positive patients. However, only a few studies have been done on candiduria in COVID -19 patients. Some studies have reported Candida can be one of the causes of fungal UTI infection. Hence, it is very important to know the candida species as a fungal pathogen in UTI. In view of this, a study was planned at Department of microbiology, DY Patil Medical College, Hospital and Research Centre at Pune to determine, (1) The prevalence of Candiduria in COVID-19 and non-COVID-19 patients. (2) Age wise and gender wise distribution and antifungal susceptibility pattern of yeast isolates and (3) To compare the prevalence of Candiduria between COVID-19 positive and negative patients.

Materials and Methods

This was a cross-sectional observational study performed during a period of June, 2021 to June, 2022. Ethical committee clearance for th study was taken by the Institutional Ethics Committee (IEC/204/150). A total of 100 participants were enrolled. The sampling frame consisted of all isolates in COVID-19 positive and COVID-19 negative patients admitted in critical care unit with signs of UTI collected at Tertiary care centre based in Pune. All participants undergoing this study signed written informed consent. The asymptomatic patients and bacterial isolates were excluded from the study.

Inclusion Criteria : All patients admitted in ICU with symptoms of UTI

Exclusion Criteria : All asymptomatic patients of UTI and bacterial isolates around 10ml of urine was collected as per standard guidelines for collection of urine in catheterized patients. Utmost care was taken in collection of the samples. Samples once collected were sent to the laboratory immediately. The staffs collecting the specimens were also trained for the same. Routine microscopy of wet mounts wase done on the sample to see the presence of pus cells etc. The specimens were inoculated immediately on a Cysteine Lactose Electrolyte Deficient (CLED) agar with the help of a calibrated double loop inoculator. Plates further incubated for 18-24 hours in an incubator at 37ºC. Gram stain was done and then if budding yeast cells were seen, inoculated on Sabouraud's dextrose agar, Hichrom agar and Corn meal agar was done to identify the isolates. All study isolates were tested for Germ tube tests and speciation was done. Relevant patient related demographic information was collected and used for further demographic co-relation and covid and non-covid status of the patients. Data was entered on the Microsoft Excel sheet. Appropriate statistical tests such as t test or analysis of variance was used for testing the difference in mean values across *Candida* species for continuous variables and

Fisher's exact test or χ^2 test, as appropriate, was used for testing associations between categorical patient characteristics and *Candida* species.

Results

68% were men and 32% were women. The mean age was little less than 50 years (49±2)40% patients were in 40 to 60 years of age group. More male than female patients were COVID +ve. Age wise one-third patients in each age category (1 to 40, 40 to 60 and above 60 years) were COVID positive. Age and gender wise there no significant difference was observed between COVID positive and negative groups.

Common Isolates present in the study population were *C tropicalis* (37), *C albicans* (34), and *C parasilosis* (16). More Covid positive patients were observed with the infection of these isolates compared to covid negative patients except for C albicans. But the difference was not significant (Table 1).

Gender, age and isolate wise no significant difference was found between COVID positive and COVID negative patients.

We combined the isolates those were small in number and created "Others" category. Table 3 is derived from Table 2.

Table 1 — *Sex and Age by COVID Status (Sex : P = 0.135, Age : P =0.335)*

		Status		Total
		COVID Positive	COVID negative	
Sex	F	22 (37.9)	10 (23.8)	32 (32.0)
	M	36 (62.1)	32 (78.2)	68 (68.0)
P = 0.135 ns				
Age	1 to 40	19 (32.8)	13 (31.0)	32 (32.0)
	40 to 60	20 (34.5)	20 (47.6)	40 (40.0)
	Above 60	19 (32.8)	9 (21.4)	28 (28.0)
P = 0.334 ns				
	Mean ± std	49.62 ±18.92	48.38 ±16.30	49 ± 17.79

Table 2 — *Isolate by COVID Status P = 0.239*

	COVID Status		Total
	COVID Positive N (%)	COVID negative N (%)	N (%)
Isolate :			
C Tropicalis	23 (39.7)	14(33.3)	37(37.0)
C Albicans	17 (29.5)	17 (40.5)	34 (34)
C Parapsilosis	12 (20.7)	4 (9.5)	16 (16.0)
C Glabrata	2 (3.4)	3 (7.1)	5 (5)
Candida Rugosa	1 (1.7)	1 (2.4)	2 (2.0)
C Kefyr	1 (1.7)	0 (0)	1 (1.0)
C Auris	1 (1.7)	0 (0)	1 (1.0)
Candida Guilliermondii	0 (0)	1 (2.4)	1 (1)
Candida Lusitaniae	0 (0)	1 (2.4)	1 (1.0)
Cryptococcus Laurentii	1 (1.7)	0 (0)	1 (1.0)
Trichosporon Asahii	0 (0)	1 (2.4)	1 (0)
Total	58 (100)	42 (100)	100 (100)

Table 3 — *Isolate by COVID-19 Status P = 0.166*

	COVID Status		Total
	COVID Positive N (%)	COVID negative N (%)	N (%)
Isolate :			
C tropicalis	23 (39.7)	14(33.3)	37(37.0)
C albicans	17 (29.5)	17 (40.5)	34 (34)
C parasilosis	12 (20.7)	4 (9.5)	16 (16.0)
Others	6 (10.3)	7 (16.7)	13 (13)
Total	58 (100)	42 (100)	100(100)

Discussion

Although, the incidence of UTI is very common in females, but in contrast, in this study, 68% were men and 32% were women, which is consistent with the sudy of[7] (56.8%in males, 43.2% females) it may be because the men were moving more out of the home for work and in lockdown period it was more expected. Common Isolates present in the study population were *C tropicalis* (37), *C albicans* (34), and *C parasilosis* which was consistent with the study of Shah Dharati, *et al*[9] & Santana, *et al*[10,7]. Although Candida albicans is the most commonly reported species in cases of candidal UTI, numerous research have shown that non-albicans Candida species are also becoming more common as UTI causative agents. Non-albicans species that cause candiduria include Candida tropicalis, Candida glabrata, Candida parapsilosis, Candida lusitaniae, Candida guilliermondii, and Candida krusei[5].

Future Prospects

It is evident from various previous research studies and newer studies that pathogenesis of hematogenous seeding of Candida species to the kidney was well established[4-7]. In the largest series, only 11% of 861 patients with candiduria were without any predisposing factors but Eighty-three percent of patients had long-term indwelling urethral catheters or other urinary drainage devices[1]. It was also observed from various studies that most patients were converted from asymptomatic to symptomatic candiduria; In one major multicenter trial, just 4% of patients showed symptoms that suggested a UTI, but in another smaller series, 14% did. This observation

emphasis on that the clinician to make a early diagnosis of asymptomatic candiduria, comparable to asymptomatic bacteriuria, so no additional testing or care should be necessary. In neonatesUrine containing candida species is typically indicative of hematogenous spread to the kidneys and is mostly linked to the formation of many blocking fungal balls in the collecting system. For most people, candiduria does not indicate candidemia. Just 7 (1.3%) of 530 patients with candiduria who were monitored for 12 weeks in a major prospective research went on to develop candidemia; in a smaller retrospective analysis, 11 (10.5%) of 105 patients with candiduria did the same[6].

Conclusion

The current study highlights the importance of taking candiduria into account as a new and significant element in the current environment. A second clean catch urine culture should be performed to confirm the existence of candiduria, which poses a therapeutic challenge for the doctor. It is crucial to identify candida species and perform an antifungal profile since our research suggests that some species may become resistant to the antifungal drugs currently in use[7]. Since many non-albicans Candida species are resistant to fluconazole treatment, understanding Candida species is crucial for the appropriate management of UTIs[6]. Hospital acquired infections are of great concern in hospital infection prevention and control. One significant factor influencing mortality is probably the existence of a secondary infection or coinfection caused by bacteria and/or fungi.In this era of emerging non albicans candida group, screening the ICU admitted patients for UTI will help in early diagnosis of isolates and are valuable in guiding treatment to control co-infection/superinfection.

Limitations : Small sample size, single hospital, no follow-up, patient were not asked about their comorbidities, antifungal susceptibility test was not carried out.

The pre-eminent issue with regard to candiduria is to develop methods to distinguish infection from colonization and to differentiate upper from lower urinary tract involvement.

Funding : None.

Ethical Statement : Ethical approval was obtained from the Institutional Sub-ethical Committee, Dr D Y Patil Medical College, Hospital and Research Center, Dr D Y Patil Vidyapeeth Pimpri, Pune.

Conflict of Interest : The authors do not report any financial or personal connections with other persons or organizations.

Acknowledgement

We acknowledge Dr Veena Joshi [Medical Writer, Central Research Facility, DPU, Pune, India] for her contribution in statistical analysis.

References

1 COVID-19 Statewise Status, https://www.mygov.in/corona-data/covid19-statewise-status
2 Singh Y, Ganesh V, Kumar S — Coronavirus Disease-Associated Mucormycosis from a Tertiary Care Hospital in India: A Case Series. *Cureus* 2021; **13(7):** e16152. DOI 10.7759/cureus.16152
3 Guptaa D, Kulkarnia R, Pujaria S, Mulaya A — COVID-19 Associated Mucormycosis: A Case-control Study
4 Jain — Microbiological trends in nosocomial candiduria. *Indian J Ournal of Pathology and Microbiology* 2011; **54(3):** July - September 2011.
5 Cai T, Tascini C, Novelli A, Anceschi U, Bonkat G, Wagenlehner F, *et al* —The Management of Urinary Tract Infections during the COVID-19 Pandemic: What Do We Need to Know? *Uro* 2022, **2:** 55-64. https:// doi.org/10.3390/uro2010008
6 Kauffman C, Candiduria, *Clinical Infectious Diseases*, Volume 41, Issue Supplement_6, September 2005, Pages S371–S376, https://doi.org/10.1086/430918
7 Choudhury RC, Sulekha N, Bhavna M, Candiduria: Current Scenario, IOSR Journal Of Pharmacy (e)-ISSN: 2250-3013, (p)-ISSN: 2319-4219 www.iosrphr.org Volume 5, Issue 4 (April 2015), 16-9.
8 Yadav R, Xess I, Singh G, Rana B, Saumya CS — P025 A study on candiduria in neonates and infants from a tertiary care center, North India. *Med Mycol* 2022 Sep; **60(Suppl 1):** myac072P025.i. Published online 2022 Sep 20. doi: 10.1093/mmy/myac072.P025
9 Dharati S, Atit S, Lata P, Jayshri P, Urvashi L, Hiral S — Microbiological Profile and Antibiogram of Uropathogens Isolated at a Tertiary Care Hospital. *JKIMSU*, Vol. 10, No. 1, January-March 2021.
10 Milena Melges Pesenti de Santana, Hugo Dias Hoffmann-Santos, Luciana Basili Dias, Tomoko Tadano, Abdon Salam Khaled Karhawi, Valéria Dutra, Stephano Luiz Cândido, Rosane Christine Hahn, Epidemiological profile of patients hospitalized with candiduria in the Central-Western region of Brazil, Vol. 36. Núm. 4. Oct-Dec 2019.