

Candiduria in Patients Attending a Medical College Teaching Hospital, Davangere

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The presence of *Candida* species (spp) in the urine is frequent among hospitalized patients. It may represent contamination during collection, harmless colonization or a potentially life threatening infection. The present study aimed to determine the prevalence of candiduria in patients from Davangere and its adjoining areas attending a medical college teaching hospital in Davangere. Retrospective monocentric study. Laboratory records of patients aged 15 yrs and above whose urine cultures were performed at Microbiology Department of SSIMS&RC, Davangere. During the 1-year study period, 1442 urine samples cultured including 702 from males and 740 from females. Yeasts (*Candida* spp) were isolated in 74 samples(5.13%). It was more common in males(55.41 %) as compared to females(44.59%). The principal risk factors that were observed in patients with candiduria included antibiotic therapy (72.97 %), indwelling urinary catheters (63.51%). Concurrent positive Endotracheal Tube (ET) Secretions culture for candida spp was observed among 4 Candiduria patients. All positive urine cultures for candida spp were found to be from hospitalized patients. Although candiduria is a common condition in hospitalized patients, very little is known about its natural history. Attending Physician in coordination with the practicing microbiologist should work up positive urine results for candida. Efforts to increase clinician awareness of current recommendations for managing candiduria and future long term studies to understand its natural history are warranted.

Key words: Candiduria, Risk factor, Culture.

Candiduria or presence of *Candida* spp in the urine is rarely encountered in healthy people with structurally normal urinary tract. It is, however of common occurrence in hospitalized patients¹. Candiduria may represent contamination, bladder colonization related to the presence of indwelling catheters, primary infection or disseminated

mycosis.² The vast majority of patients with candiduria have no symptoms suggesting the presence of urinary tract infection (UTI)³.

Common risk factors for candiduria include advanced age, female sex, and recent use of antibiotics, urinary tract instrumentation, prior surgical procedures, diabetes mellitus, immunosuppressive therapy and prolonged hospital stay⁴. Unfortunately, there are no established diagnostic tests that reliably distinguish infection from contamination or colonization presenting a therapeutic dilemma to the clinician⁵.

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Considerable controversy exists as to whether and when to treat asymptomatic candiduria. Many a times, asymptomatic candiduria resolve once the risk factors are corrected. ²Amphotericin-B Bladder Irrigation (AmBBI) once or for 7 days and Oral Fluconazole (200mg/day for 7 days) appear to be equally efficacious in the treatment of persistent candiduria. Relapse of candida funguria will occur despite adequate treatment, which raises the possibility that funguria may not need to be treated or is untreatable. ⁶To our knowledge, no information is available on the prevalence of candiduria from Davangere and its adjoining areas. Therefore, the present study was undertaken to determine the prevalence of candiduria in patients from the above areas attending a medical college teaching hospital, Davangere.

MATERIALS AND METHODS

A retrospective analysis of microbiology laboratory records was done in the SS Institute of Medical Sciences and Research Centre (SSIMS & RC) which is a medical college with a teaching hospital attached to it. All patients attending the various Outpatient Departments (OPDs) and the In Patients (IPs) of SSIMS & RC aged 15 yrs and above, whose urine cultures were analyzed in the microbiology laboratory between September 2009 to August 2010 were included. Catheter or clean void urine samples were eligible for the inclusion. Urine cultures were not done routinely on visit to hospital. Depending on medical presentation, urine cultures were recommended by the practitioner incharge of the patient. A case of candiduria was

defined in the patient who had, atleast one urine culture that yielded $\geq 10^2$ CFU of yeasts/ml. Demographic characteristics including age, gender and medical history were extracted from laboratory records.

Culture methods and quantitative culture methods

The urine samples were spread by calibrated loop (0.01ml) onto the Blood Agar and Mac Conkey's agar plates. Plates were incubated aerobically at 37°C and read within 24 hours (hrs). The detection level for quantitative cultures used in this study was 100CFU/ml, represented by a single colony of yeast on a plate. ⁷Identification of candida isolates were by colony morphology and gram stain.

Statistical methods

The categorical data was analyzed by using Chi-square test. A p value <0.05 was considered to be significant.

RESULTS

A total of 1442 urine samples cultured during the study period from the patients aged 15 yrs and above, out of which 702 were from males and 740 from females. *Candida* spp were isolated from 74 samples (5.13%) that included 41(55.41%) from males and 33(44.59%) from females respectively, showing a higher prevalence rate among males (Table 1). In both of them, it was clearly demonstrated that age had no influence on prevalence on candiduria (males p=0.3; females p=0.2). Also, in the present study, candiduria showed no significant association with any particular gender (Table 2).

Table 1. Age and Gender wise distribution of Urine samples tested for Candiduria

Age in years	Males		Females	
	No. of tested	Positives (%)	No. of tested	Positives(%)
15-25	145	9(6.2)	229	7(3.0)
26-35	153	3(1.9)	167	7(4.2)
36-45	124	7(5.6)	110	5(4.5)
46-55	101	6(5.9)	104	6(5.7)
56-65	95	8(8.4)	83	6(7.2)
66 >	84	5(5.9)	47	2(4.3)
Total	702	41(5.8)	740	33(4.5)

X²= 0.99 P=0.3, NS

X²= 1.7 P=0.2, NS

Classical risk factors for *Candida* spp funguria were present in most patients (Table 3). Antibiotic therapy and indwelling urinary catheters were observed in 54(72.97%) and 47(63.51%) patients respectively as the common risk factors. A previous surgery was noted in 17(22.97%) patients. Underlying condition such as diabetes mellitus was present in 9(12.16%) patients. this association was statistically significant; ($p < 0.001$).

Table 2. Association of gender to Candiduria

Patients	Positives (%)
Males	41(55.41)
Females	33(44.59)

$X^2 = 0.86$, $P = 0.35$ NS

Table 3. Risk factors for *Candida* spp funguria

Risk Factors	Positives (%)	Negative (%)
Antibiotic therapy	54(73.0)	20(27.0)
Indwelling Urinary Catheters	47(63.5)	27(36.5)
Surgical procedures	17(23.0)	57(77.0)
Diabetes Mellitus	9(12.2)	65(87.8)

$X^2 = 80.6$, $P < 0.001$ HS

In 7 candiduria patients, repeat urine culture was positive for candida spp once, while it was twice in 5 patients. There were 4 patients whose ET secretions sample for culture also yielded candida growth. Finally, all candiduria cases were observed in hospitalized patients (IPs) who were admitted to various Intensive Care Units (ICUs) like Coronary Care Unit (CCU), Medical Intensive Care Unit (MICU) and Surgical Intensive Care Unit (SICU).

DISCUSSION

In the present one year retrospective study, candiduria was detected in 5.13% of the patients. Although, an increase in the prevalence of candiduria has been reported in the last 30yrs, it's significance is not clearly understood. It is a common finding seen in 10% of the hospitalized

patients who have a pathogen recovered from urine.^{8,9} In our study, presence of *Candida funguria* might be indicative of bladder colonization following instrumentation, urinary tract infection or a less common systemic infection.² Several previous studies from Fraisse *et al.*¹⁰, Kobayashi *et al.*,² Bouza *et al.*,¹¹ and Chen *et al.*,¹² have documented a prevalence rates of 8.9%, 22%, 9.4% and 4.7% respectively. The result from our study does not fall in agreement with any of the above studies. One explanation for such a wide variation may be due to the differences in the definition of a positive culture and the population being studied¹³. Although various risk factors have been suggested to candida funguria, we observed that antibiotic therapy (72.97%) and urinary tract catheterization (63.51%) were more common in the patients studied.

In a retrospective monocentric study, Fraisse *et al.*,¹⁰ showed that use of antibiotics and presence of urinary catheter represent important risk factors for the development of candida funguria. Antibiotics contribute to colonization by candida organism by suppressing susceptible endogenous bacterial flora, primarily in the gut and lower genital tract and possibly in superficial areas adjacent to the urethral meatus. Catheters placed into the bladder serve as a portal of entry for microorganisms into the urinary drainage system. All catheters become colonized if left in place long enough.¹⁴ However, changing or removing the catheter could eradicate the funguria⁶.

A previous surgery was a factor associated with candiduria. Surgery (especially of the abdominal compartment) predispose to infection with candida spp by alteration of natural host barriers.¹⁵ There is a need for urinary drainage device during perioperative period in many of the surgeries.² However, in our study, it was difficult to determine whether surgery *per se* or the catheter presence as the most critical. Notably, in our study, all cases of candiduria were documented among ICU patients, a finding consistent with the observation of another investigator, Passos XS, *et al.*,⁹ ICU patients usually have urinary catheters and many receive antibacterial therapy.¹³

Diabetes Mellitus was the most common underlying disease seen in 12.16% of the patients. Diabetes may predispose patients to fungal candiduria by predisposing them to candida

colonization of the vulvovestibular area (in women), by enhancing urinary fungal growth in the presence of glycosuria, by lowering host resistance to invasion by fungi as a consequence of impaired phagocytic activity and by promoting stasis of urine in a neurogenic bladder. Finally, patients with diabetes are more likely to undergo urinary tract instrumentation and to receive antibiotics.^{14, 16,17}

Our study revealed that candiduria was more common in males (55.41%) as compared to females (44.59%). Only a few observers reported no significance in terms of female sex having more chances of candiduria. This could be due to predominance of other associated risk factors in our study^{18,1}.

It was noticed that ET secretions culture was also positive in 4 candiduria patients. This could be due to the fact that these patients might had disseminated infection at the time of urinary isolation and what was interpreted as urinary candidiasis was infact, a evidence of disseminated infection. Also, there was the possibility that the patients developed systemic infection subsequently and urinary candidiasis was a predictor of that potential risk¹⁹.

Candiduria is a rare finding in the outpatient setting and most cases still occur in hospitalized patients²⁰. It was verified from our study that there was no outpatient candiduria.

The present study has some limitations mainly related to the retrospective collection of data. We are deprived of the data mainly on clinical manifestations that could help to separate colonization from infection. No information is available on the microbiological characterization of yeast to know about common candida spp from the study region.

CONCLUSION

Candiduria is a common condition in hospitalized patients. There is a increasing prevalence of candiduria as a result of increase in pool of at-risk patients together with the cumulative pressure of contributing factors. Unfortunately, very little is known about the natural history of candiduria including whether it leads to disseminated infection or vice versa. Routinely, physicians often ignore candiduria and donot perform follow-up of such cases. It is necessary

for the attending physician and the practicing microbiologist to work in relation and plan the future action. Adopting non-pharmacologic interventions and correction of the underlying risk factors should be of prime importance. In addition, the present study demands future long term studies to understand the natural history of candiduria.

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