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ORIGINAL RESEARCH

Use of Chromogenic agar for Identification of Candida species from urine samples in a tertiary care hospital of North India

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Abstract

Background: Candida species have emerged as the most opportunistic pathogens to cause UTI (Urinary Tract Infection).

Aim: To explore the usefulness of Chromogenic medium in speciating clinical isolates of Candida and to determine their antifungal susceptibility.

Methodology: A total of 100 Candida species were isolated from urine sample. Speciation of Candida was done based on the growth on Chromogenic medium and other methods like formation of Germ Tube Test.

Results: Among the 100 clinical Candida isolates, only 24% of the Candida isolates were identified as Candida albicans and the rest were non albicans Candida species.22% Candida parapsilosis (22/100), 28% Candida krusei (28/100), 26% Candida tropicalis (26/100). Among the non albicans species Candida krusei was the commonest isolate followed by C. tropicalis and C. parapsilosis.

Conclusion: CHROM Agar can be used for rapid identification of most commonly isolated Candida species from urine samples. This will be useful to initiate appropriate antifungal therapy thereby reducing morbidity and mortality.

Keywords: CHROM agar, Candida species, Non albicans Candida, UTI.

Introduction

Over one hundred and fifty million people worldwide experience an episode of candiduria yearly[1]. Candiduria is known as the most frequent nosocomial fungal infection worldwide. Candida albicans is the most common cause of nosocomial fungal urinary tract infections[2]. The risk factors include urinary tract instrumentation, surgical procedures, antibiotic use, advanced age, female gender, intensive care unit (ICU) admission, immunosuppressive therapy, and prolonged hospitalization[3]. There has been a shift in the causative species of Candida from past few years from albicans to non albicans like Candida tropicalis, Candida glabrata, Candida krusei, and Candida parapsilosis[4].Candiduria caused by Non-albicans Candida is a marker for a serious underlying illness[5].Currently, antifungal drug resistance is now on the rise. An increase in the number of Candida species resistant to antifungal drugs has been recognized worldwide; C. tropicalis and C. pararapsilosis are both generally susceptible to azoles, whereas C. glabrata and C. krusei are intrinsically more resistant to antifungal agents, particularly to Fluconazole[6].

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Therefore, this study was done to determine the prevalence of Candida isolates obtained from urine samples in cases of diagnosed urinary tract infections.

Material and methods

A total of 100 Candida isolated over a period of 6 months from clean-voided mid stream urine was sent to the Microbiology laboratory from different clinical units of a tertiary care hospital. Sample was processed according to the established departmental protocols. Every white colour colony on UTI Chrome agar was subjected to the Gram staining and germ tube test. All isolates were further inoculated on Candida CHROM agar for the species identification based on color change.

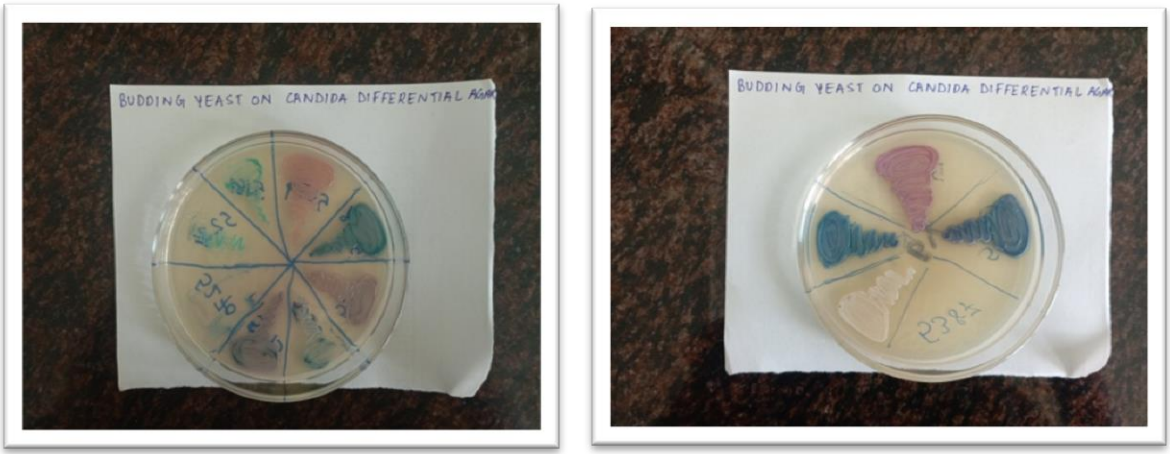
Results

A total of 100 Candida species was isolated from urine. Distribution of Candida species is shown in table 1. Candida albicans isolates were 24% (24/100). Other Candida species isolated were; 22% Candida parapsilosis (22/100), 28% Candida krusei (28/100), 26% Candida tropicalis (26/100). The overall prevalence of non albicans Candida species 76% (fig.1).

Table1. Total number of Candida species obtained from urine.

Candida species	Total number(100)
Candida albicans	24(24%)
Candida parapsilosis	22(22%)
Candida krusei	28(28%)
Candida tropicalis	26(26%)

Fig1. Above figure shows:
1. Green colored colonies of Candida albicans,
2. Blue colonies of Candida tropicalis,
3. Pinkish to purplish coloredcolonies of Candida krusei,
4. Cream colored colonies of Candida parapsilosis.



Discussions

There have been an increase in number of opportunistic infections caused by yeast particularly in immune compromised patients (Kangogo et al., 2011)[7]. Candida species accounts for 80% of infections. In view of antifungal resistance being reported, identification of Candida species and their antifungal susceptibility pattern, is necessary to decide on the on the choice of antifungal drugs[8]. The detection and identification of Candida requires easy cost

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effective methods that are easy to perform. We recovered 100 samples from urine over a period of 3 months. 23/75 The Candida albicans was 24 in number (24%). The other Candida species isolated were Candida parapsilosis (22%), Candida krusei (28%), and Candida tropicalis (26%). Our study shows that non albicans were in majority(76%) which is similar to the studies of Yashavanth R *et al* (69.7%)[9] and in the study of Dharmeshwari T *et al*[10]and Iman *et al*[11], where 70% were non albicans compared to 30% of Candida albicans. Among non albicans, Candida tropicalis is most common[12,13] while we observed C. krusei as most common.

For the diagnosis of Candida infection, there are various tests that can be employed but for the easy and rapid identification, we have a differential media like Chrome agar which allows the presumptive differentiation of yeasts. It contains various substrates for the enzymes of yeast species. It has been demonstrated that β-N-Acetylgalactoseaminidase which was produced by Candida albicans enables the chromogenic substrates into the medium and the isolates to be incorporated into the medium and the isolates of these species were seen as green colored colonies (Shawn *et al*[14], 2009; Mine Yucesoy *et al*[15], 2003).The germ tube test, which is the commonest test employed and gives rapid results, is not very accurate as more than 5% Candida albicans can be negative. Some non albicans species like Candida tropicalis and Candida parapsilosis are occasionally germ tube positive[16]. In our study we speciated 24% of Candida as albicans based on the color change on CHROM agar but only 66% of Candida were positive for germ tube test. CHROM agar Candida albicans (24%) produced green colonies and Candida tropicalis (26%) produced blue colonies in our study. Rudrappa P *et al*[17] reported 40% of non albicans as Candida tropicalis. Rudrappa, P *et al*[17]also observed 23% of cream colored colonies as Candida parapsilosis which is similar to our study (22%). In our study, Candida krusei (28%) produced pinkish to purplish colored colonies while in the study of Rudrappa P *et al*[17], none of the isolate was positive for krusei.

The limitation in this study was that no other method was used to confirm the identity of the Candida isolates like the Vitek system and lack of antifungal susceptibility testing in our set up.

Conclusion

Species of Candida like krusei and glabrata are intrinsically resistant to the azoles and now they are emerging as the most frequent opportunistic pathogens, the use of CHROM agar for presumptive identification of Candida species is an easy, rapid and reliable method especially Candida albicans, Candida tropicalis, Candida krusei and Candida parapsilosis.

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