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Microbiology

DISTRIBUTION AND CHARACTERIZATION OF *CANDIDA* SPECIES IN VARIOUS CLINICAL SAMPLES AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Candida infections are becoming an increasingly important cause of morbidity and mortality in hospitalized patients. The increase in the incidence of Candida species over the past two decades is significant. Hence this study was to expand the yeast identification capabilities and to detect major pathogenic Candida species in different clinical samples.

Objectives: To determine the predominant *Candida* species in various clinical samples and phenotypic identification of various *Candida* species.

Materials and Methods: A hospital based observational cross-sectional study was conducted from October 2015 to June 2017 in the Department of Microbiology, Indira Gandhi Institute of Medical Sciences, Patna, Bihar.

Results: A total 106 samples were collected which mostly comprised of urine (57%) followed by blood (18%), HVS (10%), sputum (8%), pus (4%), oral swab (2%) and stool (1%). It showed dominance of non-albicans Candida spp. (71%) over Candida albicans (29%).The changing epidemiology of candida infection highlights the need for close monitoring of *Candida* species distribution and susceptibility to optimize treatment and outcome.

Conclusions: Invasive fungal infections seriously threaten the health of hospitalized patients, causing substantial morbidity, mortality, and increases in hospital costs. Therefore, early and accurate diagnosis of *Candida* infection is essential since each species varies significantly in susceptibility to the currently used antifungal drugs.

KEYWORDS :

INTRODUCTION

Candidiasis represent a significant burden of infection to the hospital population. Although not all species are pathogenic, some can cause serious disease and pose a significant public health risk. Candida infections are becoming an increasingly important cause of morbidity and mortality in hospitalized patients. *Candida spp.* has been shown to be the fourth most common cause of nosocomial blood stream infection(BSI) in the United States. *Candida albicans* has historically been the most frequent cause of candidaemia. However, over the last two decades, both the incidence of nosocomial candidaemia and the proportion of BSI due to Candida spp. other than C. albicans have increased. [1, 2] Candida is usually a commensal and turn pathogenic because of alteration of host immunity. The increase in the incidence of Candida species over the past two decades is significant. The non-albicans Candida species continue to replace Candida albicans at most of the clinical sites like blood stream infections. [3] The clinical presentation of Candida can range from superficial infection to life threatening deep seated candidiasis. Among Candida, C.albicans is by far most common species isolated. But now India is showing predominance of non Candida albicans and it is the commonest cause of Invasive Candidiasis in neutropenic patients. Hence the purpose of the study is to expand the yeast identification capabilities and to detect major pathogenic Candida species in different clinical samples.

MATERIALS & METHODS

A hospital based observational cross-sectional study was conducted from October 2015 to June 2017 in the Department of Microbiology, Indira Gandhi Institute of Medical Sciences, Patna, Bihar. The cases for the study were selected from the patients with history and clinical features suggestive of fungal infection after the approval of Institutional Ethics Committee. Informed consent was taken from the patient before conducting the study.

A total of 106 patients with various symptoms suggestive of candidiasis and in-patients not responding to antibacterials whose sample showed yeast cells after staining were included in the study. Patients already on anti-fungal therapy and patients who did not give consent were excluded from the study.

Samples like urine, blood, pus, sputum, oral/aural/ high vaginal swab were taken with proper aseptic precations and as per the standard procedures. Direct microscopy with 10% KOH (sputum, pus, blood) or wet preparation (urine) were done to look for presence of yeast cells and were inoculated on Sabraud's Dextrose Agar. Reading of growth was taken after 24hrs of incubation and was confirmed by Gram's stain for presence of budding yeast cells. Then germ tube test was done for presumptive identification of C.albicans. later on it was inoculated on CHROM agar for species identification which was confirmed by sugar fermentation test (*KB006 HICandida Identification Kit)*.

RESULT & DISCUSSION

A total 106 samples were collected which mostly comprised of urine (57%) followed by blood (18%), HVS (10%), sputum (8%), pus (4%), oral swab (2%) and stool (1%) **[Figure -1]**. Urinary tract infection was the most common nosocomial in fection as shown by Mythri et al. but contrasts with Khan et al. [4,5] which may be due to small sample size. In the present study non-albicans candida spp. (76.64%) emerged as the predominant pathogen causing nosocomial UTI.

Initially the samples were classified by the conventional method of germ tube test which gives presumptive diagnosis of C.albicans. It showed dominance of non-albicans Candida spp. (71%) over Candida albicans (29%). The increased prevalence may be explained due to infrequent use of antifungal agents and selection pressure of the species. Chakrabarti et al. also showed similar pattern in their study. [6]

On the other hand, higher prevalence rates (39.5% and 35%) of C. albicans was reported by Dag et. al. and Nerurkar et. al. respectively. [7, 8] Chromogenic medium used for rapid identification of *Candida spp.* showed 31% of *C.tropicalis,* 29% *C.albicans,* 22% *C.glabrata,* 11% *C.krusei,* 2% *C.parapsilosis* and 5% include *C.haemulonii* & *C.famata.* **[Figure -2]** It is similar to the study seen by and Mokkadas et al. [10] S. Giri et al reported C.tropicalis (74.35%) was the most common isolate followed by C.albicans, C.parapsilosis, C.krusei, C.glabrata. [11]

The present study indicated an increased prevalence of Candidia species in the ICUs (46%) followed by surgical (24%), medical (19%) and oncology (3%) departments of the institute. **[Figure – 3]** Similar results were reported by Sahar et.al. and Sheevani et al. This can be explained on the basis of the fact that the use of invasive devices are common in these wards and that the immune status of the patients are also compromised to the maximum as compared to that of the patients of other wards. [11,12]

Kanitha Tritipwanit et al. reported a 6.14% prevalence of candidiasis in blood stream infection, of which 57.1% belonged to the non-albicans species. [13] The present study noted a prevalence of 17.92% in blood stream infections of which non albicans species constituted 73.68%. **[Figure – 4]** Xess et al. reported a 79-80% incidence in both male and female population. [14] Malini et al reported a 28.17% incidence of which 75.4% isolates belonged to the non albicans group. [15] The present study corresponds to those of Xess et al., Malini et al., in terms of isolation rate of the non albicans species.

CONCLUSION

The changing epidemiology of candida infection highlights the need for close monitoring of *Candida* species distribution and susceptibility to optimize treatment and outcome. Invasive fungal infections

seriously threaten the health of hospitalized patients, causing substantial morbidity, mortality, and increases in hospital costs. Therefore, early and accurate diagnosis of *Candida* infection is essential since each species varies significantly in susceptibility to the currently used antifungal drugs. Conducting antifungal susceptibility testing in the laboratories can aid clinicians with timely administration of the appropriate and accurate antifungal agents; it may also restrict the empirical use of the current antifungal agents. This will not only reduce the morbidity and mortality but also cease the myriad search for newer antimicrobials.

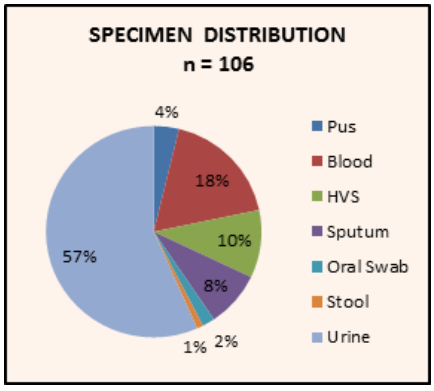

Figure 1 Specimen Distribution

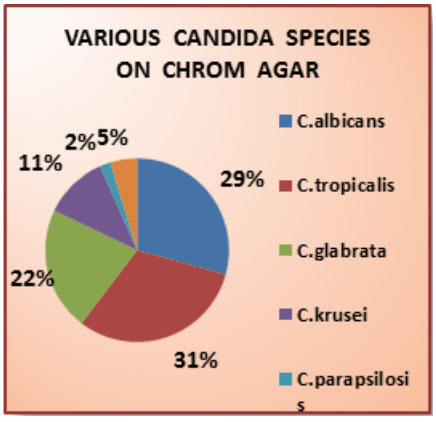

Figure 2 Various *Candida* species ON CHROMAGAR

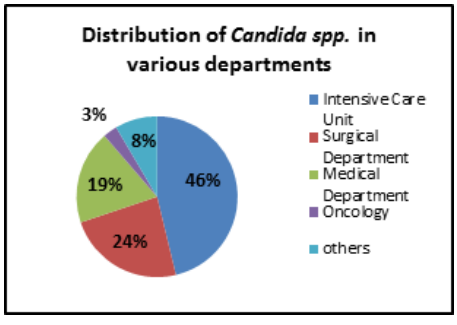

Figure 3 Distribution of *Candida spp*. in various departments

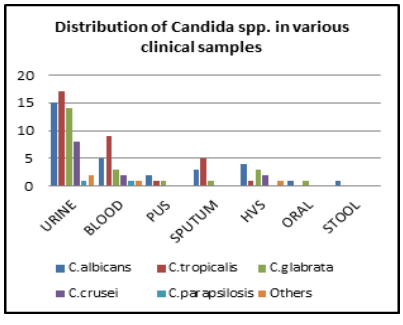

Figure 4 Distribution of Candida spp. in various clinical samples

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