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Prevalence of Candida Infection and Antifungal Susceptibility Pattern in a Tertiary Care Hospital

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A B S T R A C T

In developing countries like India increase in infection with multidrug resistant bacteria due to inappropriate use of broad-spectrum antimicrobials leads to overgrowth of candida species thus enhancing the opportunity to cause the disease. This makes major health impact due to its severity, increased hospital stay, increased morbidity and mortality. In this study, out of 76 candida isolates, 41% were *C.albicans* and 59% were non albicans group. This shows high prevalence of non albicans group. Resistance to antifungal agents is also higher in Non-albicans compared to *C.albicans*.

Introduction

Candida is responsible for a variety of infections in humans ranging from surface infections to systemic candidiasis (1, 2). Though a part of normal microbial flora, any alteration in immune status will promote the proliferation of endogenous *Candida* (7-8).

This study aims to determine the prevalence of candidial infection, candidemia and its antifungal susceptibility profile among patients admitted in a tertiary care hospital thus to help the clinicians to develop an empirical antifungal therapy in this region.

Materials and Methods

This prospective study done in patients admitted in Govt. Mohan Kumaramangalam Medical College Hospital, Salem for a period of 6 months with age group 20-60 years after getting ethical committee approval.

Blood samples, urine samples, Sputum, swabs from vagina and wound, were collected aseptically. Blood sample collected in Brain Heart Infusion broth were inoculated after incubation on MacConkey and blood agar plates. Colony morphology observed after 48 hours of incubation. Urine samples, sputum

and swab specimens were inoculated immediately on MacConkey & blood agar plates and incubated. On performing Gram staining from colonies, that showed gram positive budding yeast cells are subcultured on Sabourauds Dextrose Agar slopes.

Candida species isolated were differentiated into albicans and non albicans group by germ tube test. Out of 76 candidal isolates 31 (41%) were germ tube test positive (albicans) and 45(59%) were germ tube test negative (non albicans). This shows high prevalence of non albicans group. Speciation of Candida was done by coloured colony morphology on HICHROM Candida differential agar as per standard microbiological procedures

Antifungal susceptibility testing is done by Disc diffusion method using Amphotericin B, Fluconazole, Ketoconazole, Itraconazole, Nystatin, Voriconazole on MHA agar with 2%glucose and methylene blue.

Results and Discussion

In the present study, out of 76 candidal isolates 31 (41%) were albicans and 45 (59%) were non albicans.

In this study totally 76 candida species were isolated and out of which 32 were from urine samples, 14 were from pus samples, 12 were from sputum samples, 12 were from high vaginal swabs and 6 from blood samples.

In this study, candida infection is common in male 59% as compared to that of female 41%. Most common affected age group is between 50-60 years.

Antifungal susceptibility pattern

Candida albicans showed highest susceptibility to Amphotericin B 89% followed by Voriconazole 85%, Itraconazole 85%, Ketoconazole 78%, Nystatin 76% and least susceptibility to Fluconazole 68%.

Candida non albicans group showed highest susceptibility to Amphotericin B 92% followed by Voriconazole 80%, Itraconazole 79%, ketoconazole 73%, Nystatin 71% and least susceptibility to Fluconazole 49%.

Speciation of candida

A total of 76 isolates of Candida species were obtained from different clinical specimens of patients for a period of 6 months.

The distribution of different Candida species are given in table 4. Accordingly, the species isolated were *C.albicans* 31 (41%), *C.tropicalis* 25 (33%), *C.guilliermondii* 9 (11%), *C.parapsilosis* 7 (9%), *C.glabrata* 3 (4%) and *C.krusei* 1(2%).

The infection due to Candida non-albicans (59%) was more compared to *Candida albicans* (41%).Among the non albicans isolates, *C.tropicalis* was the most common isolate followed by *C.albicans* which is similar to most of the other studies from different parts of the world.

Non albicans candida are on the rise due to increasing immunocompromised states. Non albicans Candida are more resistant to antifungal agents, therefore species level identification has a direct impact on choice of empirical antifungal treatment.

Higher incidence of non albicans candida ranging from 54 - 74% have been seen in various studies. [4,9,10] CHROM agar serves as a primary isolation and differentiation medium for clinical specimens to rapidly identify *Candidal* spp, which helps clinicians to choose appropriate antifungal agents.

Table.1 Sample wise distribution of Candida species

Sample	*Candida albicans*	Candida Non albicans	Total
Urine	14	18	32
Pus	6	8	14
Sputum	5	7	12
High vaginal swab	4	8	12
Blood	2	4	6
Total	31 (41%)	45(59%)	76

Table.2 Sex wise distribution of Candida species

Age (Yrs)	Male	Female
20-30	4	2
30-40	5	3
40-50	10	8
50-60	26	18
Total	45 (59%)	31(41%)

Table.3 Antifungal susceptibility pattern

Antifungal Agent	*Candida albicans* n=31	Candida non albicans n=45
	Sensitive (%)	**Sensitive (%)**
Amphotericin B	28(89%)	41(92%)
Nystatin	23(76%)	32(71%)
Fluconazole	21(68%)	22(49%)
Voriconazole	26(85%)	36(80%)
Ketoconazole	24(78%)	33(73%)
Itraconazole	26(85%)	35(79%)

Table.4 Speciation of Candida

Candida species	Number (%)
C.albicans	31(41%)
C.tropicalis	25 (33%)
C.guilliermondii	9 (11%)
C. parapsilosis	7 (9%)
C.glabrata	3 (4%)
C.krusei	1 (2%)

Fig.1 Distribution of Candida

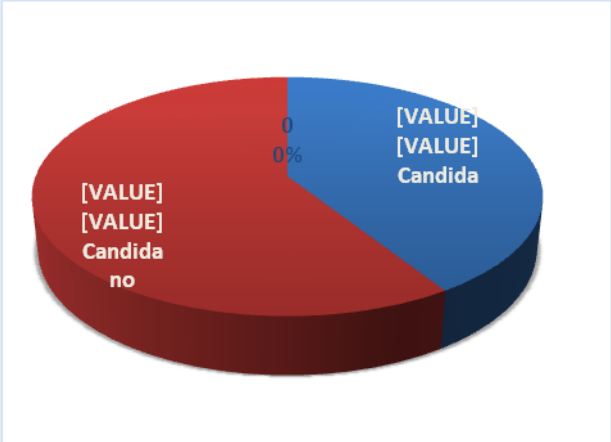
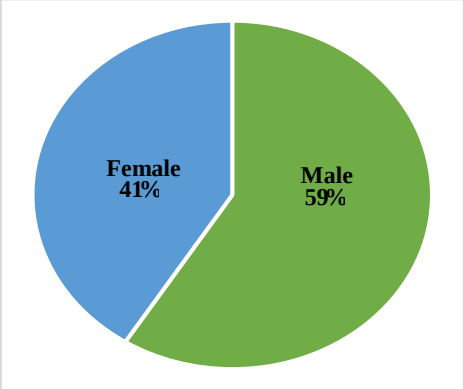


Fig.2 Sex wise distribution of Candida species



Species level isolation of *Candida* helps in early identification of resistant *Candida* strains and prompt treatment of the cases there by preventing the dissemination of infection in individuals (4-6). Increased resistance to drugs like azoles is of crucial importance in treatment of patients. Prior knowledge of species distribution and its Antifungal susceptibility pattern from different clinical samples help the clinician to choose early empirical therapy.

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