



STUDY ON INCIDENCE OF DIFFERENT CANDIDA SPECIES FROM VARIOUS CLINICAL SAMPLES IN A TERTIARY CARE TEACHING HOSPITAL

Dr.N.Bharathi Santhosh MD

Senior Assistant Professor of Microbiology, Coimbatore Medical College, Coimbatore -641014

Dr.C.Ashok Kumar MD

Senior Assistant Professor of Microbiology, Coimbatore Medical College, Coimbatore -641014

Dr.N.Mythily MD*

Professor of Microbiology, Coimbatore Medical College, Coimbatore -641014
*Corresponding Author

ABSTRACT Candida species are the most common cause of fungal infections worldwide. They are endogenous fungal pathogen which cause secondary infection in individuals with underlying immunocompromised conditions and are the fourth leading cause of health care associated infections. An increase in the prevalence of non-albicans species has been noted during the last few decades causing invasive candidiasis with higher mortality and morbidity. The aim of the study was to isolate and identify the various species of Candida from clinical samples from patients of all age group and both sexes with suspected Candida infection and also to study the predisposing factors for candidiasis. Total 100 isolates of Candida species were recovered from the clinical specimens over the period of one year. *Candida* was mainly isolated from Urine (45%) and respiratory samples (24%). The most common species of *Candida* isolated was *C. albicans* forming 48% of the total isolates. The non-albicans *Candida* species form the remaining 52% of the total isolates, thus stressing their emergence as major opportunistic fungal pathogens. Characterization to species level helps to identify species which might be intrinsically resistant to commonly used antifungal agents.

KEYWORDS : Candida albicans, Non- albicans candida, HiCrome

Introduction:

Candida is a yeast like fungus and ubiquitous normal flora of the skin, mucous membranes, gastrointestinal & genital tract¹. They become an opportunistic endogenous pathogens and cause infections at the site of colonization, when the host's resistance is lowered either locally or systemically^{1,2}. The genus is composed of a heterogeneous group of organisms and more than 17 different *Candida* species are known to be the aetiological agents of human infection¹. Among the species, *Candida albicans* is the most common cause of candidiasis accounting for about 60-80% of infections. From last decade onwards, as a result of HIV pandemic, long term use of immunosuppressive treatment in cancer and organ transplant recipients, increasing use of invasive medical procedures, indwelling devices, prolonged hospitalization for critical care illness and also widespread use of broad spectrum antibiotics have all favored emergence of other non - albicans *Candida* species namely *C. glabrata*, *C. parapsilosis* and *C. tropicalis* as clinically important opportunistic as well as nosocomial pathogens causing invasive candidiasis³. These infections are often severe, rapidly progressive, fatal and refractory to therapy, as these species are intrinsically resistant to some common antifungal drugs^{4,5}.

Knowledge on isolation frequency of *Candida* and its identification up to species level is important for management as species other than *Candida albicans* often fail first line treatment. Early detection and initiation of appropriate therapy may alter the course of this type of invasive fungal infections and improve the prognosis^{4,5}. Hence, present study was undertaken to determine the incidence and distribution of different *Candida* species from various clinical samples among the patients admitted in a tertiary care teaching hospital of south India.

Material & Methods

A total of 100 *Candida* isolates from various clinical specimens (urine - voided and catheterized, sputum, tracheal aspirates, stool, exudates, various body fluids, blood and medical implants) were taken up for the study during a period of one year. The various clinical specimens were collected and processed as per the standard microbiological

procedures. They were further speciated by the germ tube test, Chlamydo-spore formation on Corn Meal Agar and using HiCrome *Candida* Differential Agar.

Results

A total of 100 samples showing growth of *Candida* were included in the study. *Candida* was mainly isolated from catheterized urine (35%), vaginal swab (18%), sputum (16%), voided urine (10%), tracheal aspirate (8%) and blood (6%). Other sources included exudates (2%) like ear discharge, medical implants (3%) like catheter tip and stool sample (2%) Table 1: Isolation of *Candida* spp. from clinical samples

Table 1: Isolation of *Candida* spp. from clinical samples.

Clinical Samples	No. of isolates (%)
Catheterized urine	35
Vaginal Swab	18
Sputum	16
Voided urine	10
Tracheal Aspirate	8
Blood	6
Exudates	2
Medical implants	3
Stool	2
Total	100

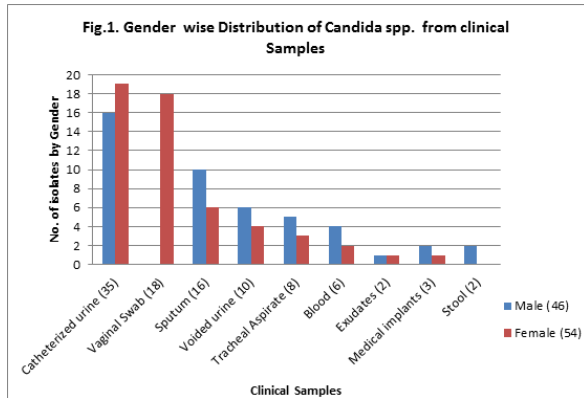
Out of the 100 number of *Candida* species isolated, the most common was *Candida albicans* forming (48%) and the remaining (52%) were non-albicans *Candida* species with *Candida tropicalis* (36%) being the commonest, followed by *Candida parapsilosis* (8%), *Candida glabrata* (6%) and *Candida krusei* (2%) were the other species isolated. Among urine and tracheal aspirates samples, non-albicans *Candida* were more common than *C. albicans* while in vaginal swab, sputum and stool samples *C. albicans* was more common than

Table 2: Distribution of *Candida* spp. among different clinical samples

<i>Candida</i> Species	No. of isolates (%)	Urine	Vaginal swab	Respiratory samples	Blood	Exudates	Medical implants	stool
<i>C. albicans</i>	48	18	12	10	3	1	2	2
<i>C. tropicalis</i>	36	20	4	8	2	1	1	0
<i>C. parapsilosis</i>	8	4	2	2	0	0	0	0
<i>C. glabrata</i>	6	3	0	2	1	0	0	0
<i>C. krusei</i>	2	0	0	2	0	0	0	0
Total	100	45	18	24	6	2	3	2

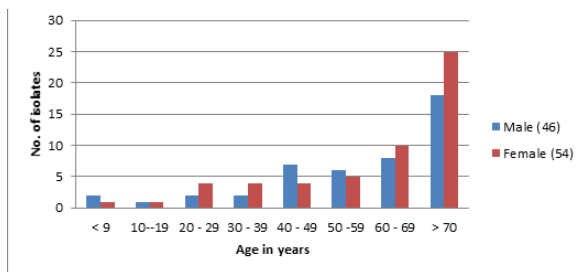
non-*albicans* *Candida*.

The isolation rates from catheterized urine were slightly higher in women and those from other samples (excluding vaginal swab) they were slightly higher in men. Combining the entire samples, the sex ratio of males and females was 1:1.1 and was slightly higher in women.

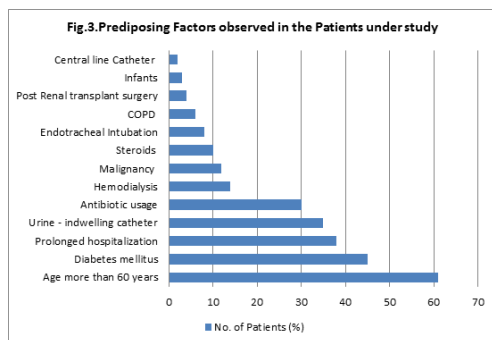


The age wise distribution of isolated *Candida* spp. showed that the isolation was significantly higher 61% in the age group of (60 yrs and above), whereas 22% in the age group (40 to 60 yrs), 12% in the age group (20 to 40 yrs) and a low isolation rate at 5% in the age group of (20yrs and below).

Fig.2. Age wise Distribution of candida Spp.



The most common predisposing factor were old age (61%), diabetes mellitus (45%), prolonged hospitalization(38%) and indwelling catheter (35%) followed by antibiotic usage (30%). Other associated risk factors were hemodialysis, malignancy, steroids, endotracheal intubation, COPD, transplant surgery and Preterm & LBW infants. There were also more than one risk factor were observed in 75% of the patients under study.



Discussion

Candida albicans was the commonest species isolated causing 48% of the infections followed by *Candida tropicalis* causing 36% and other non-*Candida* 16% of the infections respectively. The higher isolation rate of non-*albicans* *Candida* indicates there is a shift of trend from *C.albicans* to non-*albicans* *Candida* due to the factors like overuse of broad spectrum antibiotics, antifungal agents, long term use of catheters and also increase in the number of immunocompromised conditions contributes to the emergence of this non-*albicans* *Candida* species as important opportunistic fungal pathogens nowadays.

Over the last three decades, various studies have also shown that there is a considerable shift towards the non-*albicans* *Candida* isolates. Our

study showed that non-*albicans* *Candida* were isolated at a higher rate (52%) than *C. albicans* (48%), which was in concordant with the findings of the studies by Mokaddas *et. al.*, which also showed the non-*albicans* *Candida* incidence (60.5%) to be higher than that of *C. albicans* (39.5%) and by Chakrabati *A et.al.*, where non-*albicans* *Candida* have a higher incidence (75%) than *C. albicans* (25%)^{6,7}.

The speciation of *Candida* is important to identify the incidence and trends of Candidial infections in a geographical area under study and also to choose the appropriate drug because of the variation in the sensitivity of different species to different antifungal drug, as the azoles are found to be effective against *C. albicans* and *C. tropicalis*, whereas ineffective against *C. krusei* and *C. glabrata*.

Our study observed that the infection rate by *Candida* spp. had a tendency to increase with increasing age, whereas other studies by Dalal PJ and Kelkar SS at Mumbai⁸ reported that the highest incidence of candidiasis to be in the age group of 30 - 40 years and on the other hand, they reported lower incidence in the age group <20 years, which was in concordant with our study. It is explained that the infection rate is relatively low because this age group of teenagers has a vigorous immune system and limited exposure to outdoor activities.

The isolation rates of *Candida* by sample & gender were analyzed and the sex ratio of males and females was 1 : 1.1 with no significant difference in both sexes, whereas study by Patel *et. al.*, reported a male preponderance, with an overall male: female ratio of 2:1 and by Kandhari KC *et. al.*, reported higher incidence in females (61.2%) than in males (38.8%)^{9,10}.

However, it was observed slightly higher incidence in the men of all age groups for most of the samples, except in the women of age group of > 60 yrs for catheterized urine. It is explained that the yeasts colonized in the women genital tract may ascend to the urinary tract causing candiduria especially following urinary catheterization.

In this study the important associated predisposing factors were old age group, diabetes mellitus, prolonged hospital stay, presence of indwelling catheter, antibiotic over usage etc., and these findings were in concordant with various Indian and International studies.

Conclusion:

The results of this study have shown a notable shift in the incidence of *Candida* species from *C. albicans* to non-*albicans* *Candida* spp as an important opportunistic pathogen causing invasive candidiasis which are often severe, rapidly progressive, refractory to therapy because of intrinsic resistance and are always associated with higher mortality and significant morbidity. Hence, there is an urgent need for improved knowledge of different *Candida* species from various clinical sources in terms of geographical area with associated specific or non-specific risk factors and it's varied clinical presentation that will help in timely planning of appropriate antifungal treatment which will alters the course of infection and improves the prognosis thereby decreasing the burden of invasive candidiasis especially in potentially high risk groups.

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