Original article

"CHANGING TRENDS OF CANDIDA SPECIES AND ITS RAPID IDENTIFICATION FROM VARIOUS CLINICAL SAMPLES AT A TERTIARY CARE HOSPITAL IN KANPUR"

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Abstract: Candida species have emerged as a major cause of human disease, especially among the immunocompromised and those hospitalized with serious co-morbid conditions. The aim of this study was to detect the clinical distribution of candida species and its rapid identification in a tertiary care hospital. **Materials & Methods**: A total of 48 candida isolates from various clinical specimens were processed as per the standard microbiological procedures. They were further speciated by Hichrome agar (Hi-media), the germ tube test, chlamydospore formation on corn meal agar and carbohydrate asimilation tests. **Results:** Out of 48 *Candida* isolates obtained, 42% were from male patients and 58% were from female patients, found in the age group of 20 - 40 years. The distribution of the clinical samples was urine 31%, blood 20.8%, sputum 16.7%, vaginal swab 10.4%, pus 10.4%, body fluid 6.3% and foley's tip 4.2%. Non albicans candidia species (54%) was the most common species isolated from these samples followed by C.albicans (46%). The distribution of non *C.albicans (54%)* was *C. krusei* (23%), *C. glabrata* (13%), *C. dublinensis* (10%) and *C. tropicalis* (8%). The specificity and sensitivity of Hichrome agar was 98%. **Conclusion**: It can be concluded from our results that the prevalence of non-C.albicans species is greater than C.albicans. The species level identification of the Candida isolates using chrome agar medium would enable the laboratories to rapidly identify and speciate the clinically important candida species. This can greatly influence the treatment options for the clinician and may have an impact on the patient care that can potentially reduce the patient's morbidity and mortality.

Keywords: Candida species, changing trends, clinical samples

Introduction: Fungal infection due to candidia species are increasing in the recent few decades worldwide mainly attributed due to advances in medical and surgical managements[1], immunocompromised conditions like use

of steroids and broad spectrum antibiotics, drug abuse and organ transplantation[2]. More than 100 species of candida have been identified but only a few species have been isolated from humans. C.albicans is the most common cause of invasive candidiasis accounting for about 50-70% of infection[3,4]. Recent studies suggest that with the introduction of fluconazole and itraconazole there is a shift on the distribution of yeast species; >30% of nosocomial infections are due to non-albicans species such as C.albicans, C.tropicalis and C.parasiplosis[5,6]. Clinical presentation of systemic candidiasis due to these species is indistinguishable from bacterial septicaemia. These infections are severe, difficult to diagnose and refractory to therapy. The mortality attributed to candidemia ranges from 5% to 7% in various studies[7]. Therefore isolation and prompt identification of the infecting organism to the species level is essential to optimize the early antifungal therapy. Chromagar Candida is a new differential culture medium that allows the isolation and presumptive identification of yeast species of clinical importance rapidly[8]. Hence the aim of this study was to rapidly isolate and identify the distribution of candida species from various clinical samples at a tertiary care hospital.

Materials & Methods: This was a prospective study was conducted in Microbiology Department of Rama Medical College Hospital and Research Center, Kanpur. A total of 48 candida species isolated from various clinical samples (urine, vaginal swab, sputum, blood, pus and CSF) from IPD and OPD patients of all age groups and either sex were included in the study during a period of one year (October 2014 to September 2015). The clinical samples were processed as per the standard microbiological procedures. They were further speciated by Hichrome agar (Hi-media), germ tube test, chlamydospore formation on corn meal agar and carbohydrate asimilation tests[9].

Results: Out of 48 *Candida* isolates collected; 42% were from male patients and 58% were from female patients [**Fig-1**], more commonly found in the age group of 20- 40 years. The distribution of the clinical samples was urine 31%, blood 20.8%, sputum 16.7%, vaginal swab 10.4%, pus 10.4%, body fluid 6.3% and folley's tip 4.2% **[Table-1]**. The species spectrum of the isolate was as follows; out of the 48 isolatess the non albicans species were 54% and C. Albicans were 46%. The distribution of non *C.albicans (54%)* was *C. krusei* (23%), *C. glabrata* (13%), *C. Dublinensis* (10%) and *C. tropicalis* (8%) **[Fig - 2**]. Growth of candida on Hichrome agar and germ tube test is shown in **Fig-3 and Fig-4** respectively.

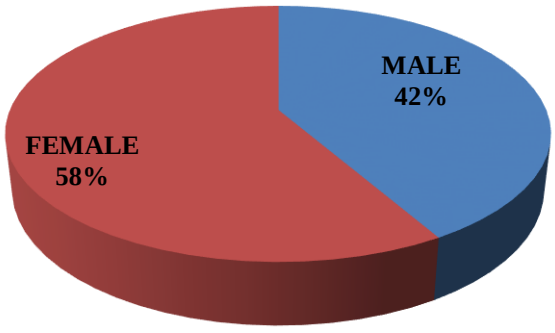

Fig 1: Sex distribution of Candida species in clinical samples

Discussion: The frequency of mycoses has increased during the past few years. This study investigated Candida species from different clinical samples from all age group and both genders. Patel et al.[10]

Table-1: Distribution of samples showing growth of Candida species

TYPE OF SAMPLE	C.albicans	C.kuseri	C.glabrata	C.dublinens	C.tropicalis	Total
URINE	9	1	3	2	0	15
PUS	1	2	1	1	0	5
SPUTUM	5	2	0	0	1	8
FLUID	0	0	1	1	1	3
BLOOD	4	2	1	1	2	10
VAGINAL	2	3	0	0	0	5
FOLEY'S TIP	1	1	0	0	0	2
TOTAL	22	11	6	5	4	48

recorded that the prevalence of candida was higher in males in their study but in our study it was predominant in females (58%) than male (42%). Kandhari KC et al[11] also found that higher incidence of candidiasis in females (61.2%). Jaggi et al[12] documented male predominance however candiduria was higher in females than in males. According to Achkar J 2010; vulvovaginal candidiasis (VVC) is the most common manifestation of genital candidiasis in females[13]. In our study higher urine and vaginal samples indicate higher prevalence of vulvovaginal candidiasis in females confirming its high prevalence in the reproductive age group of 20-40 years.

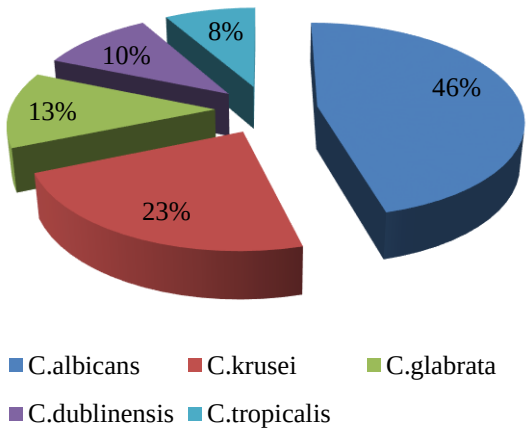

Fig-2: Distribution of Candida species

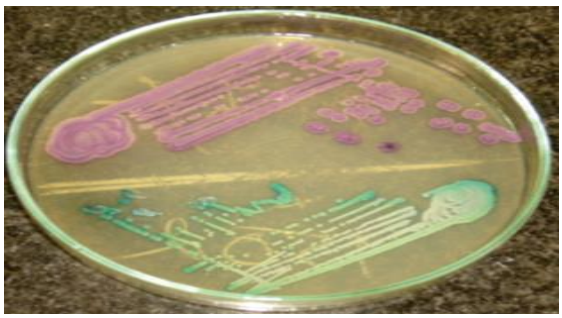

Fig - 3: Candida species on Hichrome Agar

Fig-4: Germ tube test

In our study the distribution of Candida species in different clinical samples showed the highest number of isolates in urine (31.3%); followed by blood (20.8%), sputum (16.7%), high vaginal swab (10.4%), pus (10.4%), fluid (6.3%) and foley's tip (4.2%). Studies which were done earlier by Pfaller et al.[14] have reported Candida isolated from 25% of all the urinary tract infections. Jaggi T et al[12] isolated Candida mostly from blood (33.6%) and respiratory samples (20%) and least from urine (8%) while

Saldhana et al[15]found high vaginal swabs showed the highest number of isolates (38%); followed by blood (16%) and urine (12%). These studies showed high variation of Candida isolates from various clinical specimens.

Several studies have shown a considerable increase in the non-albicans Candida infections. A study by Saldhana et al[15] showed that non-albicans Candida were isolated more frequently (53%) than C. albicans (47%). A study by Mokadas et al[16] also found the non-albicans Candida incidence (60.5%) was higher than that of C. albicans (39.5%). Similarly Jaya et.al[17]found non-albicans Candida was the predominant pathogens (47.8%) followed by C. albicans (32.86%). These findings suggested that non-albicans Candida species are emerging as important as well as predominant pathogen (54%) followed by C.albicans (46%). Among non-albicans; C. krusei (23%) were more prevalent than C. glabrata (12.5%), C. dublinensis (10.4%), C. tropicalis (8.3%); which are similar to the results of a study by Mujika et al[18]. While Jaya et.al.[17] and Saldhana et al[15] found C. tropicalis was the predominant pathogen 47.8% and 30% respectively. Mokadas et al[16] reported C. parapsilosis (30.6%) as the most common non-albicans isolate.

C. albicans is also the most common species isolated from neonatal septicemia[19]. In our study candidal septecemia was 20.8%, among which C. albicans species was common; which is in contrast with a study conducted by Roy A et al at Calcutta[20] , Vaideeswar P et al at Chandigarh[21] and Rani R et al[1] at New Delhi. These studies showed C. tropicalis as predominant species among C. non-albican species, which emphasize that there is a change in the trend of candida species causing candidemia in different regions of our country. Mortality in case of candidiasis was mainly due to candidemia; which in our study was seen due to both C.albicans and non-albicans species.

To control mortality, accurate and rapid diagnosis of candida species is important and Chrom Agar is the most widely method used in laboratories. Many microbiologists use Chromagar for speciation. Veena manjunath [2] and Manikandan [8] found that Hichrome is a better method that speciates candida early than other methods. Even in our study its sensitivity and specificity was found to be 98%.

Conclusion: Percentage of non-albicans species (54%) has increased in prevalence as compared to C.albicans (46%) from clinical samples. C. albicans species and non C. albicans species have equivalent prevalence in case of candidemia. The use of chrome agar medium would enable the laboratories to rapidly identify and speciate the clinically important candida species while potentially reducing the patient's morbidity and mortality. Therefore isolation and prompt identification of the infecting organism to the species level is essential to optimize the early antifungal therapy.

Limitations of the study: Due to cost constraints the antifungal susceptibility testing was not done, which is very important for starting the specific antifungal therapy.

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