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AN EPIDEMIOLOGICAL STUDY OF CHARACTERIZATION AND ANTIGUNGAL SUSCEPTIBILITY PROFILE OF CANDIDA SPECIES FROM PATIENTS ATTENDING AT TERTIARY CARE CENTRE IN CENTRAL INDIA.

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ABSTRACT

Background: From many parts of the world infection caused by Non albicans Candida (NAC) had been reported regularly, due to increased isolation rate of NAC and gradually shifting of Antifungal susceptibility profile raise the need for early diagnosis of Candida species along with their Antifungal susceptibility pattern.

Aim: The aim of the study to early isolate, characterize the Candida from different clinical sample & do the Antifungal susceptibility testing.

Study Design: This study was conducted in Dept of Microbiology at tertiary care centre in central india, total 200 Candida positive species were studied from Jan 2017 to Dec 2017

Material & Method: Candida isolates from the clinical sample were characterized by conventional techniques and CHROM agar. Antifungal susceptibility test was performed using Disc diffusion method. Clinical history and risk factors Profile were taken from Patient record .

Results & conclusion: The most common species isolated from the clinical samples was *Candida albicans* & it is followed by *Candida tropicalis*. The Candida isolates were more susceptible to Amphotericin B compared to other antifungal agents used in testing. Amongst all the predisposing Factors Diabetes Mellitus is most common cause for development of the Candida infections, followed by chronic drug therapy and Pregnancy.

KEYWORDS : CA, NAC.

INTRODUCTION:

Candida is a yeast like fungus and ubiquitous in human . They become pathogens and cause infections when the host's resistance to infection is lowered either locally or systemically [1]. Candida species is endogenous and the disease represents opportunistic infection. The clinical manifestations of the disease are extremely varied, ranging from acute, subacute and chronic. It may be localized or may become systemic. They cause diseases with severity ranging from benign to potentially life-threatening infection. The increase in the predisposing conditions in recent years has resulted in a concurrent increase in the number of patients who suffer from candidiasis. Candida albicans (CA) remains the predominant spp. causing over the half of all the yeast infection cases in the world [2]. Increase in the prevalence of yeast infections caused by non-albicans Candida (NAC) has been documented from many parts of the world. Accurate identification of species is very important for the treatment of Candida infections as the Non Albicans Candida (NAC) continues to be increasingly documented with decreased susceptibility to antifungal agents [3]. Hence, this study was conducted to isolate and speciate Candida species from cases where candidiasis was suspected clinically and to determine the antifungal susceptibility, pattern and to analyse the predisposing factor for candidiasis

MATERIAL & METHODS:

In this study various clinical sample of 200 Candida isolates were used in study. A detailed clinically history is taken from patient and their clinical records to determine the predisposing factors. The samples collected from the patients were processed as per standard microbiological protocol [4]

The candida isolates obtained from patients were further isolated as per standard protocol for yeast identification which includes following test. Gram's stain, culture on sabourauds dextrose agar, germ tube test, cornmeal agar morphology (Dalmau technique), sugar fermentation test and sugar assimilation test (auxanographic plate method). In addition CHROMagar (BioMeriux) morphology were studied. Antifungal susceptibility test for candida species were done using clinical laboratory institute Protocol 2010 for antifungal disc diffusion suscipatibility for yeat as per guidelines M44-A. Fluconazole (25 µg) (HiMedia),Itraconazole (10 µg) (HiMedia) and Amphotericin B (20 mcg) (HiMedia disc were used for susceptibility testing in this study.

RESULTS:

In this study 200 clinical isolates of candida were taken for the study. It is found that Candida isolates were more predominat in females (56%) compared to male as shown in Table 1. In age distribution (Table 2) highest incidence of candida is seen in age group above 60 years. Table 3 showing various clinical sample from which candida species were isolated, highest number of candida wew isolated from urine sample. Table 4 showing different types of candida species were isolated from clinical sample , four types of clinical species of candida were isolated from clinical sampes, *viz Candida albicans, Candida tropicalis, Candida glalbarta, Candida parapsilosis* . out of all clinical specimen *Candida albicans* was most frequent species isolate followed by Candida tropicalis. But isolation rate of NAC (53%) is more compared to Candida albicans (47%). Table 5 showing various types of sample were taken for isolation of candida, out of all clinical sample urine is most frequent sample in which all types of candida were isolated followed by exudates and vaginal swab. Candida tropicalis is more frequently isolated in urine samples followed by candida abicans. Table 6 showing various predisposing factors associated with emergence of candida, it is found that Diabetes mellitus (24.5%) is most frequent underlying condition for emergence of candida followed by chronic drug therapy (15%) and pregnancy (10%). Table 7 showing species distribution in various clinical samples according to underlying risk factors, it is found that candida albicans is more frequently isolated in patients with underlying risk factors compared to Non albiacans Candida(NAC).

All isolated candida were subjected to antifungal disc susceptibility testing ,out of that 191(95.5%) were sensitive to Amhotericin B, and only 143(71.5%) were sensitive to fluconazole. (Table 8)

Table 1: **Showing Sex distribution of patients:**

Sex	Number	Percentage(%)
Male	88	44
Female	112	56
Total	200	100%

Table 2: Showing age distribution of patients:

Age group (in years)	Number
Up to 10 years	38
11-20	20
21-30	28
31-40	25
41-50	14
51-60	24
.>60	51

Table 3: Showing distribution of clinical specimen from which candida were isolated:

Urine	113
Exudates	20
High vaginal swab	29
Respiratory tract sample	14
Blood	17
Catheter tip	7
Total	200

Table 4 : Distribution of type of *candida* species

Species	Number	Percentage
Candida albicans	94	**47**
Candida tropicalis	48	24
Candida glalbarta	30	15
Candida parapsilosis	28	14
Total	200	100

Table 5: showing distribution of various types of candida species in all types of sample

	Candida albicans	*Candida tropicalis*	*Candida glalbarta*	*Candida parapsilosis*
Urine	23	34	22	21
Exudates	24	2	2	2
High vaginal swab	20	3	4	1
Respiratory tract sample	10	2	1	1
Blood	11	3	1	2
Catheter tip	5	4	0	1
Total	94	48	30	28

Table 6 : Showing various risk factors in patients

Risk factor	Number	Percentage
Diabetes Mellitus	49	24.5
Chronic drug therapy	30	15
Pregnancy	20	10
Sepsis /infection	11	5.5
Immunosupression	15	7.5
Preterm /low birth weight	06	03
Device in situ	05	2.5
No specific factor	64	32
Total	200	100

Table 7: Showing species distribution in various clinical samples according to underlying risk factors

	Candida albicans	*Candida tropicalis*	*Candida glalbarta*	*Candida parapsilosis*
Diabetes Mellitus	23	16	5	5
Chorinic drug therapy	18	7	3	1
Pregnancy	13	6	2	1
Sepsis	5	2	3	1
Immunosupression	7	7	1	1
Preterm /low birth weight	5	0	2	0
Device in situ	5	1	1	1
Total	76	39	17	10

Table 8: showing Antifungal disc susceptibility pattern of different species of *Candida*

Species	Total	Fluconazole n (%)				Itraconazole n(%)				Amphoteracin B n(%)			
		Sensitive	%	Resistant	%	Sensitive	%	Resistant	%	Sensitive	%	Resistant	%
Candida albicans	94	70	74.46809	24	25.53191	80	85.10638	14	14.89362	90	95.74468	4	4.255319
Candida tropicalis	48	31	64.58333	17	35.41667	40	83.33333	8	16.66667	46	95.83333	2	4.166667
Candida glalbarta	30	22	73.33333	8	26.66667	26	86.66667	4	13.33333	28	93.33333	2	6.666667
Candida parapsilosis	28	20	71.42857	8	28.57143	25	89.28571	3	10.71429	27	96.42857	1	3.571429

DISCUSSION :

Since candida infections has variable clinical presentation so it is very important to identify these pathogen very early from all clinical sample received in the laboratory for irrespective of their clinical diagnosis. Candida species differ in their antifungal susceptibility and virulence. This identification of various candida species and their antifungal susceptibility become very essential in diagnosis. Early identification & speciation is important in selecting appropriate antifungal treatment to avoid resistance to antigungals.[5]

Although candiasis can occur at any age but other study by Dalal et al shows that higher incidence of candida infection occurs in age group of 21-40 years but in our study age more than 50 years is more proned to developed candida infection and it is more in age group more than 60 years , it maybe more due to immunocompromised status[6]

In our study female patients (56%) are more proned to develop candiasis compared to Male(44%), similar finding were also shown by dharwad et al (64**%**)[7,] this may be due to higher number of samples were collected from female patients.

In our study out of total sample reorted Candida albicans (47%) was the most frequent isolate were reported followed by candida tropicalis (24%), Prince et al [8] also reported similar finding. however it is found that if we put together non Albicans Candida (NAC) was more frequent 53% compared to Candida which is only 47%.similar finding were also reported from Mokaddas et al, Chakrbart et al, Min et al [9,10,11]. This finding suggest that NAC is also emerging as important pathogen and most common NAC isolated at our facility is C Tropicalis.

We studied various risk factor for development of candiasis in 200 patients. Diabetes Mellitus (24.5%) is most frequently associated risk factor and most common isolate were Candida albicans.use of chronic drug therapy or multiple antibiotic use (15%) was the second most

frequent risk factor followed by Pregnancy(10%), the most common drugs used were Antibiotic, steroids and contraceptive pills. In pregnant females candiasis leads to vulvovaginitis which has great risk of transmission to new born infants[12]. other significant factors associated with candiasis are immunosupression, sepsis,infection,pre term birth , low birth weightand device in situ.

In our study the antifungal disc susceptibility showed that 28.5 %of candida species were resistant to fluconazole, 14.5% resistant to itraconazole and 4.5 % of candida only resistant to amphotericin B. this is similar to study by Passos et al & Knechtel et al [12,13]. It was also observed that resistance pattern were more common in NAC group compared Candida albicans.

CONCLUSION:

In last few decades it is seen that incidence of fungal infections is increasing around the globe, this creates a great challenge among health care professionals to treat their patients. In the era of increasing usage of broad spectrum antibacterial drugs in hospitals it is evident to monitor distribution of candida & their resistant pattern. Continued surveillance is required to monitor epidemiological features & their antifungal susceptibilities. Therefore the description of various candida infection at the species level and research on antifungal sensitivity will be very useful in treatment and prevention of resistance CHROM agar is a simple, rapid and inexpensive method with good sensitivity and specificity for identification of such species.

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