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Speciation of Candida Isolated among Immunocompromised Patients

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A B S T R A C T

Immune-compromised patients have lead to rise in infections caused by *Candida albicans* and by Non *Candida albicans*. This study was done with 368 samples from 300 immunocompromised patients. The most common species isolated was *C. albicans* (42%), followed by *C. tropicalis* (35%), *C. pseudotropicalis* (5%), *C. krusei* (5%), *C. glabarata* (4%), *C. parapsilosis* (3%), *C. guilliermondii* (2%). CHROM agar candida medium was used in identification of Candida species. It is very important to identify these pathogens at the species level from all the clinical specimens received at laboratory for effective treatment.

Introduction

Fungal infections involving yeast isolates, especially Candida species are increasingly being identified as etiological agents in nosocomial infections. Despite the clinical importance, the ability to prevent, diagnose and treat Candida infections is difficult particularly in immunocompromised patients (Lata R. Patel *et al.*, 2012). Certain factors that contribute to colonization leading onto infection include prolonged treatment with multiple antimicrobial agents, use of indwelling devices, prolonged neutropenia with cancer, congenital or acquired immunodeficiency, malnutrition, diabetes mellitus, neutropenic ulcers (Manchanda *et al.*, 2011). The incidence of Candida infection is increasing because of a rising number of immunocompromised patients and widespread use of broad spectrum antibiotics. Although *Candida albicans* remains the most frequently isolated pathogen, other Candida species such as *C. tropicalis*, *C. glabarata*, *C. guilliermondi* and *C. krusei* are emerging as opportunistic pathogens (Gugnani *et al.*, 2003). The present study was done to study the prevalence of Candida species and for the speciation of Candida isolates isolated from immunocompromised patients.

Materials and Methods

The study was done at madras Medical College Chennai for a period of one year involving 300 immunocompromised patients which included 1. HIV infected persons, 2. Renal transplant patients, 3. Patients suffering from diabetes mellitus, 4. Patients on immunosuppressive therapy especially corticosteroids, 5. Cancer patients and those receiving anticancer therapy 6. Patients with chronic diseases like TB, COPD or on prolonged antibiotic therapy. The samples were collected according to the clinical presentation: Oral scrapings, Urine, Sputum / tracheal aspirate/bronchial wash, Blood, Vaginal swab, Nasal Swab, CSF, swab from palatal perforation and pus. The samples were inoculated into Sabouraud Dextrose agar supplemented with antibiotics (Chloramphenicol, Gentamicin and tetracycline) to prevent bacterial overgrowth. Cultures are incubated at 28 C and 37 C-colonies become apparent within 2-3 days but in some cases as early as 24 hours. Candida Speciation done using CHROMagar which uses chromogenic substrates to react with specific enzymes of the different species resulting in the formation of differently coloured colonies allowing rapid presumptive identification of different Candida species.

Results and Discussion

300 immunocompromised patients were included in the study and a total number of 368 samples were processed. In the immunocompromised group, HIV infected individuals constituted a large number 155(41.7%), compared to renal transplant recipients 40(10.8%), patients on immunosuppressive therapy 30 (8%), patients with cancer 30(8%), diabetes mellitus 30(8%) and chronic disease 15(4%). In our study Among the HIV infected patients, most of the samples were from oral cavity 62(38.5%), followed by vaginal discharge 50(31%), urine 25 (15.5%), sputum 10(6.2%), blood 8(4.9%) and CSF 6(3.7%). Studies which have also reported the highest yield of *Candida* spp. from oral swabs and the lowest yield of *Candida* spp. from blood specimens from HIV positive patients (Wadhwa *et al.*, 2007).

In renal transplant recipients, 40 samples were urine (61.5%), 15 from oral cavity (20%), 7 blood (10.7%) and 3 CSF (4.6%). Among the patients on immunosuppressive therapy which excludes the renal transplant recipients, 30 (60%) samples were from oral scrapings, 10 (20%) from urine, 8 (16%) from sputum and 2 (4%) from blood. 37 and 30 samples were obtained respectively from patients on cancer chemotherapy and patients with diabetes-mainly from oral cavity and urine.

The most common species isolated was *C. albicans* (42%), followed by *C. tropicalis* (35%), *C. pseudotropicalis* (5%), *C. krusei* (5%), *C. glabarata* (4%), *C. parapsilosis* (3%), *C. guilliermondii* (2%). Our study revealed Out of the 45 isolates of *C. albicans*, 34 (75.5%) were from HIV patients followed by 5 in renal transplant recipients (11%), 2(4.4%) each in patients on immunosuppressive therapy and on cancer chemotherapy and 1 (2.2%) in a patient with diabetes. Of the 37 isolates of *C. tropicalis*, 11(29.7%) were from HIV infected patients, followed by 8(21.6%) from patients on immunosuppressive therapy, 4(10.8%) in diabetic patients, 3(8%) in patients with chronic diseases and 2(5.4%) in patients on cancer chemotherapy. Among the 5 *C. pseudotropicalis* isolates, 3 were from patients with diabetes and 1 each from a patient with chronic disease. Out of 3 *C. parapsilosis* isolates, one isolate was obtained each from a HIV infected patient, patient on immunosuppressive therapy and a diabetic patient. *C. krusei* isolates were isolated 2 each from renal transplant recipients and diabetics and one from a patient on immunosuppressive therapy. Nweze *et al*., in their study showed

though *Candida albicans* is the most frequently isolated species other Candida species such as *C. tropicalis, C. krusei, C. glabrata, C. dubliniensis, C. guilliermondii, C. parapsilosis, C. kefyr*, and *C. pelliculosa*, have become a significant cause of infection in immunocompromised patients (Table 1–4).

Table.1 Samples collected from patients

Patient Category	No of patients	Total no of samples
HIV	155	161
Renal transplant Recipients	40	65
Immunosuppressive therapy	30	50
Cancer	30	37
Diabetes	30	30
Chronic disease	15	17
Total	300	368

Table.2 Samples collected from patients

Patient Category	Oral	Vaginal	Urine	Blood	Nasal swab	Tracheal aspirate	Sputum	CSF	Palate	Pyo pneumo thorax
HIV	62	50	25	8	-	-	10	6	-	6
Renal transplant Recipients	15	-	40	7	-	-	-	3	-	3
Immunosuppressive therapy	30	-	10	2	-	-	8	-	-	-
Cancer	20	-	10	3	-	-	4	-	-	-
Diabetes	10	-	10	-	3	4	3	-	-	-
Chronic disease	3	-	-	-	4	4	6	-	1	-

Table.3 Species of *Candida* isolated

Patient Category	No of isolates	*C. albicans*	*C. tropicalis*	*C. pseudotropicalis*	*C. glabarata*	*C. parapsilosis*	*C. krusei*	*C. guilliermondii*	Unidentified
HIV	50	34	11	-	1	1	-	-	3
Renal transplant Recipients	12	5	2	-	3	-	2	-	-
Immunosuppressive therapy	12	2	8	-	-	1	1	-	-
Cancer	4	2	2	-	-	-	-	-	-
Diabetes	11	1	4	3	-	1	2	-	-
Chronic disease	4	0	3	1	-	-	-	2	3

Table.4 *Candida* species in various clinical samples

***Candida* species in Various Clinical Samples species**	**Oral**	**Vaginal**	**Urine**	**Blood**	**Nasal swab**	**Tracheal aspirate**	**Sputum**	**Palate**
C. albicans	31	-	11	-	-	1	1	1
C. tropicalis	14	4	9	1	2	2	3	1
C.pseudotropicalis	-	1	2	-	-	2	-	
C. glabarata	1	-	3	-	-	1	-	
C. parapsilosis	1	1	-	-	-	-	1	
C. krusei	1	1	-	2	-	-	1	
C. guilliermondii	-	1	-	-	-	-	1	
Unidentified	3	-	-	-	-	-	3	

C. albicans was predominantly isolated from the oral cavity 31(68.8%) followed by urine 11 (24.4%), bronchial wash 1(2.2%), sputum 1(2.2%) from palatal perforation. Majority of the *C. tropicalis* isolates were obtained from oral cavity 14(37.8%) followed by urine 9(24.3%), vagina 4(10.8%), sputum 3(8.1%) and 2 (5.4%) each from nasal swab, tracheal aspirate and bronchial wash. *C. pseudotropicalis* was isolated 2(40%) each from urine and tracheal aspirate and one (205) from vagina. *C. glabrata* was isolated more from urine 3(75%) than from oral cavity 1 (25%). 3 isolated of *C. parapsilosis* were obtained one each from oral cavity, vaginal discharge and sputum. *C. krusei* isolates were obtained 2(40%) from blood and one each from oral cavity, vaginal discharge and sputum. Monika Maheshwari *et al.*, had a similar observation in their study. Among *C. albicans* strains, the maximum number (was from oral swabs followed by sputum and urine (6/64), while most of *C. glabrata* strains were isolated from urine samples. *C. dubliniensis*, *C. parapsilosis*, *C. krusei*, *C. tropicalis*, and *C. kefyr* were mainly detected in oral swabs.

In conclusion, along with *Candida albicans*, non albicans *Candida* spp like *C. tropicalis*, *C, krusei and C. glabrata* are increasingly being isolated from clinical specimen among immunocompromised patients. CHROM agar Candida not only facilitates the detection of mixed cultures but also allows for a presumptive identification to the species level so as to help the clinicians to choose appropriate antifungal agents.

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