



Speciation of Clinically Relevant Candida Isolates From a Tertiary Care Hospital

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Abstract

Background: *Candida*, a genus of yeast causes a diverse spectrum of opportunistic infections ranging from mild superficial cutaneous infections to life threatening invasive candidiasis. The emergence of Non Albicans Candida (NAC) species has complicated the overall incidence of candidiasis either as colonisers or as nosocomial fungal pathogen causing blood stream infections. So the early diagnosis and speciation of *Candida* is necessary.

Aim: To find out the proportion of different *Candida* species from clinically relevant specimens.

Setting of the study: The study was conducted in Department of Microbiology, Govt. Medical College, Kozhikode over a period of one year.

Materials and Methods: 117 relevant *Candida* isolates were speciated by conventional methods and CHROM AGAR

Results: The predominant species was *C.tropicalis* followed by *C.albicans*

Conclusion: Non albicans *Candida* is an emerging pathogen. The isolation rate of Non albicans *Candida* was 60.7%. *C.tropicalis* was the predominant species followed by *C.albicans*, *C.parapsilosis*, and *C.kefyr*. The isolation of *Candida* from blood must be considered significant.

Keywords: *Candida albicans*, *Candida tropicalis*, Non albicans *Candida*.

Introduction

The *Candida* constitutes the most common fungal flora in human beings. They inhabit the gastrointestinal tract, upper respiratory tract, female genital tract, and skin in about 35-55% of healthy individuals¹. There is more than 200 *Candida* species, which are found in different habitat involving animate and inanimate

environment^{1,2,3}. *Candida* species was found to be the fourth most common cause of BSI in a hospital set up⁴ accounting for 10% of all blood stream infections. *Candida* spp. has been recognized as the fourth commonest cause of nosocomial invasive infections⁵. Candidiasis may be localised or systemic. The increasing incidence of immunosuppressive states associated with HIV

infections, the advancement in therapeutic modalities such as life supportive measures, organ transplantation and prosthetic surgeries have contributed to the expanding incidence of Candida infection. The mucocutaneous candidiasis is the most common clinical manifestation.

The changing epidemiology of Candidiasis and relative drug resistance of Non albicans Candida species necessitates the accurate and rapid identification of Candida to the species level. Hence this study was undertaken to isolate and speciate Candida from suspected Candidiasis cases.

Materials and Methods

117 out of 253 Candida isolates found to be clinically relevant were taken up for the study during the period December 2012 to November 2013. The clinical details and history of patients were collected to determine the associated risk factors. The various clinical specimens were grown on routine culture media - blood agar or Sabouraud's agar. Candida isolates obtained were speciated by gram stain, germ tube test, cornmeal agar morphology, (Dalmau technique), sugar fermentation test and sugar assimilation test. Presumptive identity of Candida species done by using Hichrome Candida agar (Himedia, Mumbai, India). A single Candida isolate was confirmed by Vitek 2 identification system (Biomérieux).

Results

Out of 253 Candida isolates 117 isolates were found to be clinically relevant. Non albicans Candida constituting about 60.7% which was higher than that of *C.albicans* (39.3%). Out of 117 isolates, *C.tropicalis* was the predominant species, constituting 48.7%, followed by *C. albicans* (39.3%), *C.parapsilosis* (10.2%) and *C.kefyr* (0.9%), and the rate of isolation of different species showed slight variation with the nature of clinical specimens. One species isolated from blood of preterm, LBW new born, biochemical reactions did not match to any of the Candida species, according to the data available both by

conventional methods and by Vitek system and was sent for MALDI-TOF at microbiological laboratory, Coimbatore and identified as Non albicans Candida, but couldn't speciate.

Table: 1 Gender wise distribution of patients

Gender wise distribution of patients		
Gender	Number	Percentage
Males	65	55.6%
Females	52	44.4%
Total	117	100

The study group included 65 males and 52 females with male to female ratio 1.25:1

Table: 2 Clinically Relevant Candida species isolated from different specimens

Specimen	Total No. of Candida Isolated	No. of clinically relevant Candida isolates	Percentage
Blood	40	23	57.5
Urine	167	78	46.7
Ascitic fluid	5	3	60
High vaginalswab	4	3	75.
Oral swab	3	3	100
CAPD fluid	4	1	2
Gastric aspirate	3	1	33.33
Aspirate from pancreatic pseudo cyst	1	1	100
Retropharyngeal aspirate	1	1	100
Lymph node aspirate	1	1	100
Pleural fluid	3	1	33.3
Wound swab	9	1	11.11
CVC tip	6	0	0
ET tip	1	0	0
Ear swab	1	0	0
Tracheostomy swab	2	0	0
SSI	2	0	0
Total	253	117	46.2

Table: 3 Age distribution of patients

Age in years	Number	Percentage
Newborn	18	15
<12 years-	12	10
13-25 years	7	6
25-45 years	24	21
46-60 Years	24	21
>60 years	32	27
Total	117	100

Table 4-No and percentage of *Candida* species isolated from different specimens

Candida species	Number	Percentage
<i>C. albicans</i>	46	39.3
<i>C. tropicalis</i>	57	48.7
<i>C.parapsilosis</i>	12	10.2
<i>C. kefy</i>	1	0.9
Non albicans <i>Candida</i> -un identified	1	0.9
Total	117	100

Table: 5 Percentage of clinically relevant *Candida* species

Specimen	<i>C. albicans</i>	<i>C. tropicalis</i>	<i>C. parapsilosis</i>	<i>C. kefy</i>	Non albicans <i>Candida</i> species un identified	Total
Blood	4 (17.4%)	10 (43.5%)	8 (34.8%)	0	1 (4.3%)	23
Urine	32 (41%)	41 (52.6%)	4 (5.1%)	1 (1.3%)	0	78
Ascitic fluid	1 (25%)	3 (75%)	0	0	0	4
High vaginal swab	3 (100%)	0	0	0	0	3
Oral swab	2 (66.6%)	1 (33.3%)	0	0	0	3
Wound swab	1 (100%)	0	0	0	0	1
Gastric aspirate	0	1 (100%)	0	0	0	1
pancreatic pseudo cyst	1 (100%)	0	0	0	0	1
Retropharyngeal aspirate	1 (100%)	0	0	0	0	1
Lymph node aspirate	0	1 (100%)	0	0	0	1
Pleural fluid	1 (100%)	0	0	0	0	1
Total	46	57	12	1	1	117

Discussion

As there is an increasing trend for the Non albicans *Candida* infection nowadays^{6, 7, 8, 9}, the present study aimed at characterizing the clinically relevant *Candida* isolates and to determine the rate of isolation of *C. albicans* and Non *Candida albicans*. Total of 117 consecutive pure cultures of clinically relevant *Candida* isolates from various clinical specimens submitted to Microbiology laboratory from different clinical units were studied.

In the present study the predominant species was *C.tropicalis* 57(48.7%) followed by *C.albicans* 46 (39.3%), *C.parapsilosis* 12(10.2%) and *C.kefy* 1(0.9%).The percentage of isolation of Non albicans *Candida* was higher (60.7%) when compared to *C.albicans* (39.3%).This result is in consistent with various studies conducted indifferent parts of world including India where Non albicans *Candida* has outnumbered *C.albicans*. Dharward S et al 2011 in Department of Microbiology, Kasturba Medical College, Mangalore showed the isolation rate of *C.albicans* (47%), *C.tropicalis* (30%), *C.krusei* (14%) and *C.glabrata* (9%)¹⁰.Kothavade. et al 2010, reported *C.tropicalis* as the most prevalent pathogenic yeast species of Non albicans *Candida*¹¹.

Chakrabarthi A et al 1996, showed a higher isolation rate of Non albicans *Candida* (75%) when compared to *C.albicans*. (25%)¹² in their study. These findings suggest Non albicans *Candida* as an emerging pathogen.

This study shows the male to female ratio of *Candida* isolation as 1.25:1. This may be due to the higher number of samples collected from male patients (56.6%). A study by Jha BK et al 2006 showed the male to female ratio as 2.3:1¹³.A study by Sehar Afshan Naz et al 2004, showed 1.2:1^{as} the ratio¹⁴.

In this study, among 23 blood culture isolates most of them were of preterm, LBW babies (52.2%). Among blood *Candida* isolates, *C.tropicalis* was the most prevalent species (43.5%), followed by *C.parapsilosis* (34.8%) and *C.albicans* (17.4%). A study by Anil.K Paswan et

al 2012, in the Department of anesthesia and Critical care, India also showed the predominance of Non candida albicans(73.6%)¹⁵. Studies by Morrell et al and Garey et al have shown that the delay in antifungal therapy for treatment of candidemia is associated with increased mortality^{16, 17}. So the isolation of Candida from blood must be considered significant to avoid delay in administering potentially lifesaving therapy. This also highlights the need for starting early antifungal therapy in candidemia based on risk assessment and clinical conditions.

The isolation rate of non albicans Candida from urine sample was 59% in this study. In most studies *C. albicans* dominates and account for 50-70% of all Candida related urinary isolates followed by *C. glabrata* and *C. tropicalis*¹⁸. Use of broad spectrum antibacterial and presence of indwelling catheters along with diabetes mellitus and chronic liver and or kidney failure, were found to be the most important predisposing factors in urinary isolates.

In the present study *C. albicans* was the predominant species from oral swab, high vaginal swab, wound swab, pancreatic pseudocyst, retropharyngeal abscess, and pleural fluid. Enam et al, 2012 also reported *C. albicans* as the predominant species from pregnant and non pregnant women with vulvovaginitis¹⁹.

Conclusion

Non albicans Candida is an emerging pathogen. The isolation rate of Non albicans candida was 60.7% .*C. tropicalis* was the predominant species followed by *C. albicans*, *C. parapsilosis*, and *C. kefyr*. The isolation of Candida from blood must be considered significant until they have been proved, otherwise to avoid delay in administering potentially lifesaving therapy.

Conflict of interests: No conflict of interests..

Ethical approval and consent to participate:

The ethical approval for study was taken from Institutional Research committee, Govt. Medical College, Kozhikode, Kerala.

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