Int.J.Curr.Microbiol.App.Sci (2016) *5*(11): 346-350

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 5 Number 11 (2016) pp. 346-350**
Journal homepage: http://www.ijcmas.com

Original Research Article http://dx.doi.org/10.20546/ijcmas.2016.511.039

A Study on Identification and Antifungal Susceptibility Pattern of different Candida Species Isolated from Various Clinical Specimens in a Tertiary care Hospital of West Bengal, India

Indrajit Gupta[1*], Purbasha Ghosh[1], Ayan Nandi[1], Prosenjit Naskar[2], Sayantan Mondal[1] and G.D. Mitra[1]

[1]Department of Microbiology, Burdwan Medical College, West Bengal, India
[2]Department of Community Medicine, Burdwan Medical College, West Bengal, India

**Corresponding author*

Keywords

Candidiasis, Candida, non-albicans antifungal agents.

Article Info

Accepted:
16 October 2016
Available Online:
10 November 2016

A B S T R A C T

Cadidiasis is the 4th most common organisms causing blood-stream infection. It is mainly caused by *Candida albicans* but non-albicans Candida such as *Candida tropicalis, Candida glabrata, Candida krusei* etc has also increased in last few years. These emerging pathogenic non-albicans *Candida* are developing resistance to most of the conventional antifungal drugs. To find out the different *Candida* species in various clinical specimens and determine their antifungal susceptibility pattern. All the Candida isolates recovered from various clinical samples during the period from August 2015 to August 2016 were included in this study. The presumptive diagnosis was done on the basis of wet mount, gram's stain, culture on Sabouraud's dextrose agar media. Once the colonies were confirmed speciation was done by germ tube test, corn meal agar inoculation, sugar assimilation test and CHROMagar Candida inoculation. Antifungal susceptibility pattern was carried out by disc diffusion method recommended by CLSI.The antifungal agents were fluconazole (10µg), amphotericin B (10µg), ketoconazole (10 µg) and nystatin (10µg). In the present study, a total of 302 various clinical specimens were collected. Among them 126 (41.7%) Candida isolates were found. The maximum number of Candida isolates were obtained from vaginal swab (42) followed by sputum (28) and oral swab (18). The most commonly found Candida isolates were *Candida albicans* (52.4%) followed by *C. tropicalis* (27%), *C. Krusei* (14.3%), *C. glabrata* (6.3%). All the isolates of *C.albicans* and *C.tropicalis* were sensitive to amphotericin B. The next most effective antifungal drug was ketoconazole with 85.7% (108). Fluconazole was the least effective drug in our study with sensitivity of 38% (48). *Candida* is one of the most commonly found nosocomial pathogens. The accurate species identification of *Candida* is important for treatment as Non-albicans *Candida* are resistant to most azole group of drugs and also because of rising anti-fungal resistance among different *Candida* species.

Introduction

Candida is yeast like fungus which causes commonest fungal disease (called Candidiasis) in humans affecting skin, mucosa, nails and various internal organs. It is caused by various species belonging to genus *Candidia* with *Candida albicans* as the representative species (Chander, 2009). However in recent years non-albicans *Candida* are increasingly found in various clinical scenarios (Gullo, 2009). The infection may be acute or chronic, superficial or deep and its clinical spectrum is wide. It is found mainly as secondary infection individuals with some underlying immunocompromised conditions such as prolonged usage of antibiotics, chemotherapy, immunosuppressive drugs, long term catheterization etc.

Species identification of *Candida* is very much important especially for treatment purposes as not all species respond to the same treatment because of the development of antifungal resistance (Shivanand *et al*., 2011). So the objective of this present study is *Candida* species identification among various clinical specimens and to determine their antifungal drug susceptibility.

Materials and Methods

The present study was conducted in the department of Microbiology, in a peripheral tertiary medical college of west Bengal for a period of one year i.e. from August 2015 to August 2016.All the clinical samples from those patients having suspected fungal infections submitted in the microbiology department were included in this study. Samples were collected from blood, urine, sputum, oral swab, vaginal swab, pus, skin scrapping and nail scrapping. The preliminary presumptive diagnosis was made on the basis of wet mount, gram's stain, culture on SDA (Sabouraud's dextrose agar) media. (Figure-1) Isolates other than Candida species were excluded from the study. Colonies were identified and confirmed by colony character and Gram's stain. Once the colonies were confirmed Candida species identification was done by germ tube test, corn meal agar inoculation, sugar assimilation test and CHROMagar Candida inoculation. Antifungal drug susceptibility testing was done by disc diffusion method on Muller Hinton Agar recommended by CLSI (CLSI, 2016). The antifungal discs used were fluconazole (10µg), amphotericin B (10µg), ketoconazole (10 µg) and nystatin (10µg).

The study proposal along with other relevant documents was submitted to the 'Institutional Ethics Committee' for review and approval. The study was commenced only after approval is obtained from appropriate authority.

Statistical Analysis

Data were coded and entered into MS-Excel sheet. Statistical analysis were done using software SPSS 20 version. Descriptive and inferential statistics were used. Data were presented in percentages.

Results and Discussion

In the present study, a total of 302 various clinical specimens were collected. Among them 126 (41.7%) Candida isolates were found. The maximum number of Candida isolates were obtained from vaginal swab (42) followed by sputum (28) and oral swab (18).This distribution is displayed in Table-1.

The most commonly found Candida isolates were *Candida albicans* (66) followed by *C. tropicalis* (34), *C. Krusei* (18), *C. glabrata* (08).The percentage wise distribution of different Candida species is shown in pie diagram-2.

All the isolates of *C.albicans* and *C.tropicalis* were sensitive to amphotericin B. The next most effective antifungal drug was ketoconazole with 85.7% (108). Fluconazole was the least effective drug in our study with sensitivity of 38% (48). Antifungal sensitivity pattern of *Candida* isolates is shown in Table-2.

The frequency of diseases caused by *Candida* has amplified over the last few years especially in immunocompromised patients. There is also an increased frequency of non-albicans *candida* commonly *Candida tropicalis*, *Candida glabrata, Candida krusei.* Our study shows occurrence of Candida infection was 41.7% in various clinical specimens. This finding is similar with the study done by Mohandas *et al.*, (2011).

In our present study, highest numbers of isolates (52.40%) were *Candida albicans* followed by *C. tropicalis* (27%), *C. krusei* (14.30%) and *C. glabrata* (6.30%).These findings also correlates with Mohandas *et al.*, (2011) study.

In this study, speciation of *Candida* was done by germ tube test, corn meal agar inoculation, sugar assimilation test and CHROMagar Candida inoculation. Chromogenic agar media is a differential medium used in mycology laboratory for rapid identification of *Candida spp.* in comparison to conventional methods. It contains enzymatic substrates linked to different chromogenic compounds. When a specific substrate breaks down the substrate, the chromogenic substrate produce colours. The different colour variation is useful for the rapid and presumptive identification of *Candida* (Odds *et al*., 1994). Consequently this will help for the early initiation of appropriate therapy.

Table.1 Distribution of Candida isolates according to various clinical specimens:

Specimen	Number of isolates	Percentage
Vaginal swab	42	33.3%
Sputum	28	22.2%
Oral swab	18	14.3%
Blood	06	4.8%
Pus & wound swab	08	6.3%
Urine	12	9.5%
Nail scraping	05	4.0%
Skin scrapings	07	5.6%

Table.2 Antifungal sensitivity pattern of Candida isolates

	Candida species			
Antifungal agents	*C. albicans* (n=66)	*C. tropicalis* (n=34)	*C. krusei* (n=18)	*C. glabrata* (n=08)
Amphotericin B	100%	100%	96.7%	98.1%
Nystatin	94%	92.5%	96.3%	100%
Fluconazole	62.7%	66%	28.4%	R
ketoconazole	92.3%	79%	69.7%	49.2%

Fig.1 Growth of Candida sp. in Sabouraud's Dextrose agar:

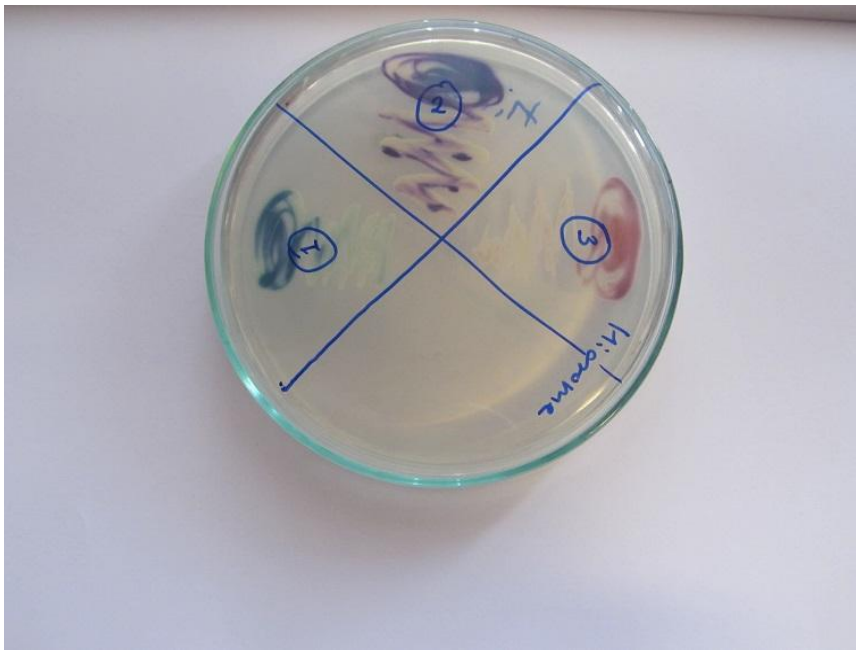
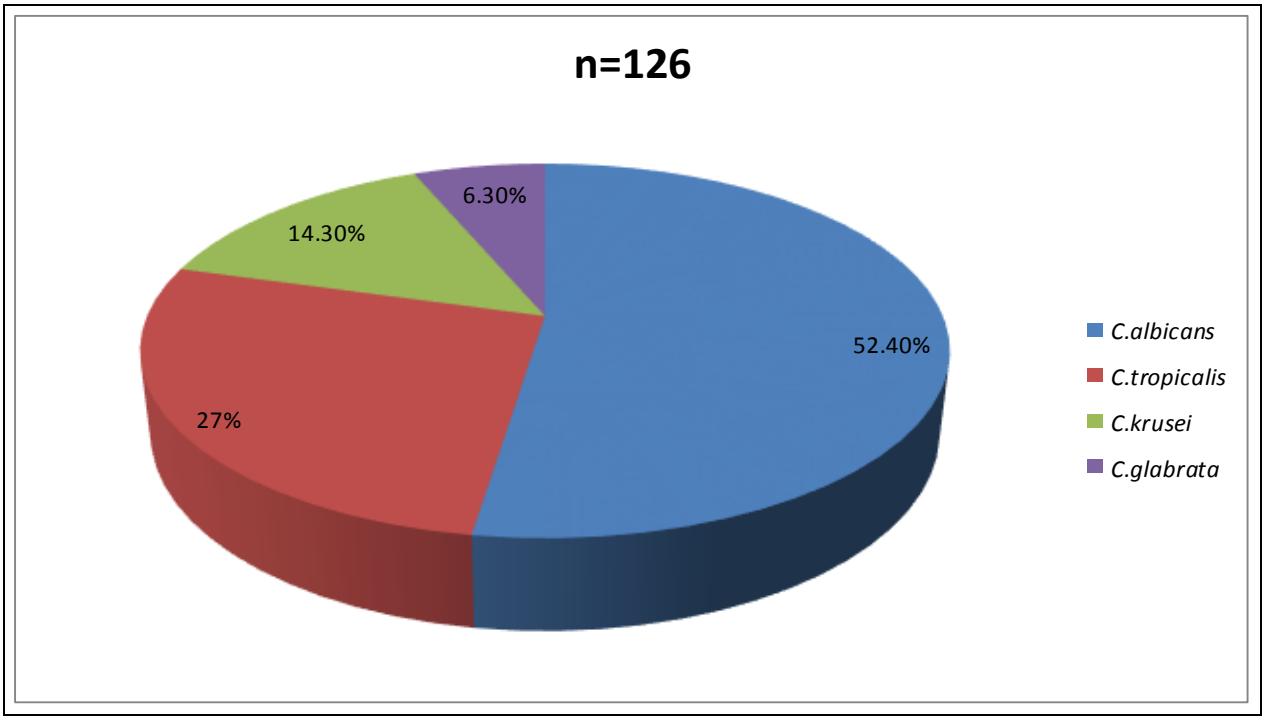


Fig.2 Pie diagram showing distribution of different Candida species:



Our study showed that Amphotericin B was the most effective antifungal drug. This finding is similar with another study done by Maria Fatima Sugizaki *et al.*, (1998). The next most effective antifungal drug was ketoconazole with 85.7% (108). Fluconazole was the least effective drug in our study with sensitivity of 38% (48). These findings

correlate with study done by Ananth kashid *et al.*, (2011).

In conclusion, *Candida* is one of the most commonly found nosocomial pathogen. The accurate species identification of *Candida* is important for treatment as Non-albicans *Candida* are resistant to most azole group of drugs and also because of rising anti-fungal resistance among different *Candida* species.

This study therefore emphasizes the need for rapid and precise identification of different Candida isolates to species level for effective treatment and management strategies. The present study also advocates the need for periodic surveillance of the antifungal drug susceptibility pattern of the prevalent various Candida species, as it would enlighten the judicious use of antifungal therapy in patients.

Acknowledgement

We express our sincere thanks to Professor Sukumar Basak, Principle of Burdwan Medical College for his kind support and allowing us to conduct this study.

References

Ananth Kashid, Sandhya Belawadi, Gaytri Devi, Indumal. 2011. Characterisation and antifungal susceptibility testing for Candida in a tertiary care hospital. *J. Health Sci. Res.*, 2(2): 1–1.

Chander, J. 2009. Textbook of Medical Mycology.3rd edition, Chapter-20, Candidiasis, p-266.

Clinical Laboratory Standards Institute (CLSI). 2016. Method for antifungal disk diffusion susceptibility testing of yeasts. Approved guidelines.26th edition, CLSI document - M44 – A2.

Gullo, A. 2009. Invasive fungal infections: the challenge continues. *Drugs*, 69: 65–73.

Maria Fátima Sugizaki, Cristianne Roberta Rhoden, Denise Mara Bombonatti. 1998. Prevalence and in vitro antifungal susceptibility of *Candida* spp. isolated from clinical specimens in São Paulo, Brazil. *Rev Iberoam Micol.*, 15: 16–18.

Mohandas, V., Ballal, M. 2011. Distribution of Candida species in different clinical samples and their virulence: biofilm formation, proteinase and phospholipase production: a study on hospitalized patients in Southern India. *J. Global Infect. Dis.*, 3(1): 4–8. doi:10.4103/0974-777X.77288.

Odds, F.C., Bernaerts, R. 1994. CHROM agar *Candida*, a new differential isolation medium for presumptive identification of clinically important *Candida* spp. *J. Clin. Microbiol.*, 32(8): 1923–9.

Shivanand Dharwad, Saldanha Dominic, R.M. 2011. Species identification of candida isolates in various clinical specimens with their anti-fungal susceptibility patterns. *J. Clin. Diag. Res.*, 5(6): 1177–1181.

How to cite this article:

Indrajit Gupta, Purbasha Ghosh, Ayan Nandi, Prosenjit Naskar, Sayantan Mondal and G.D. Mitra. 2016. A Study on Identification and Antifungal Susceptibility Pattern of different Candida Species Isolated from Various Clinical Specimens in a Tertiary care Hospital of West Bengal. *Int.J.Curr.Microbiol.App.Sci.* 5(11): 346-350.
doi: http://dx.doi.org/10.20546/ijcmas.2016.511.039