International Journal of Research in Medical Sciences
Singh R et al. Int J Res Med Sci. 2017 Aug;5(8):3466-3468
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: http://dx.doi.org/10.18203/2320-6012.ijrms20173542

Original Research Article

Rapid identification and susceptibility pattern of various *Candida* isolates from different clinical specimens in a tertiary care hospital in Western Uttar Pradesh

Rajani Singh, Rajesh K. Verma*, Sunita Kumari, Amit Singh, Dharmendra P. Singh

Department of Microbiology, Uttar Pradesh University of Medical Sciences, Saifai, Etawah, Uttar Pradesh, India

Received: 18 May 2017
Accepted: 17 June 2017

***Correspondence:**
Dr. Rajesh K. Verma,
E-mail: rshverma@gmail.com

ABSTRACT

Background: *Candida* species are component of normal flora of human beings. Candidiasis is the commonest fungal disease affecting mucosa, skin, nails and internal organs. A variety of predisposing factors are known to cause candidiasis either by altering balance of normal microbial flora of the body or by lowering the host defence.
Methods: A total of 90 specimens submitted in the department of microbiology were included in this study. Identification of *Candida* species as well as antifungal sensitivity testing was performed with Vitek®2 compact (Biomerieux France) using Vitek2 cards for identification of yeast and yeast like organisms (ID-YST cards). Antifungal susceptibility testing was performed using Vitek2 fungal susceptibility card (AST YS01) kits respectively.
Results: The distribution of the clinical samples were urine 53 (58.9%), sputum 14 (15.5%), blood 10 (11.1%), nail 6 (6.7%) and high vaginal swab 7 (7.8%). Among 90 clinical isolates, species obtained were *C. tropicalis* 53 (59%), *C. albicans* 23 (25.5%), *C. glabrata* 6 (6.7%), *C. parapsilosis* 4 (4.4%), *C. krusei* 2 (2.2%), *C. pelliculosa* 1 (1.1%), *C. famata* 1 (1.1%).
Conclusions: Infections caused by non-*candida albicans* species have increased. Identification of *Candida* species and their antifungal susceptibility are important for the treatment of hospitalized patients with serious underlying disease.

Keywords: AST YS01, Candida, ID- YST cards, Vitek®2 Compact

INTRODUCTION

Candida species are component of normal flora of human beings. Candidiasis is the commonest fungal disease affecting mucosa, skin, nails and internal organs. A variety of predisposing factors are known to cause candidiasis either by altering balance of normal microbial flora of the body or by lowering the host defence. It has been noticed that the indiscriminate use of antibacterial antibiotics and the emergence of pandemic of AIDS has led to the increased incidence of candidiasis.[1]

The genus *Candida* includes more than 150 species, but only nine species are regarded as frequent pathogens for humans. *Candida* is the 6th most common isolated nosocomial pathogens, mainly from urinary tract. It is the 4th most common cause of blood-stream infections with a mortality rate of 29%.[2]

The genus consists of heterogeneous group of organisms, and approximately 20 different *Candida* species are known to be etiological agents of human infection. 90% of invasive infections are caused by *Candida albicans, Candida glabrata, Candida parapsilosis, Candida*

tropicalis and Candida krusei.[3] The extensive use of antifungals for prophylaxis became the leading cause of colonization of non-*albicans Candida* (NAC) species and increasing resistance to antifungal drugs.[4]

Drug resistance to azoles is emerging, hence early speciation and antifungal susceptibility pattern helps in guiding the physician in choosing the appropriate antifungal drug and thus prevent therapeutic failures.[5]

The aim of the present study was to determine the prevalence and antifungal susceptibility of various *Candida* species in our tertiary care hospital.

METHODS

All the isolates of *Candida* obtained during January 2016 to December 2016 from different clinical samples submitted to the department of microbiology, Uttar Pradesh University of Medical Sciences, Saifai, Etawah, Uttar Pradesh, India, were included in the study. The collected clinical specimen was cultured on sabouraud dextrose agar (HiMedia, India) and incubated at 25^0C and 37^0C for 4 weeks. The media was supplemented with antibiotics, such as chloramphenicol to minimize bacterial contamination. The cultures were examined daily for 1 week and weekly thereof.

Suspected colonies of *Candida* were confirmed on Gram stain and then identified with Vitek®2 Compact (Biomerieux, France) using Vitek2 cards for identification of yeast and yeast like organisms (ID-YST cards) kits. Antifungal susceptibility testing was performed with AST YS01 Kits on Vitek®2 Compact. Standard operative procedures as described by the manufacturer were followed.

RESULTS

A total of 90 isolates of *Candida* species were obtained from different clinical specimens of patients. The distribution of the clinical samples were urine 53 (58.9%), sputum 14 (15.5%), blood 10 (11.1%), nail 6(6.7%) and high vaginal swab 7 (7.8%). The distribution and percentage of different *Candida* species in these 90 isolates are (Table 1).

Table 1: Distribution of *candida* in different clinical specimens.

Clinical specimen	*C. tropicalis*	*C. albicans*	*C. glabrata*	*C. parapsilosis*	*C. krusei*	*C. pelliculosa*	*C. famata*	Total
Urine	36	12	1	3	0	0	1	53
Sputum	8	1	5	0	0	0	0	14
Blood	5	1	0	1	2	1	0	10
Nail	0	6	0	0	0	0	0	6
High vaginal swab	4	3	0	0	0	0	0	7
Total	53	23	6	4	2	1	1	90

Accordingly, species isolated were *C. tropicalis* [53 (59%)], *C. albicans* [23 (25.5%)], *C. glabrata* [6 (6.7%)], *C. parapsilosis* [4 (4.4%)], *C. krusei* [2 (2.2%)], *C.pelliculosa* [1 (1.1%)], *C. famata* [1 (1.1%)].

The susceptibility profile of all *Candida* isolates showed 100% sensitivity to voriconazole, 97.8% to amphotericin B, 97.8% to flucytosine and 95.6% to fluconazole. Dose-dependent susceptibility to fluconazole and amphotericin B was observed in 2.2% and 1.1% of the isolates respectively. All isolates of *C. krusei* were resistant to both fluconazole and flucytosine.

DISCUSSION

In current study, the distribution of *Candida* species in different clinical samples showed the highest number of isolates in urine (58.9%); followed by sputum (15.5%), blood (11.1%), high vaginal swab (7.8%), nail (6.7%). As *Candida* species are opportunistic fungi and being a part of normal human flora, they can be responsible for significant infections ranging from superficial skin and nail infections to invasive infections like UTI, Candidemia.[6]

Numerous factors like immunocompromised status, prolonged hospital stay, catheterisations have all contributed for increase in number of cases of candiduria. Catheterisation increases chances of UTIs by allowing migration of the organisms into the bladder from external periurethral surface. This finding is in concordance with the studies done by Iman et al.[7]

In current study among 90 *Candida* isolates, the most common isolate was *C. tropicalis* (59%), followed by *C. albicans* (25.5%), *C. glabrata* (6.7%), *C. parapsilosis* (4.4%), *C. krusei* (2.2%), *C. pelliculosa* (1.1%) and *C. famata* (1.1%) respectively.

The predominant NAC isolated in our tertiary care centre was *C. tropicalis*. This agreed with the studies conducted by Ragini et al, Chakrabarthi et al.[8,9] These findings are

suggestive of non-*C. albicans* are emerging as important pathogens and major threat for future.

But in a study by Khan P et al, *C. albicans* (66%) was the most common isolated species followed by *C. parapsilosis* (10.5%), *C. krusei* (7.8%), *C. tropicalis* (7.4%), *C. guilliermondii* (3.5%), *C. dubliniensis* (2.7%) and *C. glabrata* (1.9%).[10]

In present study by Vitek® 2 compact system, the sensitivity was 97.8%, 95.6%, 100%, 97.8% for amphotericin B, fluconazole, voriconazole and flucytosine respectively. Dose-dependent susceptibility to fluconazole and amphotericin B was observed in 2.2% and 1.1% of the isolates respectively.

Adhikary R et al concluded that all *Candida* isolates showed 100% sensitivity to voriconazole, 92% to amphotericin B, 90% to flucytosine and 75% to fluconazole.[11] Dose dependent susceptibility to fluconazole was observed in 25% of the isolates.

Frequent use of fluconazole selects for the emergence of *Candida krusei* as a commonly isolated opportunistic pathogen. *Candida krusei* is intrinsically resistant to fluconazole both invivo and invitro.[12] This agreed with present study as all the 2 isolates of *Candida krusei* were resistant to fluconazole by Vitek® 2 Compact.

The present study showed that along with *C. albicans*, NAC species are increasingly being isolated from clinical specimens. So, it is essential to identify all yeasts isolates up to species level and determine their antifungal susceptibility. It will speed up specific therapy, reduces morbidity and mortality in patients infected with *Candida*.

CONCLUSION

The speciation of *Candida* is important to provide a database for given area of study. The choice of antifungals is dependent on the species of *Candida*. This information will help us to recognize the emerging fungal pathogen and determine increasing drug resistance. The present study highlights the need for periodic surveillance of antifungal susceptibility pattern of the prevalent *Candida* species, as it would enlighten the judicious use of antifungal drugs in patients and thus preventing the emergence of drug resistance.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Fauci AS, Edwards JE. Candidiasis. In: Ed Kasper DL, Braunwald E, Fauci AS, Longo DL, Hauser SL, Jameson JL, eds. Harrison's Principles of Internal Medicine. 16th ed. New York, NY: McGraw-Hill; 2005:1254-1256.
2. Lal YB, Kalyani M. Phenotypic Characterisation of *Candida* species and their antifungal susceptibility from a tertiary care hospital. J Pharmaceut Biome Sci. 2011;11:1-4.
3. Ortega M, Marco F, Soriano A, Almela M, Martinez JA, Lopez J, et al. *Candida* species bloodstream infection: epidemiology and outcome in a single institution from 1991 to 2008. J Hosp Infect. 2011;77(2):157-61.
4. Hsueh PR, Lau YJ, Chuang YC, Wan JH, Huang WK, Shyr JM, et al. Antifungal susceptibilities of clinical isolates of *Candida* species, *Cryptococcus neoformans*, and *Aspergillus* species from Taiwan: surveillance of multicentre antimicrobial resistance in Taiwan program data from 2003. Antimicrob Agents Chemother.2 005;49(2): 512-7.
5. Mondal S, Mondal A, Pal N, Banerjee P, Kumar S, Bhargava D. Species distribution and In vitro antifungal susceptibility testing pattern of *Candida*. J Institute Med. 2013;35(1):45-9.
6. Hogan LH, Klein BS, Levitz SV. Virulence factors of medically important fungi. Clin Microbiol Rev.1996;9(4):469-88.
7. Iman KB, Shorouk KEH, Muhmoud M. *Candida* infection associated with urinary catheter in critically ill patients. Identification, antifungal susceptibility and risk factors. Res J Med sciences.2010;5(1):79-86.
8. Ragini AK, Sandhya B, Gayatridevi, Indumal. Characterisation and antifungal susceptibility testing for *Candida* in tertiary care hospital. J Health Sci Res. 2011;2(2):1-12.
9. Chakrabarthi A, Ghosh A, Batra R. Antifungal susceptibility on non-*Candida albicans* and distribution of species isolated from Candidemia cases over a 5-years period. Indian J Med Res. 1996;104:171-6.
10. Khan P, Fatima N, Nabeela. Antifungal susceptibility pattern of *Candida* isolates from a tertiary care hospital of North India: a five-years study. Int J Curr Microbiol App Sci. 2015;1:177-81.
11. Adhikary R, Joshi S. Species distribution and anti-fungal susceptibility of Candidemia at a multi super-specialty center in Southern India. Indian J Med Microbiol. 2011;29(3):309-11.
12. Orozco AS, Higginbotham LM, Hitchcock CA, Parkinson T, Falconer D, Ibrahim AS et al. Mechanism of Fluconazole resistance in *Candida krusei*. Antimicrob Agents Chemother. 1998;42(10):2645-9.

Cite this article as: Singh R, Verma RK, Kumari S, Singh A, Singh DP. Rapid identification and susceptibility pattern of various *Candida* isolates from different clinical specimens in a tertiary care hospital in Western Uttar Pradesh. Int J Res Med Sci 2017;5:3466-8.