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Prevalence and Antifungal Susceptibility Profiles of Candida Tropicalis in a Tertiary Care Hospital Ahmedabad, Gujarat, India

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ABSTRACT

Introduction: Fungal infections caused by Candida tropicalis are increasing throughout the globe particularly in developing countries. It has been identified as the most prevalent pathogenic yeast species of the non Candida albicans group. Most of these infections are now resistant to azoles which lead to very high morbidity and mortality. Aim of the study is to determine prevalence and antifungal susceptibility of C.tropicalis isolated from various clinical specimens.Material and Methods: In duration of six month (July to December 2012) total of 258 yeasts isolated from various clinical specimens. Isolation of C.tropicalis was done by using routine standard conventional methods and antifungal susceptibility was performed by disc diffusion method. Results: C.tropicalis 120(65.21 %) predominated over Candida albicans 67(26.69%) and other Candida species. Isolates were more susceptible to Amphotericin B 119(99.9%) followed by Clotrimazole 100(83.33%),Itraconazole and Voriconazole 98(81.66%) and Fluconazole 61(50.83%). Conclusion: Study confirms the high prevalence of Candida tropicalis infection in this part of the world and the findings also indicated high resistance of this fungus to commonly use azole.

Introduction

Fungi are widespread in the environment1.Candida tropicalis is one of the more common Candida species causing human disease in tropical countries; the frequency of invasive disease varies by geography causing 3-66% of candidaemia2.It is a diploid ascomycete yeast and an opportunistic human pathogen, which colonizes several anatomically distinct sites, including the skin, gastrointestinal and genitourinary tracts, and may also be seen in the respiratory tract. It can also be recovered from the environment, particularly from surfaces in medical settings. Infection caused by C. tropicalis can be acquired endogenously, when the individual is already colonized by the microorganism as a part of the normal flora, but under altered conditions yeasts may be translocated and spread through the gastrointestinal tract to different anatomical sites, causing infection. The exogenous infection can occur through contact of the hands of health professionals with patient or through catheter, implantable prostheses, as well as parenteral solution, which were previously contaminated. The mechanism used by the commensal C. tropicalis to become a human pathogen is not yet clear. Moreover, C. tropicalis infections involve a broad spectrum of invasive diseases, affecting patients exposed to a wide variety of risk factors3 .C. tropicalis is taxonomically close to C. albicans and shares many pathogenic traits2. Therapeutic application of immunosuppressive drugs, the use of broad spectrum antibiotics in various clinical conditions and other predisposing factors are responsible for an increasing number of immunocompromised patients and consequent opportunistic infections globally. Candida tropicalis is the most prevalent fungal species isolated from clinical materials at present in developing countries particularly in India. The extensive use of antifungal for prophylaxis in patients became the leading cause of colonization of non Candida albicans(NCA) species and increasing resistance to antifungal drugs (Hsueh et al., 2005; Perfect, 2004). In India, Candida tropicalis is the most common cause of nosocomial candidaemia1.It has also been noticed that in tropical countries, Candida tropicalis isolates more prevalent in clinical materials like blood, urine and sputum.4 Fungal nosocomial infections (FNIs) incidence has increased significantly over recent decades. Candida species are the most frequently isolated fungi, corresponding to approximately 80% of FNIs, being the fourth responsible cause for blood stream infections and responsible for the overwhelming majority of urinary tract infections3, 5 .However, in parallel with the overall increase of fungal infections, it has been observed that infections caused by non Candida albicans Candida (NCAC) species are emerging3, 6 .The reasons for this alteration in the pattern of Candida species distribution has not yet been completely understood, but could be attributed to the resistance of the NCAC species to antifungal agents, which are used for relatively long periods during hospitalisation5,6,7.This study was carried out to determine prevalence and antifungal susceptibility of C.tropicalis isolated from various clinical specimens.

Method and Materials

In duration of six month (July to December 2012) total of 258 yeasts isolated from various clinical specimens (e.g. urine, blood, sputum, endotracheal secretion, wound swab etc.) submitted to the laboratory from different clinical units of our hospital were included in the study. They were screened for yeast with the help of 10% KOH, Gram stain and culture on Sabourad's Dextrose Agar. Isolated all yeast were further speciated by the germ tube test, chlamydospore formation on corn meal agar and inoculation on chromogenic medium8,9 . These isolates were also further identified on the basis of microscopic morphological features of the growth obtained through slide cultures on CMA (Corn Meal Agar) by doing Dalmau technique , sugar assimilation on yeast nitrogen base agar(YNB) and Sabourad dextrose broth (SDB) was used to see surface pellicle 8,10,11 .The antifungal susceptibility testing was performed by disc diffusion method by using commercially available discs for azole group including Fluconazole(25mcg), Itraconazole (10mcg), Clotrimazole (10mcg),Voriconazole (1mcg), and Amphotericin B(100 Unit) for polyene group . The results were interpreted according to National Committee for Clinical Laboratory Standards 201112.

Results

A total 258 yeasts were isolated from various clinical specimens in which 251(97.28%) isolates were belongs to Candida species in which Candida tropicalis was dominant.Frequency of isolation of Candida tropicalis, Candida albicans, other non albicans Candida and Trichosoporon biegelli shown in Figure 1. In specimen wise analysis highest number of Candida tropicalis were isolated from respiratory specimens followed by urine and blood which is shown in Table 1. On antifungal susceptibility

testing, Amphotericin B showed good sensitivity, 119(99.9%) strains were sensitive, while in azole group 61(50.83%) strains of were sensitive to Fluconazole, 98(81.66%) to Itraconazole and Voriconazole,100(83.33%) to Clotrimazole. Resistance pattern shown in Table 2.

Discussion

Candidiasis is a primary or secondary infection which involves a member of the genus, Candida. The clinical manifestations of the disease are extremely varied, ranging from acute, subacute and chronic to an episodic involvement. It may be localized to the mouth, lungs or the gastrointestinal tract, or may become systemic. In India, C. tropicalis is now the most common cause of nosocomial candidemia. Epidemiological studies have implicated C. tropicalis in as many as 67-90% of cases of candidemia 13, 14, 15 .In present study Candida tropicalis was most common species of Candida isolated from various clinical specimens which is similar to study done by Manchanda et al 16and Kashid RA et al.17Studies over the years have shown that there is a considerable increase in the non-albicans Candida isolates. Our study showed that non Candida albicans were isolated at a higher rate (65.21%) than C. albicans (26.69%), which was in agreement with the findings of the studies by Mokaddas et al18 Chakraborti A et al 19which showed the non Candida albicans incidence 60.5% and 75% respectively. These findings seem to suggest that non Candida albicans are emerging as important pathogens19.On specimenwise analysis highest isolation C.tropicalis was from respiratory specimens which is similar to study done by Somansu basu et al 20 while in study of Dr.Vijay et al21 maximum isoloation was from high vaginal swab followed by respiratory specimens, blood and urine. In our study maximum resistance to Fluconzole was found. Resistance to Fluconazole, Itraconazole,Voriconazole were similar to study done by Saldanha Dominic R.M.et al.22 On comparison with study of Dr.Vijay et al 21 sensitivity for Amphotericen B and Itroconazole are similar but different for Fluconazole.

In conclusion,non C. albicans Candida species predominate over C. albicans and C. tropicalis appears to be most prevalent and the emerging non C. albicans species at our setup. It was seen that some of the medically important fungi are not inhibited by azoles (e.g. Fluconazole). C. tropicalis is one of them. Use of Fluconazole should not be continued in patients with recurrent Candida infections. Rapid species identification from clinical specimens, standard drug susceptibility testing, constant monitoring and better interaction between the clinicians and the microbiologists would be an effective approach for to decreased prevalence and drug resistance against candidiasis.

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