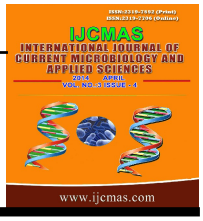
International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 3 Number 4 (2014) pp. 135-140**
http://www.ijcmas.com



Original Research Article

Oropharyngeal Candidiasis in HIV/AIDS: A hospital based co-relation study

Debkumar Ray[1*] and Debashis Roy Burman[2]

[1]Department of Oncopathology, Medical College & Hospital, Kolkata, India
[2]Department of Biochemistry, B.S.Medical College and Hospital, Bankura, West Bengal, India

*****Corresponding author

Keywords

Candida infection; Socio-economic status, immune status, species differentiation

A B S T R A C T

Candida infection is found among a wide population including immuno-compromised individuals like HIV/AIDS patients. Candidiasis is the commonest opportunistic infection in the immuno-compromised group. It shows considerable variation among age group, sex, socioeconomic status, immune status, species differentiation and some other aspects. HIV/AIDS patients attending Out Patients' Department (OPD) of School of Tropical Medicine, Kolkata, West Bengal were included in this study with the aim to assess the prevalence of Oropharyngeal Candidiasis among them. Data were collected from 160 patients clinically suspected for Oropharyngeal Candidiasis and with low CD_4 count (< 50/c.mm). A pre-tested questionnaire along with the informed consent from the patient was used to collect information on socioeconomic details from these clinically suspected cases. Study subjects were further investigated after proper collection of specimens from the site of lesions and characterization of *Candida sp.* were done using standard techniques. One hundred thirty seven out of 160 patients (85.6%) were found to be suffering from Candidiasis in this study. The prevalence of this infection varied with age, sex, income groups and occupational status. Two species, *Candida albicans* and *Candida tropicalis* were found to be the major causative agents (91.87 % cases) followed by *Candida parapsilosis* (7.5 %) and *Candida glabrata* (0.63 %). Oropharngeal Candidiasis may be considered as a sentinel event for the detection or progression of HIV diseases, presenting months or years before development of more severe opportunistic infection in these patient groups.

Introduction

Candidiasis is the most common opportunistic fungal infection that affects both immuno competent individuals as well as persons with suppressed immunity especially those suffering from diseases like HIV/AIDS. Although the incidences of opportunistic infections in HIV/AIDS have been reduced around the globe by

highly active antiretroviral therapy (HAART), the situation remains the same in most developing countries including India, where patients can hardly afford this treatment [(1)]. The disease occurs mainly in three forms, Oropharyngeal Candidiasis (OPC), Esophageal Candidiasis (EPC) and Vulvovaginal Candidiasis (VVC). The most common form that prevails among the immuno compromised patients with low CD_4 count ~ 200cells/mm^3 is Oropharyngeal and/or Esophageal Candidiasis [(2)]. The resultant decrease in systemic and mucosal immune integrity in turn is associated with an increased frequency of oral lesions [(3)]. Candida species reside as part of the normal flora of the oral cavity in about 40% of the general population known as carriers. In the event of immune suppression, there is a shift from commensalism to an exponential increase in colonization, which eventually leads to clinical signs and symptoms of this disease.

Thrush is the most common presentation of Oropharyngeal Candidiasis which is representated by white, adherent, painless, discrete or confluent patches in the mouth, tongue or esophagus occasionally with fissuring at the corners of the mouth as has been mentioned by Chander, 2002. This disease if seen in a young otherwise healthy individual, the person should be investigated to rule out the possibility of HIV/AIDS. As has been proved by Dodd, C.L. et al(1991), Klein, R.S. et al (1984) and Katz, M.H. et al(1992), Oropharyngeal Candidiasis may be a sentinel event for the detection or progression of HIV infection, presenting months or years before more severe opportunistic infection [(5,6,7)]. The frequency of this infection varies in different countries and in different areas within the same country. With increase in the number of HIV/AIDS patients, the determination of prevalence to this disease becomes difficult. Our study was thus conducted to determine the prevalence of Candida infection among various groups of patients attending the Out Patients' Department (OPD) of a tertiary care hospital with respect to their age group, sex, socio-economic status, occupational status, immune status and species differentiation of the Candida isolates.

Materials and Methods

The study was carried out for a period of 6 months in School of Tropical Medicine, Kolkata on immunocompromised patients attending the Out Patients' Department (OPD) of the institute and clinically diagnosed of having Oropharyngeal Candidiasis. Out of 2822 patients attending the OPD, 200 were clinically diagnosed with this infection. Out of these cases, 160 were actually suffering from the overt infection. Informed consent was taken from the patients before collecting the sample and was entered into the case proforma sheets.

The patients were divided into various groups to determine their socio-economic status, age, sex, occupation and immune status.

In the socio-economic status, Group I consisted of patients with annual income of < Rs.20,000 ; Group II-Rs.20,000-Rs.40,000 and Group III > Rs.40,000.

The age groups of patients were divided as <20 years.; 21-40 years; 41-60 years and above 60yrs. of age.

Occupational groups were considered as follows: skilled labour, unskilled labour, business, office jobs and others.

Finally the patients were divided according to their immune status as follows: CD4 count <50/c.mm, 51-200/c.mm, 201-400/c.mm and >400/c.mm. Samples were collected with the help of a scoop from the site of localization of the lesion and were subjected to direct wet KOH (10%) preparation and Grams' staining followed by culture on Sabouraud's Dextrose Agar (SDA) in duplicate. The cultures were incubated at 25^0C for 48 hrs. at room temperature. The presence of mucoid, white, oval-shaped colonies were detected which was then subjected to Lactophenol Cotton Blue (LCB) staining, Germ Tube test and biochemical tests like Sugar fermentation and Carbohydrate Assimilation. The species were identified by growth on HiCrome Candida Agar medium and Chlamydospore formation test as the chart shows:

Results and Discussion

From the above table it can be seen that out of 2822 seropositive patients 160 (Male-70% and Female-30%) were seen to be suffering from Oropharyngeal Candidiasis. The annual income of patients shows that maximum patients were in the income group II (Rs.20,000-40,000) i.e. 34 (21.25%) out of 160, of which all were male. This is followed by group III (>Rs.40,000), where there were 33 (20.625%) patients and finally group I (<Rs.20,000) which consist of only 26 (16.25%) patients. Rest of the patients was unemployed where females (21.875%) outnumbered the male (20%). From the occupational distribution of patients it can be seen that maximum were involved in skilled labour (21.25%) where males (20%) dominated over females (1.25%). Of the 24 patients involved in unskilled labour, all were male. Businessmen and office goers were found to be 9 and 6 respectively (all males). In the other jobs which included NGO service, domestic helps and commercial sex workers 87 people were involved, out of which females were found to be 28.75% followed by males, 25.625%. In the age and sex wise distribution, maximum (72.5%) were in the age group of 21-40yrs. where males (51.875%) outnumbered the females (20.625%).

This was followed by the age group of 41-60 yrs (24.375%), >60 yrs. (1.875%) and finally <20 yrs. (1.25%). In all of these results, males dominated over females.

From Table 2 it can be seen that, *Candida albicans* were found in 45.25% males and 18.98% females. This was followed by *Candida tropicalis*, which was found in 27.74% of the patients, *Candida dubliniensis* in 7.50% of the patients and finally *Candida glabrata* found in only 0.63% of the cases. In all of these males were predominant.

The present study was undertaken to determine the prevalence of Candida infection among various groups of patients attending the Out Patients' Department (OPD) of a tertiary care hospital with respect to their age group, sex, socio-economic status, occupational status, immune status and species differentiation of the Candida isolates.

Out of 200 clinically suspected patients, 160 were found to be positive for Candida infection by laboratory investigations. Among this culture confirmed group, males dominated over females (3:1) and

Table.1 *Overall distribution of patients*

Organism	Crome Agar Medium	Chlamydospore formation
Candida albicans	Light green colour colonies	large, thick-walled chlamydospore, usually terminal and present singly or in small clusters along with clusters of round blastoconidia
Candida tropicalis	Purple colour colonies	Oval blastoconidia singly or in very small groups all
		along graceful, long pesudohyphae
Candida dubliniensis	Dark green colour colonies	Abundant chlamydospores; abundant pseudohyphae, some true hyphae, clusters of blastospores along pseudohyphae
Candida glabrata	Pink, small glossy colonies	Yeast cells only
Candida parapsilosis	Creamy colour colonies	Pencil-like pseudohyphae with blastoconidia arranged singly along pseudohyphae
Candida gulliermondii	Small pink to purple colonies	Pseudohyphae with clusters of blastospores; variable appearance
Candida krusei	large, spreading pink colonies with matt surface;	Pseudohyphae with blastoconidia forming cross-matchstick appearance.

Table.1 Overall distribution of patients

Parameters	Male	Female	Total
1. No. of seropositive patient	1822 (64.56)	1000 (35.44)	2822 (100)
2. No. of overt infection	112 (70.00)	48 (30.00)	160(100)
3. Annual Income(Rs.)			
< 20,000	18 (11.25)	8 (5.00)	26 (16.25)
20,000 - 40,000	34 (21.25)		34 (21.25)
>40,000	28 (17.5)	5 (3.125)	33 (20.625)
4. Occupational Types			
Skilled Labour	32 (20.00)	2 (1.25)	34 (21.25)
Unskilled Labour	24 (15.00)		24 (15.00)
Business	9 (5.625)		9(5.625)
Office Jobs	6 (3.75)		6 (3.75)

Others	41 (25.625)	46 (28.75)	87 (54.375)
5.Age and Sex(Yrs.)			
<20	1 (0.625)	1 (0.625)	2 (1.25)
21 - 40	83 (51.875)	33 (20.625)	116 (72.5)
41 - 60	25 (15.625)	14 (8.75)	39 (24.375)
>60	3 (1.875)		3 (1.875)

Table.2 Distribution of isolated species

Name of species	Male	Female
C.albicans	62 (45.25)	26 (18.98)
C.tropicalis	27 (19.71)	11 (8.03)
C.dubliniensis	8 (5.84)	2 (1.46)
C.glabrata	1 (0.63)	0

Table.3 Distribution with respect to immune status

CD4(/^l)	Male	Female
<50	29 (18.125)	12 (7.5)

these results correlated well with the study of Singh A et al (2003) who found 87% males and 13% females among the infected population ((Singh et al., 2003) and that of Ilanna G. Gabler et.al (2008).

Income group of patients when considered, showed maximum numbers in the income group II of which all were male (34/34) and minimum number of patients belonged to group I. Singh A et al (2003) also found most of their patients in the lower socio economic status, staying away from family and had gone out in search of job to metropolitan cities, mainly to Mumbai (Singh et al., 2003). Patients from various occupational categories were found in this study. In this small group of patients majority of the males were goldsmith, shop keeper and drivers by profession. This finding establishes well with the distribution of HIV infected individuals among various occupations. Singh, A. et al (2003) have shown the similar type of distribution of occupation like hotel waiters, taxi drivers, panwallahs and mechanics among their study subjects(Singh et al., 2003). Maximum number of patients in this study was from the age group of 21-40 years where again males (83/116) predominated over the females. There were only 3 patients in the age group above 60 years and 2 from the age group below 20 years. This showed that majority of the patients belonged to the sexually active age groups like other sexually transmitted diseases. This observation correlated well with the study of Singh, A. et al (2003), where they found 54% (54/100) cases were from the age group of 31-40 years and 38% (38/100) were belonging to 2130 years, thus 92/100 (92%) were belonging to 21-40 years of age (Singh et al., 2003).

From the species distribution in our study, it is evident that *Candida albicans* (88) was the major isolate followed by *Candida tropicalis* (38), *Candida dubliniensis* (10) and finally *Candida glabrata* (1). Similar findings was shown by other researchers also. When CD4 count of the patients was

analyzed, majority of the patients (48) showed a count in the range of 201-400cells/^l, where males again dominated over females (35/13). The second group of patients (42) showed a CD4 count in the range of 50-200cells/^l (male: female ~ 3:1). Fortyone patients had CD_4 count of < 50cells/^l and 29 patients showed CD_4 count of more than 400cells/^l. A study by Usharani A et al (2011)), Patel P et al and Wadhwa A et al (2007) showed similar results.

Acknowledgment

We are grateful to the Director, School of Tropical Medicine, Kolkata, India for allowing us to work in the Department of Microbiology, Mycology Division and National Institute of Technology, Durgapur.

References

Ali Abdul Lattif, Uma Banerjee, Rajendra Prasad, Ashutosh Biswas, Naveet Wig, Neeraj Sharma, Absarul Haque, Nivedita Gupta, Najma Z. Baquer, and Gauranga Mukhopadhyay. Susceptibility Pattern and Molecular Type of Species-Specific *Candida* in Oropharyngeal Lesions of Indian Human Immunodeficiency Virus-Positive Patients. 2004. J Clin Microbiol. March; 42(3): 1260-1262

Bravo IM, Correnti M, Escalona L, Perrone M, Brito A, Tovar V,et al. Prevalence of oral lesions in HIV patients related to CD4 cell count and viral load in Venezuelan population. Med Oral Patol OralCir Bucal. 2006; 11:E33-9.

Coogan MM, Greenspan J, Challacombe SJ. Oral lesions in infection with human immunodeficiency virus. Bull World Health Organ.2005; 83:700-6.

Chander J. A Textbook of Medical Mycology.2nd edition, 2002; Mehta publishers: p. 212-30 & 379-80.

Dodd, C.L.; Greenspan, D. and Katz, M.H. et al. 1991. Oral Candidiasis in HIV infection: pseudo membranous and erythematous Candidiasis show similar rate of progression to AIDS. AIDS. **5**:1339.

Klein, R.S. ; Harris, C.A. and Small, C.B. et al. 1984. Oral Candidiasis in high-risk patients as the initial manifestation of the acquired immunodeficiency syndrome. N Engl J Med. 311:354.

Katz, M.H.; Greenspan, D. and Westenhouse, J. et al. 1992. Progression to AIDS in HIV infected homosexual and bi sexual men with hairy leukoplakia and oral Candidiasis. AIDS .6:95.

Singh, A.; Bairy, I. and Shivananda, P.G. 2003. Spectrum of opportunistic infections in AIDS cases. Indian journal of medical sciences. **57:** 16-21.

Ilanna G. Gabler; Anne C. Barbosa; Raquel R. Vilela, Sandra Lyon and Carlos A. Rosa. 2008. Incidence and anatomic localization of oral Candidiasis in patients with AIDS hospitalized in a public hospital in belo horizonte, mg, brazil. J Appl Oral Sci.16(4):247-
50.

Usharani A; Bharathi M and Sandhya C. 2011. Isolation and characterisation of candida Species from oropharyngeal secretions of HIV Positive individuals. 2(3): 119-124.

Payal K. Patel, Joshua E. Erlandsen, William R. Kirkpatrick, et al., 2012. The Changing Epidemiology of Oropharyngeal Candidiasis in Patients with HIV/AIDS in the Era of Antiretroviral Therapy. AIDS Research and Treatment, vol. 2012, Article ID 262471, 5 pages, 2012. doi:10.1155/2012/262471.

Wadhwa A,Kaur R, Agarwal S, Jain S and Bhalla P. AIDS-related opportunistic mycoses seen in a tertiary care hospital in North India. 2007. J Med Microbiol 56: 1101-06.