



Oropharyngeal and oesophageal candidiasis in HIV infected patients

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ABSTRACT

Candidiasis is a common infection caused by yeast-like fungus. Oropharyngeal candidiasis occurs when CD4 count is 200-500 cell/mm³, with fall in CD4 count to <200 cells/mm³ oesophageal candidiasis occur in HIV infected patients.

Aim- To identify and characterize *Candida* species (oropharyngeal and oesophageal) in HIV infected patients and to correlate them with CD4+ T lymphocyte count.

Method- Two hundred HIV positive cases were selected for this study. Identification of *Candida* species was done by conventional standard techniques using Gram's stain, cultural character on Sabouraud dextrose agar, germ tube test, morphology on corn meal agar, colour difference on CHROM agar and sugar assimilation test.

Findings- The prevalence of candidiasis was 72.5% with majority of the patients belonged to age group 16 - 45 years. Male to female ratio was 1.64:1 with male preponderance. 58.62% of patients belonged to Stage 4 of WHO clinical staging. Majority of species (60.67%) were *C. albicans*. The non-*Candida albicans* isolated were *C. dubliniensis* (25.33%), *C. krusei* (12.00%), *C. tropicalis* (1.33%) and *C. glabrata* (0.67%).

Conclusion- Though *Candida albicans* continues to be the common and important pathogen among the *Candida* species there is a increase in the incidence of non- *Candida albicans* species like *Candida dubliniensis*, *Candida krusei*, *Candida tropicalis* and *Candida glabrata*.

Keywords: *Candida*, HIV, oropharyngeal, oesophageal

1. INTRODUCTION

Candidiasis is a common infection caused by yeast-like fungus.¹ Two major medical events have revived the interest in fungal disease, in general and *Candida* species in particular. The first was the introduction of antibacterial drugs and second was the increase of immunosuppressed patients due to chemotherapy or acquired immuno deficiency disease.²

The usual presentation of oropharyngeal and oesophageal infections is in the form of white, "cottage cheese" patches. Oesophageal candidiasis accounts for up to 15% of the AIDS-defining illnesses. Of note, up to 30% of patients with *Candida* oesophagitis may not have oral thrush. Similarly, only 64% to 88% of patients with thrush have concomitant oesophageal candidiasis.³ In HIV infection, candidiasis occurs as angular cheilitis in stage 2,

pseudomembranous/flat erythematous candidiasis in oral cavity in stage 3, oesophageal candidiasis in stage 4.⁴ Oropharyngeal candidiasis occurs when CD4 count is 200-500 cell/mm³, with fall in CD4 count to <200 cells/mm³ oesophageal candidiasis occur.⁵

2. AIMS AND OBJECTIVES

- To identify and characterize *Candida* species (oropharyngeal and oesophageal) in HIV infected patients.
- To correlate occurrence of candidiasis (oropharyngeal and oesophageal) with CD4+ T lymphocyte count.

3. MATERIALS AND METHODS

3.1. Source of data

Two hundred HIV positive cases with clinically suspected oropharyngeal and oesophageal candidiasis of all age groups and both sexes attending ART

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Centre of our tertiary care hospital were selected for this study.

3.2. Collection of sample

Two sterile cotton tipped wooden swabs moistened with saline were used to swab and scrap the lesion in the mouth without touching any other structure after rinsing the mouth.

Swabs kept in sterile container with cotton plugs and transported immediately to microbiology laboratory. One swab for Gram stain. Second swab inoculated on Sabouraud dextrose agar and 5% blood agar.

Endoscopic brush washings were taken from oesophagus.

Demonstration

Identification of Candida species was done by conventional standard techniques using Gram’s stain, cultural character on Saboraud dextrose agar, germ tube test, morphology on corn meal agar, colour difference on Hichrome Candida differential agar (CHROM agar) and sugar assimilation test by using HIMEDIA candida identification kit KB006.

4. RESULTS AND OBSERVATIONS

Out of 200 samples collected 145 samples showed growth on SDA, the prevalence being 72.5%.

Out of 145 study subjects 45.52% were from age group 31- 45 years while 44.14% were from age group 16- 30 years. Mean age of study subjects was 33.55 years. (Table I). Males were 62.07% (90/145) and females were 37.93% (55/145). Male to female ratio was 1.64 : 1.

Age group (years)	Number of cases	Percentage
0-15	03	02.07 %
16-30	64	44.14 %
31-45	66	45.52 %
46-60	09	06.21 %
61-75	03	02.06 %
Total	145	100 %

Table I: Age wise distribution

58.62% of the cases belonged to stage 4, while 35.17% of the cases belonged to stage 3. (Table II)

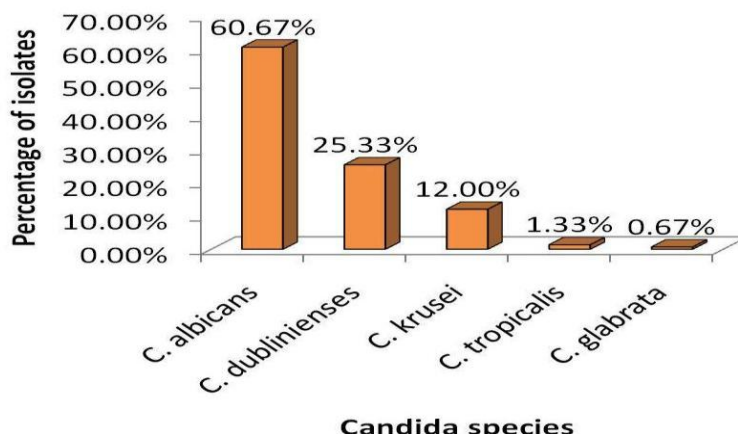
WHO clinical staging	Number of cases	Percentage
Stage 1	00	00.00%
Stage 2	09	06.21%
Stage 3	51	35.17%
Stage 4	85	58.62%
Total	145	100%

Table II: WHO clinical staging of patients

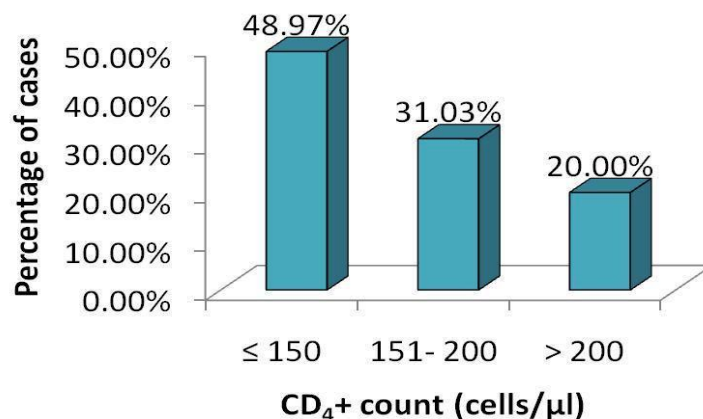
Of 145 cases, two species each were isolated from 5 cases, while single species was isolated from 140 cases. Of 5 samples, combination of C. albicans + C. dubliniensis was isolated from 3 samples while combination of C. albicans + C. krusei was isolated from rest of 2 samples.

The total number of candida species isolated was (140 X 1) + (5 X 2) = 150. Out of 150 isolates, Candida albicans was the most common species isolated 60.67% (91/150). Non Candida albicans isolates were 39.33% (59/150) of which most common was C. dubliniensis 25.33%, C. krusei 12.00%, C. tropicalis 1.33% and C. glabrata 0.67%. (Fig 1)

Occurrence of different species of candida



Distribution of samples according to CD4+ count



48.97% of the cases had CD4+ counts ≤ 150 cells/μl, while 31.03% had CD4+ counts between 151-200 cells/μl and 20% of cases had CD4+ counts > 200 cells/μl(Fig 2). The mean CD4+ count was 176.79 ± 84.03 cells/μl.

5. DISCUSSION

The prevalence of oropharyngeal and oesophageal candidiasis in our study was 72.5%. While in study done by Njunda *et. al.*⁶ it was 67.76%. In study done by Nweze *et. al.*⁷ it was 60% and by Usharani D. M. *et. al.*⁸ it was 64%.



Fig 3: CHROM agar plate of *C. Albicans* showing light green coloured colonies



Fig 4: CHROM agar plate of *C. krusei* showing large, fuzzy, rose coloured colonies with white edge



Fig 5: Photomicrograph of *C. albicans* on Cornmeal Agar

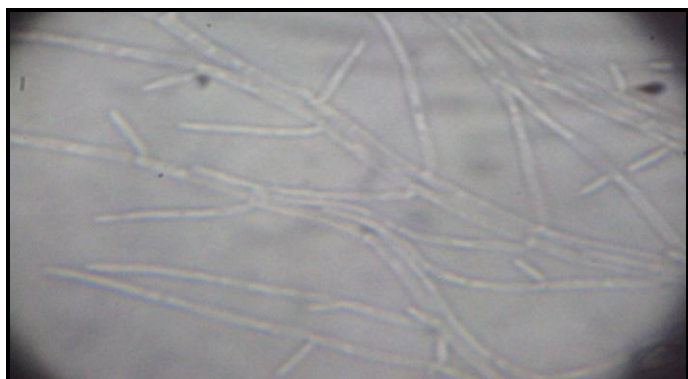


Fig 6: Photomicrograph of *C. krusei* on Cornmeal agar showing abundant branched pseudohyphae with cross match stick appearance.

Our study showed mean age of 33.55 years. 89.66% belonged to 16-45 years, this being the most productive age group of the society. These findings are consistent with studies of Jabra Rizk *et al.*,⁹

Vargas KG *et al.*¹⁰ and Anupriya *et al.*¹¹ with mean age being 37, 38 and 34 years respectively.

Male : Female ratio in our study was 1.64 :1 as in the study of Enwuru CD *et al.*¹² Male:Female ratio being 1.54:1 and Ranganathan K *et al.*¹³ 1.03:1, where as study by Anupriya *et al.*¹¹ showed Male : Female ratio being 4.8:1.

58.62% of the patients with candidiasis belonged to stage 4 and 35.17% belonged to stage 3. While in study by Anupriya *et al.*¹¹ 73% belonged to stage 4 and 23.33% belonged to stage 3.

In our study, 96.55% of single species were isolated from the patients, while studies by Nadagir *et al.*¹⁴ and Vargas KG *et al.*¹⁰ isolated 97.73% and 93.2% single species respectively.

In our study, 3.45% of the patients showed multiple species. While in other studies it was reported to be 2.27% by Nadagir *et al.*¹⁴ and 6.8% by Vargas KG *et al.*¹⁰ We isolated three combinations of *C. albicans* + *C. dubliniensis* and two combinations of *C. albicans* + *C. krusei*, while Jabra Rizk *et al.*⁹ and Vargas KG *et al.*¹⁰ isolated only one combinations of *C. albicans* + *C. dubliniensis* whereas none of them isolated combination of *C. albicans* + *C. krusei*. Multiple species were identified by growth of colonies occurring after 48 hrs of incubation. Use of CHROM agar medium helps for rapid presumptive identification of different species.

In our study *Candida albicans* isolated was 60.67% and Non-*Candida albicans* was 39.33%. While in study by Vargas LOS *et al.*¹⁵ *Candida albicans* isolated was 66.7% and Non-*Candida albicans* was 33.3%. In study by Nadagir *et al.*¹⁴ *Candida albicans* isolated was 66.6% and Non-*Candida albicans* was 33.4%. In study by Anupriya *et al.*¹¹ and Patel M *et al.*⁶⁹ *Candida albicans* isolated was 59.3% and 78.6% while Non-*Candida albicans* was 40.7% and 21.4% respectively.

In our study amongst Non *Candida albicans*, *C. dubliniensis* was 25.33% while in other studies by Patel M *et al.*¹⁶ and Nadagir *et al.*¹⁴ it was 6.3% and 16.29% respectively. *C. krusei* was 12% while in other studies by Patel M *et al.*¹⁶, Anupriya *et al.*¹¹ and Nadagir *et al.*¹⁴ it was 0.6%, 4.7% and 6.67% respectively. *C. tropicalis* was 1.33% while in other studies by Patel M *et al.*¹⁶, Anupriya *et al.*¹¹ and Nadagir *et al.*¹⁴ it was 0.6%, 4.7% and 2.97% respectively. *C. glabrata* was 0.67% while in other studies by Patel M *et al.*¹⁶ and Anupriya *et al.*¹¹ it was 5.2% and 14.8% respectively.

The low absolute CD4+ T-lymphocyte count has traditionally been cited as the greatest risk factor for the development of Candidiasis and current guidelines

suggest increased risk once CD4+ T lymphocyte counts fall below 200 cells/ μ L.¹⁷ The percentage of patients with CD4 count less than 200 cells/ μ L in our study were 80%, while in the study by Arora U *et al.*¹⁸ it was 76.66%. With progression of the disease, there is a constant decrease in CD4 count and this leads to the commensals becoming opportunistic.

6. CONCLUSION

Candida infection may occur as the first sign of the Human Immunodeficiency Virus (HIV) infection or at times may be the patient's only chief complaint. Though *Candida albicans* continues to be the common and important pathogen among the *Candida* species, there is a drastic increase in the incidence of other species like *Candida dubliniensis*, *Candida krusei*, *Candida tropicalis* and *Candida glabrata*. The increasing emergence of non- *Candida albicans* seems to be associated with HIV pandemic.

CHROM agar when used to speciate can give excellent results within short time. Presumptive identification becomes easier especially in case of non *Candida albicans*. Hence Chromagar can be routinely used instead. If this is corroborated with additional tests like germ tube and sugar assimilation test, identification upto species level can be made appropriately.

7. ACKNOWLEDGEMENTS: Staff of Microbiology Department, Medicine Department and ART centre, Study patients.

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Conflict of Interest: None Declared