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A Clinico-Mycological Study of Candidiasis in Patients Attending to a Tertiary Care Centre

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ABSTRACT
The clinical presentation of candidiasis most often enables us to detect the underlying probable predisposing factors or diseases, the prevention or treatment of which decreases the discomfort caused by the condition and provides better quality of life. The study was conducted in the Department of Dermatology, Venereology and Leprology, for a period of 18 months. A total number of 150 patients clinically presenting with candidiasis were included in the study. Samples from these cases were subjected to direct microscopic examination and culture. Maximum number of patients 40 (26.66%) belonged to the age group of 41-50 years. Females constituted 2/3 of the patients. Housewives constituted 54(35.96%) of the patients, most common clinical type being intertrigo 64(42.6%) with diabetis mellitus being most common predisposing factor seen in 37(24.64%) patients. Prolonged contact with water, HIV infection are next common predisposing factors detected. HIV infected patients had predominantly, the involvement of oral cavity. KOH examination for Candida was positive in 102(68%) samples. Culture yielded positive in 84(56%) samples with most common species identified in our area being C.albicans 51(34%). All the samples subjected to direct microscopy and culture are positive for candida from the oral thrush, with C. albicans being the common species identified. 26(25.48%) samples from candidal vulvovaginitis are positive by KOH examination and 28(33.32%) samples by culture. 24(23.52%) samples from candidal intertrigo are positive for Candida by KOH examination and 14(16.66%) are culture positive. 4(3.92%) samples from candidal balanoposthitis are positive for Candida by KOH examination and 2(2.38%) are culture positive. 32(31.36%) samples from candidal paronychia are positive for Candida by KOH examination and 24(28.56%) are culture positive.

INTRODUCTION

Candida is a large genus of Ascomycetes yeast, consisting of about 150 species and >20 species are with clinical importance. Candida yeasts are common inhabitants of the skin and mucous membranes of trachea, gastrointestinal and genitourinary tracts. Candida species are the leading cause of nosocomial bloodstream infections, candidaemia. Among the Candida species, Candida albicans is most commonly associated with candidaemia[1]. It is notable that although the distribution of Candida species varied across geographic regions, C.albicans remains the predominantly isolated species. However, a shift towards non-albicans Candida species has been observed, mainly due to severe immuno suppression, use of broad-spectrum antibiotics and empirical use of antifungal drugs. The non-albicans Candida species are usually indistinguishable based on symptoms alone due to their similarity in clinical presentations. Also, several of them are inherently resistant or acquired resistance to antifungal drugs[1]. Although this increased reporting may be caused by increased laboratory recognition, the change in host susceptibility due to the growing number of immune compromised individuals in the population as a result of the HIV pandemic and the use of long-term immunosuppressive therapy in cancer and organ transplant patients, favored the emergence of these opportunistic pathogens[2]. Despite the availability of an expanded antifungal armamentarium the mortality associated with invasive candidal infection remains high, ranging from 19-49%[3]. The incidence and associated mortality due to candidiasis can be influenced by several factors including characteristics of the population at risk, standard of healthcare facilities available, distribution of Candida species and prevalence of resistance[4]. Evidence from several studies suggests that different species of Candida have a great propensity to cause systemic, nosocomial and superficial infections, therefore their identification is important for successful management[5]. The need for rapid identification of the pathogen and the difficulty in detecting mixed cultures on the traditional SDA(Saborauds Dextrose Agar) have led to the development of commercial isolation media intended to differentiate yeast species on the basis of colony colour. Many chromogenic agar media have been evaluated and are being used for the detection and presumptive identification of various Candida species[6]. Fungal infections caused by Candida species are being detected more frequently in clinical laboratories. Changing epidemiology and availability of newer antifungal drugs with different antifungal spectra means that physicians can no longer make therapeutic decisions based on broad identification of fungi as yeast and mold. The conventional methods of yeast identification, which mainly consist of assimilation and fermentation characteristics, are reported to be cumbersome and beyond the expertise range available in local laboratories. In non-specialized clinical laboratories, especially in resource-limited settings, identification of yeast and yeast-like organisms requires evaluation of microscopic morphology and cultural studies. In superficial fungal infections, the diagnosis can be made by examining the scrapings from the lesion using 10% KOH(potassium hydroxide)or by doing grams stain and observing under direct microscope which enable to visualize budding yeasts with hyphae or pseudohyphae. Scrapings from the lesion are inoculated onto sabouraud's dextrose agar containing antibacterial agents and examined periodically which shows creamy pasty colonies within 2-3 days and colonies on blood agar for the diagnose of this infective condition and using chrom agar and corn meal agar as species differentiating mediums[7]. The present study was undertaken as a hospital based prospective study over a period of 18 months to analyze the varied clinical presentations of candidal infections owing to its protean manifestations and to address the approach pertaining to their diagnosis using simple, easy and cost effective laboratory investigations to screen and confirm the same, as till date very few studies are available in Indian literature regarding the same. If such patients can be counseled to undergo further confirmatory investigations after preliminary screening, the overall morbidity and mortality secondary to complications and treatment failure can be reduced by early diagnosis and intervention.

Aims: To study the clinical and mycological aspects of candidal infections at a teaching institute.

MATERIALS AND METHODS

The current study has been undertaken for a period of 18 months, by including 150 clinically diagnosed cases of candidiasis including individuals from ages 1-60 years attending the Outpatient of Department of Dermatology, Venereology and Leprology, Fathima Institute of Medical Sciences, Kadapa, A.P after obtaining the approval of The Ethics Committee. Informed written consent of the participating individuals was taken. A pre-structured profroma was used to collect the baseline data. The clinical samples submitted to the diagnostic microbiology laboratory yielding Candida organisms, which were processed during the study.

Inclusion Criteria: All clinically diagnosed cases of candidiasis with age groups 1-60(irrespective of sex, occupation and socioeconomic status) attending to Department of Dermatology, Venereology and Leprology, Fathima Institute of Medical Sciences who gave consent and were willing for investigations.

Exclusion Criteria: a) Patients who are infants and age greater than 60 are excluded. b) Patient already on treatment with anti fungals or other modalities like steroids are excluded. c) Those with candidal infection with associated secondary infections(clinically).

A detailed history was taken with particular reference to name, age, sex, address OP/IP no. occupation, presence of predisposing factors, onset and duration of complaints, initial appearance and progression of the lesions, treatment taken, marital status, similar complaints in sexual partners, exposure to sexually transmitted diseases and HIV status in relevant cases also noted, similar incidents in the family members were enquired into. The study population included all clinically diagnosed cases of candidiasis with various lesions like oral thrush, vaginitis, cutaneous and nail infections, the patient was clinically examined in good light for varied manifestations of candidiasis such as discharge in genital area, swelling and discoloration of nail and nail folds, fissuring of the angles of mouth, intertriginous areas and oral cavity. In predisposing factors like diabetes blood sugar was done .In pemphigus vulgaris patients skin biopsy and immunofluorescence was done. For bronchial asthma chest X ray and pulmonary function test was done.

Methods:

Specimen collection:

- **Skin:** The site was cleansed with the 70% isopropyl alcohol and was allowed to evaporate. Skin material was scraped with the flat edge of a sterile scalpel blade.
- **Nails and Nail Bed:** Nails were cleansed with 70% isopropyl alcohol and a portion of the infected nail was clipped and excess keratin was scraped from the nail bed. In case of paronychia, the exudates were expressed from below the nail folds and the sample was collected on the moist sterile swab.
- **Vagina**: Speculum examination was done and vaginal discharge was collected using sterile swab from the posterior fornix or middle 1/3rd of vagina.
- **Mouth:** The lesions were visualized using a tongue depressor and the specimen was collected using a sterile swab.

Mycological Examination:

- Direct Microscopic examination (Potassium Hydroxide (KOH).
- CULTURE.
- Germ Tube Test.
- Chrom Agar.
- CORN meal tween 80 AGAR (dalmau plate culture technique).

RESULTS AND DISCUSSIONS

Among the 150 cases the youngest age was 5years old and the eldest was 59 years old. The mean age of presentation was 38.71 years. It is evident that the majority of individuals with the disease belonged to the age group 41-50 years(40 patients 26.66%). Minimum age group constituted <10 years. Rest of the sample was scattered among 11-40 years and 50-60 years, male to female ratio was found to be 2:3 with 90 females and 60 males.

Occupation: Housewives are the majority of patients in the study group with(54 patients, 35.96%) with intertrigo being common clinical type in (21 patients, 32.76%) followed by agricultural workers (34 patients, 22.78%) with candidal paronychia being common clinical type in 13 patients (38.22%), students and daily labour constituted 21patients each(14.07%) with intertrigo being common presentation in students(19 patients, 29.64%) and candidal Paronychia being common presentation in daily labour(10 patients, 29.4%) and least common occupation in the study group found to be commercial sex workers (2 patients, 1.34%) with vulvovaginal candidiasis being common presentation in them.

Associated Illness: Most common associated illness in the study group was observed to be HIV infection in 15 patients with oral thrush being common presentation in (9 patients, 60%) followed by vulvovaginal candidiasis in (5 patients, 33.33%), in 2 patients with pemphigus vulgaris oral thrush was the common presentation(100%), least associated illness in study group being bronchial asthma and suspected internal malignancy.

Predisposing Factors: Most common predisposing factor among study group is diabatic mellitus (37 patients, 24.64%), followed by (31 patients, 20.60%) with prolonged contact with water, (15patients, 9.99%) with HIV infection, (11 patients, 7.32%) who are obese, (9 patients, 5.99%) who are on prolonged usage of antibiotics, (5 patients, 3.33%) each who are pregnant and who are using occlusive footwear, (4 patients, 2.66%) each who are hyperhidrotic and wearing occlusive clothing. Most common predisposing factor for oral thrush is HIV infection (9 patients, 56.25%), for vulvovaginal candidiasis, intertrigo and balanoposthitis being diabatic mellitus (8 patients, 26.64%), (21 patients 32.76%) and (5 patients 83.3%) respectively and prolonged contact with water in paronychia(28 patients, 82.32%).

Species Identified: Among 16 positive samples by culture with oral thrush 14(87.5%)species identified were C.albicans, 1(6.25%) each was C.tropicalis, C.parasilosis. Among 28 positive samples by culture with vulvovaginal candidiasis,16(57.14%) species identified were C.albicans, 6(21.42%) species were C.tropicalis, 4(14.28%) species were C.parasilosis, 1 (3.57%) species each was C.glabrata and C.krusei. Among 14 positive samples by culture with intertrigo, 8(57.14%) species identified were C.albicans, 2(14.28%) species each was C.tropicalis and C.krusei and 1(7.14%) each was C.parasilosis and C.glabrata. Among 2 positive samples by culture with candidal balanoposthitis 1(50%) each was C.albicans and C.glabrata. Among 24 positive samples by culture with candidal nail paronychia 12(50%) species was C.albicans, 6(25.02%) species was C.parasilosis, 2(8.34%) species each was C.tropicalis, C. glabrata and C.krusei. Most common species identified in the study group was C.albicans 51 species(60.71%), and also it is the most common species identified in each clinical presentation, followed by C.tropicalis-15 species (17.85%), C.parasilosis-8 species (9.52%), C.glabrata-5 species(5.95%), C.krusei-5 species (5.95%).

Clinical and Mycological Association: KOH examination was positive in 102(68%) samples, negative in 48(32%) samples in the study group. Culture was positive for Candida in 84(56%) samples, negative in 66(44%) samples in the study group. All the 16 samples from oral thrush are positive for Candida by KOH examination(15.68%) and culture examination (19.04%). 6 (25.48%) samples from candidal vulvovaginitis are positive by KOH examination and 28(33.32%) samples by culture. 24(23.52%) samples from candidal intertrigo are positive for Candida by KOH examination and 14(16.66%) are culture positive. 4(3.92%) samples from candidal balanoposthitis are positive for Candida by KOH examination and 2(2.38%) positive by culture. 32 (31.36%) samples from candidal paronychia are positive for Candida by KOH examination and 24(28.56%) positive by culture. In the present study a total number of 150 patients with clinically diagnosed candidal infection were included. Candidiasis can affect any age group with no specific age group being immune to infection. Although all age groups can be affected the majority of patients in present study were in the 41-50 years age group accounting for 26.66%. In the present study the higher incidence among the age group of 41-50 years could be attributed to the fact that majority of these people had occupation which involved prolonged contact with water, agricultural workers and with diabatic mellitus as predisposing factor. In the present study females constituted to 90 patients (60%) and males constituted to 60 patients (40%) in a ratio of 3:2. In the present study females are observed to be commonly affected, as observed in various other studies mentioned. The higher incidence in women in the present study could be attributed to the fact that , the study group constituted more housewives in whom there was history of prolonged contact with water. Dalal and Kelkar have noticed in their study increased frequency among women and VVC if excluded, equal in both sexes[7].

Occupational Status: In the present study candidiasis was most commonly seen in housewives(54 patients, 35.96%) which is also found in studies conducted by Rippon[8], followed by agricultural workers (34 patients, 22.78%), students and labour constituting (21 patients, 14.07%) each, business people constituting (12 patients, 8.04%), teachers(5 patients, 3.35%) and commercial sex workers (2 patients, 1.34%). The higher incidence among housewives in the present study is due to the fact that in this part, women take care of household work like washing utensils, clothes, cleaning the floor which are very important predisposing factors for candidiasis.

Clinical Types: Candidal intertrigo was the most common clinical diagnosis made in (64 patients, 42.6%) which is also the common clinical diagnosis observed in studies made by Nihon *et al.* and Dastidar *et al*, followed by candidal paronychia in (34 patients, 22.7%), vulvovaginal candidiasis in (30 patients, 20%), candidal oral thrush in (16 patients, 10.7%) and candidal balanoposthitis in (6 patients, 4%). In the present study group the higher incidence of intertrigo is attributable to the fact that the housewives who are obese and also agricultural workers constituted the majority of patients. In a study by Nihon ishinkin, gakkai zarshi the most common clinical form was intertrigo, Dalal and Kelkar studied 100 patients of candidiasis found vulvovaginal candidiasis in 30%, intertrigo in 18%, nail involvement in 12%, generalized cutaneous candidiasis in 8%, their study also included the patients of systemic candidiasis. Dastidar[9] in their study of 295 patients found intertrigo in 29.2%, VVC in 26.4%, nail involvement in 25.90%, oral thrush in 12% of patients.

Predisposing Factors: Most common predisposing factor among study group is found to be Diabetis mellitus in (37 patients, 24.64%), which is also found to be the common predisposing factor in studies made by Montes[10], followed by (31 patients, 20.60%) with prolonged contact with water, (15 patients, 9.99%) with HIV infection, (11

patients, 7.32%) who are obese, (9 patients, 5.99%) who are on prolonged usage of antibiotics, (5patients, 3.33%) each who are pregnant and who are using occlusive footwear, (4 patients, 2.66%) each who are hyperhidrotic and wearing occlusive clothing.

Clinical Type in HIV: In the present study group, 15 patients had associated HIV infection, out of which 9 (60%) patients had involvement of oral cavity, 5 (33.3%) had involvement of vagina, 1(6.66%) had balanoposthitis. Thus the incidence of oral candidiasis in HIV patients is similar to the observation made by above authors who have observed the changes in the mucosal defence mechanisms in the oral cavity to be the responsible factor.

Associated Illness Excluding HIV Infection: Pemphigus vulgaris, internal malignancy, bronchial asthma and Stevens Johnson Syndrome were seen in 9 patients in all the above mentioned studies. Hay and Moore[11] have described about the association between internal malignancy and candidiasis in his study. The association of pemphigus vulgaris with candidiasis in the present study group can be attributed to the use of higher dosage of steroids in these patients.

KOH-Examination: Direct microscopy by KOH examination is a commonly used modality to visualize and characterize the superficial mycoses. Although the yield of diagnosis is high, it could still be negative in a significant percent of patients and also falsely negative in 5%-15 % of the patients. The KOH positivity also appears to be affected by the site of infection. In the present study out of 150 samples subjected for KOH examination, positivity was seen in 102(68%) whereas it was negative in 48(32%) samples. In the present study positivity of KOH was seen in 68% of all samples, while relevance can be attributed to positive findings, negative findings does not exclude the presence.

Culture Findings: Microbiological confirmation of the species causing dermatophytosis is a very important adjunct in diagnosing superficial fungal infections. This also helps in guiding therapy towards the specific fungus. Although fungi can be cultured in Sabouraud' s agar, addition of antibiotics to the culture media inhibits the growth of bacteria and favours the growth of fungus. In the present study out of 150 samples, culture was positive for candida in 84(56%) and negative in 66(44%). Narain[12] observed culture positivity in 30(100%) cases in his study with blood samples on systemic candidiasis in tertiary care hospital, Bahunuthala RK and Thappa[13] 41 (56.1%) culture positive in their study to evaluate role of Candida species in chronic paronychia and Chei-cheng[14] observed culture positivy of 44.3% in 176 blood samples out of 329 suspected cases with systemic candidiasis. Candida albicans was the most common species isolated in the present study group due to the fact that the clinical samples collected from various disease presentations whose etiology is mainly due to C.albicans. Chih-cheng et al observed C.albicans to be most common organism isolated 146(44.3%) from blood samples diagnosed to have systemic candidiasis.

CONCLUSION

Candidiasis is a relatively common condition in general population. Though candidiasis is seen in all age groups, it is most commonly found in the age groups of 31-50 years. Candidiasis is more often found to be associated with one or more predisposing factors. Prolonged contact with water, HIV infection and diabetes mellitus constituted to be the major predisposing factors. Higher incidence was observed among females. Intertrigo was the most commonly observed clinical type. Itching was the most common presenting complaint followed by toe web space lesions, though many were asymptomatic. Highest percentage of positive results were seen in both KOH and culture examination. Investigative results also reflected more positivity in mucosal candidiasis than cutaneous or nail candidiasis. Oral candidiasis was the most common condition in people with HIV infection and it was a good clinical marker to suspect the underlying HIV infection.

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