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A STUDY OF CANDIDIASIS IN IMMUNOCOMPROMISED PATIENTS ATTENDING DMCH, DARBHANGA

Microbiology

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ABSTRACT

A dramatic change in the epidemiology of infectious diseases has taken place with the advent of new chemotherapeutic agents, new immunosuppressive agents, organ transplantation, parenteral alimentation, broad-spectrum antibiotics and advanced surgical techniques. In this new scenario, fungal infections have emerged as a critical issue in the compromised host. Among these, candida spp. is the most common fungal pathogens. **Aims and Objectives:** To study fungal isolates in Immunocompromised patients. **Materials and Methods:** The present study was carried out in DMCH, Darbhanga. The cases for study were selected from the patients attending the medicine, ICTC, Endocrinology, Haematology, Nephrology and Intensive Care unit of DMCH, Patna over a period of one year (March 2018 – Sept. 2019). **Result:** The overall prevalence of Candidiasis among the study population was found to be 38.57% Candida spp. was isolated in 48.33% of diabetic population, 39.13% of individuals with HIV/AIDS, 18.18% in patients with haematological malignancy and 25% in patients undergoing renal transplant ($p<0.02$). **Conclusion:** It may be concluded from this study that people who are immunosuppressed are at higher risk for Candida infection. The study highlights the diverse manifestations caused by Candida species and throws light on the species prevalent locally.

KEYWORDS

Immunocompromised, Candidiasis.

INTRODUCTION:

A dramatic change in the epidemiology of infectious diseases has taken place with the advent of new chemotherapeutic agents, new immunosuppressive agents, organ transplantation, parenteral alimentation, broad-spectrum antibiotics and advanced surgical techniques. In this new scenario, fungal infections have emerged as a critical issue in the compromised host. Among these, candida spp. is the most common fungal pathogens [1].

Opportunistic infections are known to occur in people in whom the immune system is impaired and are caused by infectious agents that do not ordinarily produce disease in healthy individuals. Mims et al (1998) refers to immunocompromised hosts as people who have one or more defects in their body's natural defenses against microbial invaders.[2]

A host may be compromised by factors affecting either the innate or the adaptive system of immunity. Some of the causes of secondary adaptive immunodeficiency include infections especially HIV infection, neoplasia, diabetes mellitus, chemotherapy and radiation therapy, patients receiving solid organ transplant.

Candidas are thin-walled, small yeasts (4 to 6 microns) that reproduce by budding. Even though there are more than 200 species of Candida, no more than 20 cause disease in humans with varying frequency [3]. Of these, *Candida albicans* causes almost 100% of cases of oropharyngeal candidiasis and at least 90% of cases of Candida vulvovaginitis. When Candida produces invasive candidiasis, the other species of Candida begin to be seen with increased frequency.

Candida species are the most frequent cause of fungal infections in the immunocompromised host. Species most commonly recovered include *Candida albicans*, *Candida tropicalis, Candida* (Torulopsis) *glabrata* and *Candida parapsilosis*. Others such as *Candida lusitaniae*, *Candida rugosa* and *Candida pseudotropicalis* have more recently been reported to be associated with disseminated infection. Some are considered as a part of the usual flora, which makes the clinical significance of an isolate difficult to determine. Recovery of an organism from a normally sterile site or recovery of the same species from several different body sites is an indicator of disseminated infection with probable fungemia [4].

Candida spp. is also competing with the bacteria as one of the leading causes of nosocomial infections [Banerjee et al 1991, Edmond et al 1999]. During the 1990's Candida spp. was the fourth most common agent causing nosocomial bloodstream infection. In addition the ability of Candida spp. to produce oropharyngeal candidiasis in patients with HIV-AIDS has made candidiasis the leading fungal infection in this immunosuppressed population [5].

In recent years, an important concern has been the prominence of non-albicans species in some medical centers. Several of these species, specifically C.*krusei* and C.*glabrata* are less susceptible to fluconazole, the primary azole antifungal agent used to treat Candida infections. Whether fluconazole therapy is instrumental in selecting these more resistant species has not yet been clearly defined but it is likely that overuse of this azoles does play a role in some settings. Another concern is the emergence of fluconazole resistant C.*albicans* among AIDS patients who have frequent episodes of thrush that require treatment with multiple courses of fluconazole.[6]

The varies manifestations of candidiasis often create dilemma for the physician, both in diagnosis and treatment, and are frequently the major contributors to or are the actual cause of death in the patient. Several studies from different parts of the country have reported prevalence of Candidiasis in different immunocompromised patients [7]. However, there has been no record of such studies being conducted in the state of Bihar till date.

AIMS AND OBJECTIVES:

1. To study the prevalence of Candidiasis in immunocompromised patients attending DMCH, Darbhanga.
2. To identify the different species of Candida isolated in the study.

MATERIALS AND METHODS:

A total of 100 immunocompromised individuals admitted in different departments were taken up for this study. The study population consisted of 49 cases of diabetes mellitus, 32 cases of HIV/AIDS, 12 patients with haematological malignancy, and 7 patients who had undergone renal transplant surgery. The sample size comprised of a total of 140 samples, of which 50 were urine, 40 bloods, 20 oral swab, 16 sputum and 14 pus.

The specimens were subjected to direct microscopy in 10% KOH mount, culture in Sabouraud's dextrose agar supplemented with Chloramphenicol (0.05 mg/ml). They were then incubated at 22^{0}C and 37^{0}C and observed for fungal growth. Special tests were done to isolated Candida species. They were Gram staining, Germ tube test, Hi Chrome Agar, Corn Meal agar morphology, sugar fermentation and sugar assimilation test. The results of all these tests were then tabulated and analyzed in relation to demographic factors like age, sex, socioeconomic status, clinical features, CD4 cell count and random blood sugar level.

RESULTS:

The study population consisted of 49 cases of diabetes mellitus, 32 cases of HIV/AIDS, 12 patients with haematological malignancy, and 7 patients who had undergone renal transplant surgery.

The maximal number of patients positive for Candida spp were in the age group of 31-40 years (34.1%) followed by 51-60 years (24.4%) age group. The sex distribution showed a male preponderance with 75.6% males and 24.4% females. The majority of the (63.41%) patients came from rural area ($p<0.01$). The results and observations of the study are documented below:

Table 1: Clinical profile of study population

Study population	No (%) of patients		
	Male	Female	Total
Diabetes mellitus	32	17	49 (49%)
HIV/AIDS	27	5	32 (32%)
Malignancy	7	5	12 (12%)
Transplant	3	4	7 (7%)
Total	69(69%)	31(31%)	100(100%)

Table 2: Profile of Candida Species in Study Population

Species	Total	%
Candida albicans	14	25.92
C. tropicalis	22	40.74
C. parapsilosis	6	11.11
C. krusei	5	9.25
C.guilliermondii	2	3.70
C. rugosa	2	3.70
C. dubliniensis	1	1.85
C. glabrata	1	1.85
C. zeylanoides	1	1.85

DISCUSSION:

The present study was undertaken to find out the prevalence of candidiasis in immunocompromised patients in this part of the country as well as to identify the various species isolated from different clinical specimen. The study was conducted at DMCH, Darbhanga taking up a total of 100 immunocompromised individuals comprising 49 cases of diabetes mellitus, 32 cases of HIV/AIDS, 12 patients with haematological malignancy and 7 patients who underwent renal transplant. There were 69 males and 31 females (Table-1). Of the total 140 samples, 50 samples comprised of urine, 40 blood, 20 oral swab, 16 sputum and, 14 pus .

The overall prevalence of Candidiasis among the study population of 100 immunocompromised patients with varied clinical manifestation was found to be 38.57% (Table 11) ($P<0.02$). Among the total isolates, non albicans Candida comprised of 74% of the total isolates. Among the non albicans species, *C. tropicalis* (n=22, 40.74%) was the most common isolate in all the specimen followed by *C. Parapsilosis* (n=6, 11.11%), *C. Krusei* (n=5, 9.25%) *C. guilliermondii* (n=2, 3.70%), *C. rugosa* (n=2, 3.70%) *C. dubliniensis* (n=1, 1.85%), *C. glabrata* (n=1, 1.85%) and *C. zeylanoides* (n=1, 1.85%)(Table 2) [8].

S .Giri et al (2013) reported *C.tropicalis*(74.35%) was the most common isolate followed by *C.albicans, C.parapsilosis, C.krusei, C.glabrata.* Manisha Jain et al(2012) reported non-albicans candida spp(71.4%) emerged as the predominant pathogen causing nosocomial UTI. Kanitha Tritipwanit et al (2005) reported a 6.14%) prevalence of candidiasis in blood stream infection, of which 57.1% belonged to the non albicans species. Among the non albicans species, *C. tropicalis* was the most common isolate followed by *C. parapsilosis* and *C. guilliermondii*. Kremery and Barnes [9] reported a 35-65% prevalence of non-albicans Candida species in the general patient population.

The present study noted a prevalence of 25.92% in blood stream infections of which non albicans species constituted 74%. [10].

Few Indian studies have also reported on the prevalence of candidiasis in different study population.

Candida spp. was isolated in 29 (48.33%) out of 60 varied clinical specimen from 49 diabetic patients .

Drozdowska et al (2008) also reported a prevalence of 35-65% of Candida infection in diabetic patients, which is similar with the present study.

Missoni et al (2003) reported an incidence of 4.3% in diabetic foot ulcer, which comprised of 59.1% males and 40.9% females. Among the isolates, *C.parapsilosis* was the most common isolate followed by *C.* tropicalis (22.7%), *C. albicans* (9.1%) and *C. glabrata* (9.1%).[11]

However in the present study, the incidence of foot infection was found to be 10.71% (Table-21). The distribution of species parallels the above mentioned study except that *C. Parapsilosis* was not isolated in foot ulcer patients. Thus, the present study highlights the correlation between candidiasis and diabetes mellitus.

Candidiasis is known to be the most common opportunistic infection in persons infected with HIV. In the present study, 18 (39.13%) out of 46 samples from 32 HIV seropositive patients were found to be associated with candidiasis, the overall prevalence being 39.13% .

Costa Cr et al (2006) reported 62.6% prevalence of oral candidiasis. *C. albicans* was the prevailing species comprising of 50% of the isolates. *C. dubliniensis* was however not isolated in the study. The present study however noted a prevalence of 44.44% in patients with oropharyngeal candidiasis. However *C.tropicalis*(25%) , *C.albicans* (25%), *C.guilliermondii*(25%) each was the most prevalent species followed by *C. parapsilosis* (12.5%) and *C. dubliniensis* (12.5%)[12] .

The findings of our study corresponds to that of the above-mentioned studies and lends credence to the view suggested in many studies that HIV p The present study found candidiasis in 4 out of 22 samples from 12 patients with haematological malignancy, the overall prevalence being 18.1% redisposes to candidiasis.

Several studies have reported on the species profile of Candida in malignancy patients.

Kremery V Jr et al (1999) reported an increase in prevalence of non-albicans species. Of the cases of nosocomial fungemia due to species, other than *Candida albicans, C. parapsilosis* was the most frequent isolate.

Wingard et al reported *C. tropicalis* as the major pathogen in patients with haematological malignancy.

The present study however noted an equal isolation rate of *C. tropicalis* and *C. krusei* in blood, 1 isolate of *C. parapsilosis* in urine and 1 isolate of *C.albicans* in oral swab, constituting only 25% of the isolates .

The present study isolated Candida species from 3 out of 12 clinical samples from 7 transplant patients, the overall prevalence being 25% .

Paya CV reported an incidence of 5-40% in transplant patients. This can be correlated with the present study, which recorded 25% prevalence.

C.tropicalis was the most common species isolated in all clinical specimens whereas *C.albicans* comprised of 33.3% of the isolates.

CONCLUSION:

It may be concluded from this study that people who are immunosuppressed are at higher risk for Candida infection. The study highlights the diverse manifestations caused by Candida species and throws light on the species prevalent locally. The study also emphasizes on the need for introduction of mycological examination into the panel of methods evaluating the clinical condition of this category of patients and the need for formulating preventive and prophylactic measures.

Despite the moderate (n=140) number of samples included in the study, the data here provide some background information that can form the basis of future, more elaborative and systematic studies. Apart from this, it can also potentially have an immediate impact on patient care by suggesting appropriate interventional measures based on the results.

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