Incidence of Candidiasis in Oral Cancer Patients Pre and Post Radiotherapy Treatment

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Abstract:
Background: Oral candidiasis is one of the common infection observed in cancer patients mainly on cytotoxic therapy and in gets invades into deeper tissues can occur if treatment is not adequate. Emergence of antifungal drug resistance is of serious concern leading to morbidity and mortality. The present study aims of finding incidence of candidiasis in oral cancer patients and their antifungal drug susceptibility.

Material and methods: A total of 60 patients have been selected for this study, those were diagnosed for oral cancer from January to June 2018. The samples were taken All isolates were identified and tested for antifungal susceptibility according to CLSI guidelines 2016.

Results: Out of 60 oral cancer patients, 30 samples were collected from patients before radio therapy and 30 samples were collected from patients after radio therapy. Out of 30 samples from pretreatment cases, 16 cases of Candida species were isolated and from post treatment cases, 21 cases of Candida species were obtained. Out of 16 Candida isolates from pretreatment cases, C. albicans(8), C. dubliniensis(2), C. krusei(4) and C. parapsilosis(2) were identified. Out of 21 Candida isolates from post treatment, C. dubliniensis(9), C. albicans(7), C. krusei(2) and C. glabrata(3) were further identified. Amphotericin B was most sensitive drug for all Candida species except C. parapsilosis and Fluconazole was mostly resistant among all Candida species.

Conclusion: Candida albicans was predominantly isolated from oral cancer patients and most effective antifungal drug was amphotericin B and least effective antifungal drug was found to be fluconazole. fungal culture and anti fungal susceptibility tests are necessary for effective treatment. After radiotherapy Candida infection was recorded more common than that of pre radio therapy, it shows radio therapy increases the risk of local Candida infection due to immune-suppression.

Keywords: oral candidiasis, candida, HiChrome agar

I. Introduction

Oral candidiasis is a common fungal infection affecting immunocompromised patients. Conditions like malignant neoplasm, chemotherapy, and radiotherapy compromise the cell mediated immunity leads to fungal infections [1]. Candida species are normally present as commensals in the oral cavity and their transition to become an opportunistic infective agent may be associated with certain virulence determinants [2]. Incidence of oral candidiasis has been reported to be ranging from 7 to 52% among cancer patients (head and neck malignancy, hematopoietic malignancy, and solid tumors) on chemotherapy and or radiotherapy [1]. This indicates that the death rate because of cancer will also increase from 680000 to 1-2 million in the same period [3].

A higher incidence of oral colonisation with non-Candida albicans has been reported in patients with advanced stage of cancer [4]. Although Candida albicans and non-Candida albicans are closely related, they differ in the antifungal susceptibility patterns. Non-albicans candida causing opportunistic pathogens i.e. C. tropicalis, C. krusei, C. glabrata, C. guilliermondii, C. parapsilosis, C. lusitaniae, C. kefyr, C. rugosa, C. dubliniensis, C. viswanathi [5].

The colonised Candida invades the underlying mucosa and enter into the blood stream leading to disseminated disease which leads to morbidity and mortality if not treated properly. Fluconazole is one of the first line drugs used for the treatment of oral candidiasis in cancer patients [4-5]. Amphotericin B is usually used for invasive Candida infections. Newer drugs like echinocandins are reserved for therapy of refractory candidiasis [5-6].

So, it is important that cancer patients should be evaluated clinically and microbiologically for the presence of Candida in the oral cavity. The present study aims for Candida isolation from oral cavity of cancer patients.
patients, to study the antifungal susceptibility pattern of the isolates and to evaluate the association between clinical and mycological findings.

II. Material And Methods

A total of Sixty patients of oral malignancies, out of these 30 samples were taken before treatment and 30 samples were taken post treatment were taken and studied for indentification of Candida species in Department of Microbiology, Ayaan Institute of Medical Sciences, Teaching Hospital & Research Centre, Hyderabad.

Sample collection and processing:

Oral swab from lesion site is a relatively simple method for isolating and semi-quantitative estimation of Candida. The sampling approach involves gently rubbing a sterile cotton swab over the lesion tissue and then subsequently inoculating on primary isolation medium such as Sabouraud's dextrose agar (SDA).

(i) Wet preparation: 10% KOH was mixed with the specimen on a glass slide & specimen material was teased with two inoculating needles. A cover slip was placed on it & examined 1st under low power than under high power of the microscope to ascertain the presence of yeast cells

(ii) Gram’s staining: Smear was prepared, fixed & stained by Gram staining method. It stains the candida species as gram positive yeast cells.

Culture:

The organism was identified using conventional method that included Gram stain, colony morphology on Sabouraud dextrose agar (SDA) with and without chloramphenicol tubes, Germ tube test, CHROM agar (HI media) for species identification, Cornmeal agar with Tween-80 inoculation (HI media) for chlamydospore production. Antifungal susceptibility testing (AFST) was carried out by using disk-diffusion method.

III. Observations And Results

In the present study, 60 oral cancer patients were taken, 30 patient’s samples were collected before initiation of radio therapy and 30 patients samples were collected after radio therapy. 14 out of 30 samples from pre-treatment cases Candida species was isolated and from post treatment cases, 19/30 candida were isolated. Amphoterocin B was most sensitive drug for all Candida species except C. parapsilosis and Fluconazole was found most resistant for all Candida species.

This study was carried out in the age group of 21-90 years. Among 30 patients of pretreatment, there were 24 males & 6 females and in 30 cases of post treatment, there were 4 males & 26 females.

Out of 16 culture positive cases in pretreatment patients, the commonest isolates were C. albicans(8), C. dubliniensis(2), C. krusei(4) and C. parapsilosis(2) were identified. Out of 21 Candida isolates from post treatment patients, C. dubliniensis(9), C. albicans(7), C. krusei(2) and C. glabrata(3) were further isolated.
IV. Discussion

A significantly higher rate of total colonization and oral candidiasis was seen among patients receiving chemotherapy as compared to patients treated alone in the present study. It is well known that radiotherapy leads to mucositis, xerostomia and mucosal damage, which promote yeast infection. Also, neutropenia due to prolonged chemotherapy, disruption of mucosal barrier and overall damage to cell mediated immunity increases the risk of infection. Similar trends have been seen in various studies conducted across the world. Amador et al. found that radiotherapy induced hypo salivation encourages oral candida colonization that often leads to oral/pharyngeal candidiasis similarly found an increased incidence of oropharyngeal candidiasis in patients receiving concomitant radiotherapy and chemotherapy.

The total numbers of 37 Candida species were isolated in the oral cavity. Candida albicans was found to be the predominant with 15/37. The majority of yeast isolates from oral cavity swabs were C. albicans(15 isolates) but it was often recovered in association with other yeasts. This was followed by C. glabrata (3), C. krusei (3), C. dublinensis (1) and, C. parapsilosis 2 isolates of distribution of species. CHROMagar candida is one of the most widely used media in the mycology laboratory.

V. Summary And Conclusion

Candida albicans was predominant isolates in oral cancer patients in pre-radiotherapy pateints. The most effective antifungal drug observed was amphotericin B and least effective antifungal drug was found fluconazole. This study showed a lot of variation in drug sensitivity, this shows irrational use of antifungal drugs. Thus, fungal culture and anti fungal susceptibility tests are necessary for efficient treatment. After radiotherapy Candida infection was recorded more than that of pre-radiotherapy, it shows radio therapy increases the risk of local Candida infection due to immune-suppression. C. albicans is the most frequently isolated yeast from the oral cavity infection patients. CHROMagar Candida is a useful culture medium for the isolation and direct identification of Candida species.

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