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Oral Candidiasis in Diabetes Patients in Wasit Province

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ABSTRACT: Objective :1**.** Identification and isolation of *candida* spp in patients with diabetes mellitus (DM). 2.To identify the relationship between some important parameters (age, gender, Glycosylated hemoglobin (HbA1c) Associated with diabetes and oral candidiasis.

This study was performed in AL- Zahraa Teaching Hospital (Diabetic Center) Wasit Governorate during the period from the first of December 2018 to the end of July 2019.The samples were collected from oral swabs, then cultured on sabouraud dextrose agar (SDA), examined under microscope to show hypha and pseudohypha of *Candida* spp and cultured on chrom agar for identifying the *Candida* spp. The molecular methods that used in this study were vitek 2 system and Polymerase chain reaction (PCR). The results showed that from 50 oral sample from Patients with diabetic mellitus showed 23 (46.6%) infected with candidiasis ,22 (95.6%) of them were *C.albicans* and 1(4.4 %) was other *Candida* spp *(C.Dubliniensis)* , while 27 (53.4%) were not infected. The Current study found a significant correlation between glycosylated hemoglobin and oral Candidiasis when the HbA1c was ranging from (6.5-8.5).

Keywords: Oral Candidiasis (OC), Diabetes Mellitus (DM), Sabouraud Dextrose Agar (SDA), Glycosylated hemoglobin (HbA1c)

1. INTRODUCTION

Immunocompromised are condition where the mechanism of host defenses are impaired (weakened or absent) by primary (congenital) or secondary(acquired) causes [1] and these Immunocompromised hosts include diabetes, neutropenia, burns, persons with intravascular catheters, patients undergoing hemodialysis, abdominal surgery, persons with parenteral nutrition etc. The incidence of infections is increased in patients with diabetes mellitus (DM), some of these infections are also more likely to have a complicated course in diabetic than in nondiabetic patients. The mortality rate of patients with an infection and ketoacidosis is 43% [2]. The question then arises as to which pathogenetic mechanisms are responsible for this high infection rate in patients with DM. Possible causes include defects in immunity, an increased adherence of microorganisms to diabetic cells. Considering the above, it seems that differences in innate immunity between diabetic and nondiabetic patients and in adherence of microorganisms to diabetic and nondiabetic cells are more important in the pathogenesis of the increased prevalence of infections in these patients [3][4]. immunocompromised individuals can frequently suffer from recalcitrant infections of the oral cavity. These oral infections with Candida species are termed “oral candidiasis” (OC). Such infections are predominantly caused by *C.albicans* and can affect the oropharynx and/or the esophagus of persons with dysfunctions of the adaptive immune system [5] .Diagnosis of Candida in the laboratory is done by simple microscopy, culture or antigen detection assays. The wet mount microscopy detects budding yeasts cells and hyphal or pseudo hyphal forms. They also grow well on

routine culture medium and on gram-stain, appear gram positive and oval in shape. The culture media that used is sabouraud dextrose agar with chloramphenicol (antibiotic) are used. Creamy colored colonies are seen on the agar; making the slide from these colonies and examine, the yeast cell and pseudohyphae under the microscopes seen [6]. Then use Several techniques for confirmation like the The Vitek 2 system, first introduced a fluorometric and then a colorimetric card for the rapid identification of yeast species. The performance of both cards has been evaluated in several studies [7] [8] [9] [10] [11]. In contrast, during routine diagnostics, yeasts are also commonly isolated on other medium, including CHROMagar Candida [12], and then use Polymerase Chain Reaction technique (PCR) to Confirmation of diagnosis. PCR is a crucial tool in the diagnosis of human pathogens. This molecular method is based on nucleic acid amplification, and hybridization has been rapidly adapted to reliably detect a broad range of infectious agents. The use of PCR to diagnose medical mycoses has been challenging, however, because fungi have cell walls that impede the efficient lysis of organisms and liberation of DNA (which can lead to false-negative PCR results) and because some human pathogens are also ubiquitous in the environment (leading to false-positive results [13].

2. MATERIALS AND METHODS

Present study collects 50 patient (male and female) age ranged from 19-73years including Type 1 and Type 2 have been selected from diabetic center in AL- Zahraa Teaching Hospital according to following inclusion criteria:
- Hba1c more than 6.5%, Random Blood Sugar test (RBS) >200 mg/dc, Fasting Blood Sugar test (FBS) >120 mg/dc
- Clinical feature (polyuria, polydipsia and other symptom).
- Exclusion criteria: negative medical history of diabetes & normal blood sugar.
- physician diagnosis.

2.1 Procedure of Samples Collection

Mouth swabs were collected by using a sterile disposable cotton swabs and rubbed over the tongue palate and buccal mucosa. Cotton swabs were aseptically dipped in sterile culture tubes containing transport medium and were transported as soon as possible to the laboratory and incubated at 37 ˚C for 24 hours [14].

2.2 Isolation and Identification of Candida Species

After taking swaps from the suspected patients, the swab samples were cultured immediately on SDA with chloramphenicol and incubated aerobically at 35-37˚C for 24-48 hours, the agar plates were examined for visible growth after the incubation period [15]. Identification of Candida was done based on the colony morphology of the isolates, and then staining with gram stain and examined under the microscope to show the morphology of Candida spp.

2.3 Statistical analysis

All results obtained from the present study were entered and analyzed statistically by the statistical package for social science (SPSS) version 21 for Windows Software and Microsoft Excel 2007. Chi-square test and one way analysis of variance (ANOVA) with least significant differences were used for the assessment of association between the variables studied. A value of $P < 0.05$ was considered statistically significant [16].

3. RESULTS

Table 1. Frequency of oral candidiasis in DM patients according to age.

Age group	Frequency	Percent%
19-34	1	4.3
35-50	8	34.8
51-73	14	60.9
Total	23	100.0

P value < 0.05

Table 2. Frequency of oral candidiasis in DM patients according to gender.

Gender	Frequency	Percent%
Male	9	39.1
Female	14	60.9
Total	23	100.0

(P value > 0.05)

Table 3. Frequency of oral candidiasis in DM patients according to HbA1c.

HbA1c	Frequency	Percent %
6.5-8.5	13	56.5
8.6-10.6	6	26.1
10.7-13.8	4	17.4
Total	23	100.0

P value < 0.05

4. DISCUSSION

Candidiasis is one of the most common oral fungal infections in healthy individuals or immunocompromised patients such as those with DM [17] [18]. In current study 23(46.6%) of diabetic patients were infected with oral candidaisis. This agreed with other studies showed a various rate of oral candidiasis (40-92%) in patients with DM as Zomorodian *et al*., [19]. The results of present study showed that high percentage of infection were in aged patients (51-73 years) ($p<0.05$), while the low percent was in (19-34 years) ($p<0.05$), this statement disagreed with Zomorodian *et al*., [19] when he mentioned that there is no significant relationship between age and infection. Old aged patients are more susceptible for infection because of the different diseases that affect their immune system. As Rajana [20] stated that a better regulation of the DM leads to an improvement of these cellular functions. Furthermore, some microorganisms become more virulent in a high glucose environment. As showed in table 1.

According to gender, present study showed high rate of infection of *C. albicans* in females with diabetes mellitus. as clarified in table 2, (P value > 0.05). This result agreed with Zomorodian *et al*., [19] and Adriana *et al*., [21]. There was no significant relationship between gender and infection. This might be attributed to the hormonal changes which can affect the immune status of females.

To identify the relationship between blood sugar control and *Candida* infection, the HbA1c test was employed. Previous studies are inconsistent regarding the relationship between blood sugar level and *Candida* infection Yarahmadi *et al.*, [22]. Current study found a significant correlation between glycosylated hemoglobin and oral Candidiasis, this can be related to the fluctuated levels of HbA1c, it also appears in this study that it is high infection when it is moderate of HbA1c 6.5-8.5. Others found no clear relationship between HbA1c level and *Candida* infection with DM, Belazi *et al.*, [23]; Kumar *et al.*, [24]; Aitken-Saavedra *et al.*, [25]. Table 3 clarifies the percent of infection and HbA1c rates.

5. CONCLUSIONS

Oral candidiasis is a common complication in diabetes patients due to the interplay of high blood sugar, immune system impairment, and other factors. *Candida albicans* is the most dominant Candida spp that isolation from DM Patients. There is found a significant correlation between HbA1c levels, age of DM Patients and oral Candidiasis while There is not relationship between the gender of DM patients and oral Candidiasis. Effective management of blood sugar levels and good oral hygiene are crucial in preventing and treating this condition.

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