

## The Frequency of ABO Blood Groups among Patients with Denture Stomatitis

Sh. Abdollahzadeh\*, HR. Abdolsamadi\*\*, H. Mortazavi\*, M. Vahedi\*

\*Assistant Professor, Department of Oral Medicine, Faculty of Dentistry, Hamadan University of Medical Sciences, Hamadan, Iran

\*\*Associated Professor, Department of Oral Medicine, Faculty of Dentistry, Hamadan University of Medical Sciences, Hamadan, Iran

### ABSTRACT

**Statement of the problem:** Recent studies have shown a relation between some ABO blood types and increased susceptibility to fungal infections.

**Purpose:** The aim of this study was to determine the frequency of blood groups in patients with denture stomatitis.

**Materials and Methods:** In this descriptive cross-sectional study, diagnosis of denture stomatitis in 100 patients with complete denture, was made by direct clinical examination and confirmed by staining of samples. Blood groups were determined by direct agglutination method, using monoclonal antibodies against human A and B blood antigens. Data were analyzed by student t.test with  $p < 0/05$  as the limit of significance.

**Results:** Among 100 patients (53 males, 47 females) included in this study, the frequency of blood group O was (53%), group A (17%), group B (18%) and group AB (12%). The frequency of blood group O had the highest frequency in patients with Denture Stomatitis in comparison with other blood groups ( $p < 0.05$ ).

**Conclusion:** Blood group O might be considered as a predisposing factor for denture related candidiasis.

**Keywords:** Denture Stomatitis, Candidiasis, ABO blood groups.

### INTRODUCTION

Nowadays, the interrelation between ABO blood groups and susceptibility to infections has been excessively studied, but the results are not consistent.<sup>(1-4)</sup>

Kinane et al. reported that women with blood groups B and AB are more susceptible to urinary tract infections.<sup>(3)</sup>

Deresinski et al. have shown that blood group B is significantly associated with disseminated fungal infections.<sup>(1)</sup> Other studies, however, reported that blood type O is a risk factor for *Candida albicans* infections or its oral carriage.<sup>(5)</sup> The significance of this issue and one of the reasons for these discrepancies might be the difference in mechanisms of adherence of these organisms.<sup>(6)</sup> Many studies have shown that adhesion of candida

albicans is mediated by specific interactions with several sugar such as D-mannose, N-acetyl D glucosamine and L-fructose, which some of them are structural dominant sugars of ABO blood types.<sup>(7-10)</sup> However the relationship between ABO blood groups of denture wearers and their susceptibility to denture stomatitis has previously not been much evaluated. The aim of this study was investigation of interrelation between ABO blood groups and denture stomatitis as a common fungal infection in patients with complete denture.

### MATERIAL & METHODS

One hundred and eight patients with chronic atrophic candidiasis (Denture stomatitis) that have already worn complete denture for at least one year participated in this descriptive cross-sectional study. Patients with systemic diseases (such as Diabetes Mellitus,

**Corresponding Author:** M Vahedi Address: Department of Oral Medicine, Faculty of Dentistry, Hamadan University of Medical Sciences, Shahid Fahmideh Blv, Hamadan, Iran. Tel: +98 811 8354017-18 E-mail: Vahedi\_md@TUMS.ac.ir

immunosuppressive diseases, xerostomia and etc.), those taking antibiotic for more than 2 weeks, or hypoglycemic and hypertensive drugs, as well as tobacco and alcohol consumptions were excluded from the study. Likewise, patients with the age range between "50-65" years old were selected in this study just because increasing the age can increase the carrier state of Candida. Eight patients were excluded from the study according to the mentioned criteria.

The diagnosis of denture stomatitis was made on the basis of clinical examination and cytological smears. Samples were collected with swabs from the tissue surface of maxillary denture and the corresponding denture bearing palatal mucosa. Definitive diagnosis of candidiasis was made by periodic acid schiff staining of samples then observing the fungal hyphae under light

microscope. The informed consent was taken from all of the studied patients. Blood sampling was collected by lancet from the index finger of patients. ABO blood group identification was done by direct method, as the samples were exposed to monoclonal antibodies against A and B blood antigens (bioclone trademark,). Data were analyzed by SPSS package using student t- test with  $p < 0.05$  as the limit of significance.

**RESULTS**

One hundred patients with denture stomatitis were included in this study, 47 of which were male and 53 were female (Table1). It was revealed that the frequency of blood group O among patients with denture stomatitis was the highest comparison with the other blood groups ( $p < 0.05$ )(Fig.1).

**Table 1:** Blood group (bg) distribution among patients with denture stomatitis by sex.

	bg O n (%)	bg A n (%)	bg B n (%)	bg AB n (%)
<b>Female</b> (n=53)	27 (50.9)	11 (20.7)	11 (20.7)	4 (7.5)
<b>Male</b> (n=47)	26 (55.3)	6 (12.7)	7 (14.8)	8 (17)

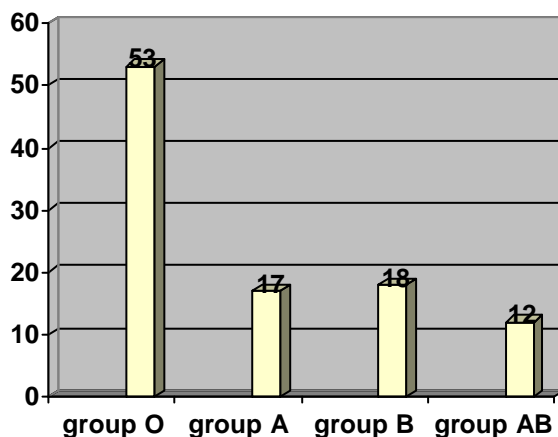


Fig.1: The frequency (%) of ABO blood groups among patients with denture stomatitis

**DISCUSSION**

Since one of the major etiologic factors of denture stomatitis is considered to be denture plaque accumulation or colonization of Candida on the denture surface,<sup>(11-16)</sup> adherence of Candida to inert surfaces or host cell surfaces is now recognized as an initial step in the successful colonization and

development of pathogenesis.<sup>(17,18)</sup> Reports have shown that Candida's adherence to the host surface is mediated mainly by specific adherence,<sup>(7,11,17,18)</sup> and several kinds of hexoses and hexosamines are identified as the receptor for Candida albicans, some of which are immunodominant sugars of blood types.<sup>(19,20)</sup> Furthermore, these

glycocompounds in body fluids such as saliva have been reported to enhance or inhibit the adherence of *Candida* to the host cell surfaces in vivo and in vitro.<sup>(21)</sup>

The adherence of *Candida* to acrylic resin surfaces or to solid surfaces is considered to be mediated mainly by a factor for denture stomatitis. Although many other etiologic factors such as microbial, allergic, nutrient, and systemic factors<sup>(12, 13, 24, 25)</sup> are involved in denture plaque accumulation and occurrence of denture stomatitis, our results may provide some information about the etiology and predisposing factors of denture stomatitis.

### CONCLUSION

The frequency of blood group O was the highest blood type among patients with denture stomatitis so it might be considered as a predisposing factor for denture related candidiasis.

### REFERENCES

1. Deresinski SC, Pappagianis D, Stevens DA. Associations of ABO blood group and outcome of candidal infection. *Sabouraudia* 1979;17:261-4.
2. Hogg SD, Embery G. Blood-group-reactive glycoprotein from human saliva interacts with lipoteichoic acid on the surface of streptococcus sanguis cells. *Arch Oral Biol* 1982;27:261-8.
3. Kinane DF, Blackwell CC, Brettell RP, Weir DM, Winstanley FP. ABO blood group, secretor state and susceptibility to recurrent urinary tract infection in women. *Br Med J* 1982;285:7-9.
4. Burford-mason AP, Weber JCP, Willoughby JMT. Oral carriage of *Candida albicans*, ABO blood group and secretor status in healthy subjects. *J Med Vet Mycol* 1988; 26:49-56.
5. Eun-seop SH, Sung-chang C.H, Young-Kuk. The relationship between oral candida carriage and the secretor status of blood group antigen in saliva. *Oral Surg Oral Pathol Oral Radiol Oral Endod* 2003; 96:48-53.
6. Aryeh B, Blumfield E, Szargel R. Oral candida carriage and blood group antigen secretor status. *Mycosis* 1995; 38:335-8.
7. Blackwell CC, Jonsdottir K, Hanson M. Non-Secretion of ABO antigen predisposing to infection by *Neisseria meningitidis* and *Streptococcus pneumoniae*. *Lancet* 1989; 2:284-5.
8. Sobel JD, Myers D, Kaye D, Levinson ME. Adherence of *Candida albicans* to human vaginal and buccal epithelial cells. *J Infect Dis* 1981; 143:76-82.
9. Sandin RF, Rogers AL, Patterson RJ, Beneke ES. Evidence for mannose-mediated adherence of *Candida albicans* to human buccal cell in vitro. *Infect Immun* 1982; 35:79-85.
10. Calderone R, Braun PH. Adherence and receptor relationship of *Candida albicans*. *Microbiol Rev* 1991;22:1-20.
11. Bendel C, Hostetter M. Distinct mechanism of epithelial adhesion for *Candida albicans* and *Candida tropicalis*. *J Clin Invest* 1993;192:840-49.
12. Davenport JC. The oral distribution of *Candida* in denture stomatitis. *Br Dent J* 1970; 129:151-6.
13. Budtz - Jorgensen E. The significance of *Candida albicans* in denture stomatitis. *Scand J Dent Res* 1974;82:151-90.
14. Lamey PJ, Darwazeh AM, Muirhead J. Chronic hyperplastic candidiasis and secretor. *J Oral Pathol Med* 1991; 20:46-67.
15. Olsen I. Denture stomatitis: Occurrence and distribution of fungi. *Acta Odontol Scand* 1974; 32:329-33.
16. Nikawa H, Hayashi S, Nidawa Y. Interaction between denture lining material, protein pellicles and *Candida albicans*. *Arch Oral Biol* 1993; 38:631-4.
17. Rotrosen D, Calderone RA, Edwards JE. Adherence of *Candida* species to host tissues and plastic surfaces. *Rev Infect Dis* 1986; 8:73-85.
18. Kennedy Mj. Adhesion and association mechanism of *Candida albicans*. *Curr Top Med Mycol* 1988; 2:73-9.
19. Kevin C, Hazen H. Participation of yeast cell surface hydrophobicity in adherence of *Candida albicans* to human epithelial cells. *Infect Immune* 1989;57:1894-99.
20. Kloltz SA, Drutz Dj, Zajic JE. Factors of governing adherence of *Candida* species to plastic surfaces. *Infect Immune* 1995; 50:97-101.
21. Minagi S, Miyake Y, Inagaki K, Tsuru H. Hydrophobic interaction in *Candida albicans* and *Candida tropicalis* adherence to various denture base resin materials. *Infect Immune* 1995; 47:11-4.
22. Miyake Y, Fujita Y, Minagi S. Surface hydrophobicity and adherence of *Candida* to acrylic surfaces. *Microbios* 1996; 46:7-17.
23. Nikawa H, Sadamori S, Hamada T. Non-Specific adherence of *Candida* species to surface-modified glass. *J Med Vet Mycol* 1996;27:296-71.
24. Olsen I, Birkeland JM. Initiation and aggravation of denture stomatitis by sucrose rinses. *Scand J Dent Res* 1976; 84:94-7.
25. Samaranyake LP. Nutritional factors and oral candidosis. *J Oral Pathol* 1986; 15:61-5