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Research Article

THE INTERRELATIONSHIP BETWEEN ABO BLOOD GROUP WITH PERIODONTAL DISEASE AMONG BANGALORE POPULATION: A CROSS-SECTIONAL STUDY

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A B S T R A C T

Aim: To identify the association between ABO blood group with periodontal disease among Bangalore population.
Material and Methodology: A total of 100 subjects aged between 25and 60 years were selected on random basis and were segregated into healthy and periodontitis group, based on probing depth and clinical attachment loss as criteria. Blood samples were collected to identify ABO blood group.
Statistical Analysis Used: Mann Whitney u test was used to compare oral hygiene index, probing depth and clinical attachment level among the healthy and periodontitis group. To compare the percentage and frequency distribution of A,B,AB and O blood group among healthy and periodontitis group Chi square test was used. 1 way ANOVA followed by tukey post hoc analysis was used to compare the mean values of OHI, PD and CAL between different blood groups among periodontitis group.
Result: There was statistically significant relationship between A and B, B and O, B and AB blood groups in terms of PPD and CAL. Subjects with O blood group were clinically healthy as compared to subjects with blood group B who were more susceptible to periodontitis.
Conclusion: There is an interrelationship between periodontal disease and ABO blood group among Bangalore population. B blood group patients were more susceptible to periodontitis as compared to other groups.

INTRODUCTION

Periodontitis is the most prevalent chronic inflammatory disease. It is correlated with genetic makeup and environmental influence. Host-related risk factors play an important role in the progression of periodontal disease.[1] Quality and quantity of the host response that is modulated by systemic disease controls the extent of disease. Systemic conditions and its role in the pathogenesis of periodontitis has become the main focus of research since the past few decades. A positive correlation between periodontal disease and systemic conditions, especially cardiovascular diseases such as myocardial infarction and atherosclerosis, respiratory infections such as chronic obstructive pulmonary diseases and pneumonia and diabetes is found through most of the studies. They act individually in an additive fashion or synergistically to contribute to periodontal disease.[3-5] Continued scientific exploration is required to determine which factors should be the primary target for the treatment of periodontitis and other complications.

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ABO blood type system comprises of four blood types: O, A, B and AB.

Investigations to relate blood group and dental diseases started in 1930. Various diseases are associated with the presence or absence of blood group antigens. The antigens of the ABO system are an integral part of the red cell membrane, which is also found in plasma and other body fluids. The presence or absence of certain antigens has been associated with various diseases and anomalies, with antigens also acting as receptors for infectious agents. Several studies have been carried out to investigate the relation between ABO blood group and incidence of disease in medicine. However according to review of literature, few investigations have been made to explore the relationship between ABO blood group and the incidence of dental and periodontal diseases.

The purpose of the present study was to compare the interrelationship between ABO Blood group with periodontal disease among males and females in Bangalore. The investigations in this research area will help in better understanding the risk factors of periodontal diseases. It also helps to predict the effective methods of prevention and treatment of periodontal diseases.

METERIAL AND METHODOLOGY

The present cross-sectional study examined 100 subjects aged between 25and 60 years. Subjects were selected from the patients who reported to the Department of Periodontology, Faculty of dental sciences, Ramaiah University of applied sciences, Bangalore on random basis. Study was approved by the ethical committee of Ramaiah University of applied sciences. Patients were informed about the procedure and written informed consent was taken from them. Subjects who met the following criteria were included

- Age ranging from 25 years to 60 years
- Subjects who had at least 20 teeth, excluding the third molars will be included in the study
- Subjects who had attachment loss and probing depth less than 3mm,no radiographic bone loss constituted Group 1 (Healthy)
- Subjects who exhibited at least one site attachment loss greater than 3 mm and periodontal pocket depth greater than 4 mm constituted Group 2 (Periodontitis)
- Following subjects were excluded
- Patients unable to perform routine oral hygiene
- Smokers
- Alcoholics
- Any previous history of antibiotic therapy
- Any periodontal treatment within 6 months prior to examination
- Subjects who were suffering from any systemic diseases or systemic conditions
- Pregnant women
- A complete oral examination was carried out using mouth mirror and UNC 15 periodontal probe. The Oral hygiene index-simplified (OHI-S index) was used to assess oral hygiene. Four sites were examined for each tooth (mesio-buccal, buccal, disto-buccal and palatal). Pocket depth and clinical attachment loss (CAL) were measured using UNC 15 periodontal probe. Subjects were divided into 2 groups. Group 1 had attachment loss and probing depth less than 3mm and no radiographic bone loss. Group 2 had at least one site attachment loss greater than 3 mm and periodontal pocket depth greater than 4 mm.

Investigations

Blood samples were collected using sterile disposable lancet and finger prick method. The blood grouping was done using slide agglutination method (visual method) after obtaining the consent form from each subject.

Statistical analysis

The study data was analyzed using SPSS [Statistical Package for Social Sciences] v.22 [IBM, Corp.,] for Windows.

Descriptive Statistics

Descriptive analysis includes frequency and percentage distribution of subjects with their ABO blood grouping and was tabulated in each group and with various grades of periodontal involvement.

Inferential Statistics

A non-parametric test, Chi-square test, was used to find the relationship between ABO Blood group with periodontal diseases. The level of significance was set at P<0.05.

RESULTS

Table 1 Comparison of study variables between healthy & periodontitis groups using Mann Whitney U test

Variables	Group	N	Mean	SD	S.E.M	Mean Diff	t	P-Value
OHI	Healthy Grp	37	0.59	0.21	0.03	-2.10	-8.340	<0.001*
	Periodontitis Grp	63	2.69	0.50	0.06			
PD	Healthy Grp	37	3.0	0.0	0.0	-3.08	-8.667	<0.001*
	Periodontitis Grp	63	6.1	1.0	0.1			
CAL	Healthy Grp	37	3.0	0.0	0.0	-3.19	-8.667	<0.001*
	Periodontitis Grp	63	6.2	1.0	0.1			

Table 1 shows a comparison of study variables between healthy and periodontitis group. Using Mann Whitney u test, there was significant difference in oral hygiene index, probing depth, clinical attachment level among healthy and periodontitis group.

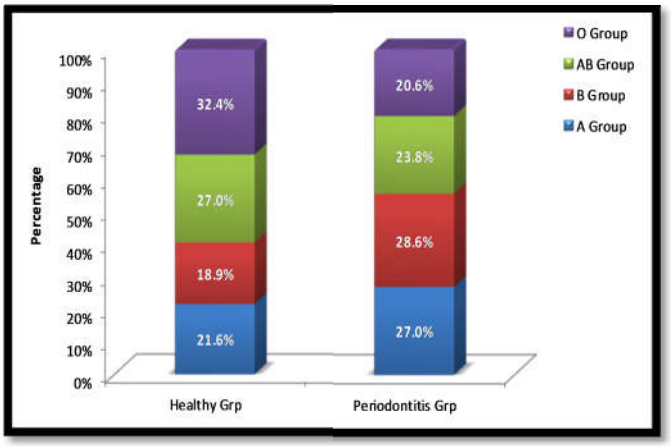

Figure 1 Comparison of percentage and frequency distribution among different blood groups between 2 study groups

According to figure 1, among the healthy group, 32.4% were of O blood group, 27% were of AB group, 18.9% were of B blood group, 21.6% were of A blood group. Among the periodontitis group, 2 0.6% were of O blood group, 23.8% were of AB blood group,28.6% were of B blood group, 27% were of A blood group.

Table 2 Comparison of Mean Values of study variables between different blood groups within Periodontitis group using One-way ANOVA test followed by Tukey's Post hoc Analysis

Variables	Blood Groups	N	Mean	SD	Std. Error	Min	Max	F	P-Value
OHI	A Group	17	2.60	0.43	0.10	2	4	1.688	0.18
	B Group	18	2.69	0.45	0.11	2	4		
	AB Group	15	2.92	0.70	0.18	2	5		
	O Group	13	2.55	0.32	0.09	2	3		
PD	A Group	17	5.6	0.5	0.1	5	6	8.676	<0.001*
	B Group	18	6.9	1.0	0.2	5	8		
	AB Group	15	6.0	1.0	0.3	5	8		
	O Group	13	5.7	0.6	0.2	5	7		
CAL	A Group	17	5.9	0.8	0.2	5	8	7.944	<0.001*
	B Group	18	7.0	0.9	0.2	5	8		
	AB Group	15	6.0	1.0	0.3	5	8		
	O Group	13	5.7	0.6	0.2	5	7		

Table 2 shows the comparison of Mean Values of study variables between different blood groups within Periodontitis group. Using Tukey's Post hoc test on multiple comparison of different blood groups and periodontitis, there was statistically significant relationship between A and B, B and O, B and AB blood groups in terms of probing pocket depth and clinical

attachment level. However, the difference was more apparent between blood group B and periodontal parameters.

DISCUSSION

Periodontal infections which include gingivitis and periodontitis if not treated will ultimately lead to tooth loss. Periodontal diseases are considered to be multifactorial. Even though microorganism is an essential factor, host-related factors are also needed for the progression of periodontal disease. Age, sex, oral hygiene habits, socio-economic status, genetic characteristics and smoking habits are all risk factors for periodontal disease.

Following are the Possible Mechanisms by Which Blood Group Can Be a Risk for Developing Periodontal Disease

1. According to Al Ghamdi, the ability of bacteria to attach to teeth surfaces is inhibited by the secretion of ABO antigens into saliva. Bacteria have surface lectins which are ABO specific and they use it to attach to tooth surfaces
2. According to Malena, bacteria have ABO specificity. With the change in host blood type, antibody titres to these specificities vary.
3. According to Singh, receptors for infectious agents are formed by the antigens of ABO system
4. According to Demir, there is difference in the rate of colonization of bacteria of various blood groups.

There is variation in the distribution of blood group among different races. Blood group A was seen more in Eskimos, blood group B in Chinese and Indians, blood group O in American and Canadian Indians and Czechoslovakian and those living in Kenia.

The antigens in the tissues correspond to the erythrocyte blood group, but the tissue expression is dependent on the secretor status of the individual. A factor influencing the development of systemic oral diseases in the stratified epithelium is the secretor status. The expression of histoblood group antigens depends on the level of cellular differentiation and maturation, and there is a sequential elongation of the terminal carbohydrate chain during the life span of the cell. Basal cells usually exhibit the short carbohydrate chains that are A/B precursors, whereas A or B antigens may be seen in the spinous cell layer. Variation in the differentiation patterns among keratinized against non-keratinized epithelium plays a vital role in the expression of blood group antigens. Keratinized squamous layer may express A or B antigens in only very a small number of highly differentiated cells, leaving the precursor H antigen expressed on spinous cells.

Only few studies were done to assess the relationship between periodontal disease and blood group. In our study we found that B blood group patients were more susceptible to periodontitis. This was in accordance with some previous studies done by Pai *et al*, Albandar JM, Kingman A, Roberts JA *et al*, Ghalyani-Esfahani P *et al*[1,7,11,20]. But it was in contrast to the studies done by Gawrzewska, Kaslick, Arowojolo, Demir *et al* [2,12,19,21].Gawrzewska concluded that greater severity of periodontal disease was seen in blood group O. Study by Kaslick *et al*[21] found that A and B blood group patients had more chance to be affected by periodontitis. No association between ABO blood group and periodontitis were found by Arowojolo *et al*[12]. Demir *et al*[2] found that gingivitis was seen more in patients with blood group A and periodontitis was more in patients with blood group O.These variations in their results may be because the study subjects were of higher socioeconomic status with awareness of oral hygiene habits and possibility of dental visits prior to the commencement of the study, while our study comprised randomly selected subjects of the age group 25-60 years and patients attending outpatient department of our college and these patients had no history of periodontal treatment in the past. It is very difficult to elaborate a hypothesis on why subjects with particular blood group are found in increased frequency in healthy, gingivitis, and periodontitis groups. However, occurrence of gingivitis and periodontitis is the result of many factors and the probable genetic influence demonstrates a small facet of multifactorial etiology of this disease.

Therefore people with this blood group should consider oral health to diminish the risk factors. No systematic review is conducted till date about the relationship between periodontal disease and blood group. Attempts in this regard will help in better understanding of the underlying mechanism.

CONCLUSIONS

There is an interrelationship between periodontal disease and ABO blood group among Bangalore population. B blood group patients were more susceptible to Periodontitis as compared to other groups. Further studies with larger sample size and in different geographical areas and populations need to be carried out.

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