

Original Article

ABO Blood Group- A tie up in Periodontal Disease

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ABSTRACT:

Aim & Objectives- The purpose of the present study is to evaluate and correlate periodontal disease severity with different blood groups. **Materials and method-** The study was conducted on 50 subjects based on periodontal condition, blood group, and medical history, who were randomly selected from individuals referred to the Periodontics, for periodontal treatment or for other reasons regarding dental health. The subjects were then divided into three groups as those with gingivitis, periodontitis, and the healthy ones.

Result- showed that higher percentage of B group patients were found in both gingivitis group and Periodontitis group, and significantly less with blood group O. **Conclusion-** study showed the definite relation between blood typing and periodontal disease. Further studies are required in order to validate the usage of blood groups as risk predictors for periodontitis.

Key words: ABO antigen, ABO blood group, Periodontal disease, Periodontitis.

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INTRODUCTION

Periodontal disease comprises a heterogeneous group of infectious disease that lead to pathologic destruction of the periodontium. This disease affects the gingiva and cause gingival inflammation and with involving the supporting fibers and bone, the tooth becomes loose and finally the tooth is lost (Page and Schroeder, 1976).¹

Although bacteria are the main cause of the inflammatory periodontal disease, there is increasing evidence that it is a chronic immune-inflammatory response associated with environmental influence, various host factors such as diabetes, smoking and genetic predisposition. It has been estimated that less than 20% of the variability in periodontal disease severity can be attributed to the quantity of specific bacteria seen in disease-associated plaque. Instead, a key role for genetic effects has been suggested.²

Landsteiner first described the existence of serologic differences between individuals, allowing him to classify people into one of four groups depending on whether their red cells contained Agglutinin 'A,' Agglutinin 'B,' neither A nor B (i.e., O) or both A and B (AB). This discovery led to a series of serologic, genetic and immunochemical studies that are still being researched upon till date.³

The discovery of ABO system and findings of red cell agglutination in serum and recognition of blood

groups laid the scientific basis for safe practice of blood transfusion. The other important blood systems are the Rhesus (Rh) and the MN system. ABO and Rh systems have major clinical significance and they are determined by the nature of different proteins present on the surface of red blood cells. 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.⁴ The presence or absence of certain antigens has been associated with various diseases and anomalies, with antigens also acting as receptors for infectious agents.

Roberts discussed the relationship between ABO blood group and susceptibility to chronic diseases as an example of genetic basis for family predisposition. Weber and Pastern first described the association between different types of blood group and periodontal disease in 1927. It was also noted that antigens of the ABO system can act as receptors for infectious agents.⁵

Weber and Pastern were the first to study the association of ABO blood group with periodontal disease, Kaslick *et al.* studied the association of aggressive periodontitis and ABO blood group. They found significantly less patients with blood group O and more patients with blood group B.

Koregol *et al.* in a study on 1220 subjects in South India concluded that blood group A formed a significantly higher percentage in the gingivitis group and blood group O formed a higher percentage in the periodontitis group.

The blood group AB showed the least percentage of periodontal diseases. The distribution of Rh factor in all groups showed a significantly higher distribution of Rh-positive.⁶

In spite of Bacterial Plaque is considered as the primary extrinsic etiologic factor for causing the periodontal diseases, even though various studies have been conducted to find out the relationship between ABO blood groups and the incidence of certain diseases in general, the dental research has still not focused on the correlation between the blood typing and periodontitis. Thus the purpose of this study is to assess whether there is a relationship between ABO blood groups and periodontal diseases by simple research methodology and evidence based analysis.

MATERIALS & METHODS

The study was conducted in the Outpatient Department of Periodontology Babu Banarasi Das college of Dental sciences, BBDU, Lucknow. The study comprises of 50 subjects, inclusive of both sexes, aged between 18-65 years, selected on a random base.

Following inclusion criteria was used-

1. Subjects with at least 20 teeth.
2. They should not have received periodontal treatment or antibiotic-related therapy for medical or dental reasons 3 months prior to the study.
3. Subjects with no systemic disease such as diabetes, leukemia, metabolic bone disease or epilepsy.
4. Non smokers and non-alcoholic subjects.
5. All participants had the history of tooth brushing at least once a day.

Subjects who met the above criteria were involved in the study after taking informed consent from them.

RESULTS

Table 1:

DISTRIBUTION OF STUDY SAMPLE			
Number of patients			
Group I (Healthy periodontium)	Group II (Gingivitis)	Group III (Periodontitis)	Total
12 (24%)	25 (50%)	13 (26%)	50

Table 2:

Blood Groups	Group I	Group II	Group III
A	3 (25%)	7 (28%)	3 (23%)
B	1 (8.3%)	10 (40%)	7 (54%)
AB	2 (16%)	5 (20%)	2 (15%)
O	5 (41.6%)	4 (16%)	1 (7.7%)

Distribution of blood group in population

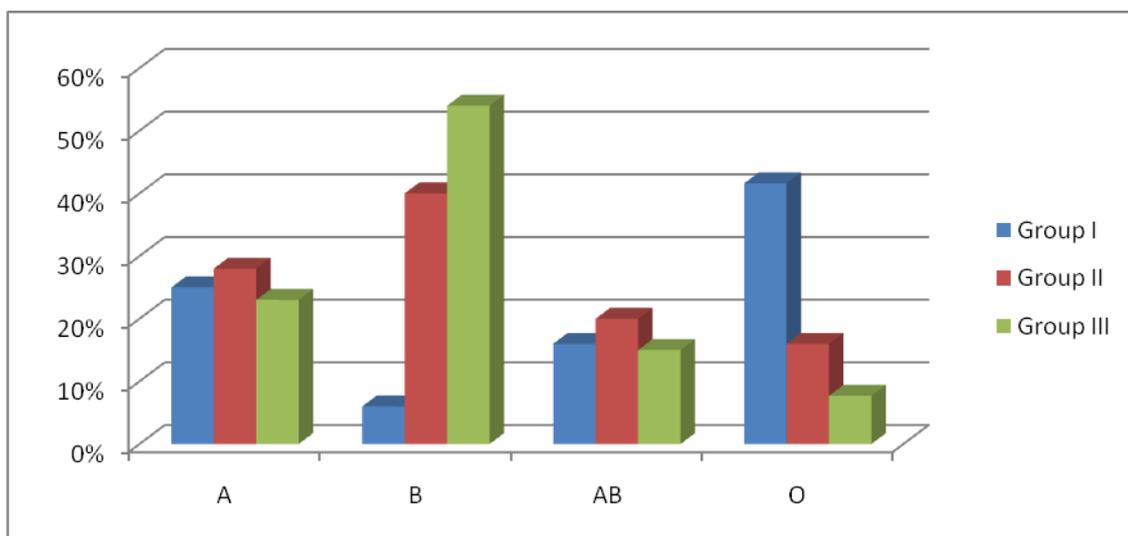
Blood group	No. Of patients	Percentage
A	13	26%
B	18	36%
AB	9	18%
O	10	20%

In this study, the patients fell into "Gingivitis" category if they had attachment loss less than 3 mm, pocket depth less than 3 mm, no radiographic bone loss together with signs of gingivitis such as gingival bleeding, erythematous enlargement of marginal and papillary gingiva, and changes in surface texture. On the other hand, the diagnostic criteria for periodontitis were at least one site of radiographic bone loss, attachment loss over 3 mm, and periodontal pocket depth more than 4 mm. Finally, those with attachment loss less than 3 mm, periodontal pockets depth less than 3 mm, no radiographic bone loss, and no signs of gingivitis were considered periodontally healthy.

Intraoral examination was carried out after the subject had been interviewed about their socioeconomic and behavioural background. Periodontal status was recorded using a dental mouth mirror and William's periodontal probe under artificial light. Subjects were examined for the presence of bacterial plaque, gingival bleeding, and signs of gingivitis, clinical attachment level, and probing pocket depth. According to index scores, subjects were divided into three groups: people with healthy gingiva (group I), Gingivitis (group II), and Periodontitis (group III). Finally, the type of blood group was obtained on the basis of patients' medical records. In cases with incomplete past medical history, they were referred to the pathobiologic laboratory for determination of ABO blood group.

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.



The results of our study concluded that the higher incidence of blood group O (41.6%) in subjects with healthy periodontium followed by blood group A (25%), AB (16.6%) and B (8.3%). Whereas blood group B (40%) showed higher incidence of gingivitis followed by blood group A (28%), AB (20%) and O (16%). The incidence of periodontitis was higher in group B (54%) followed by A (23%), AB (15%) and O (7.7%). **Table 2**

Results of blood samples surveyed showed that B blood group (36%) was most common in general population followed by blood group A (26%), O (20%) and AB (18%)

DISCUSSION

Periodontal diseases, including gingivitis and periodontitis, are serious infections that, if left untreated, may lead to loss of teeth. The principal cause of periodontal diseases is bacterial plaque. Poor oral hygiene and plaque were cited as the main etiology of periodontitis. However, with the increase in understanding the etiology of periodontitis, it was concluded that periodontal diseases are multifactorial. With advances in research it was understood that apart from the common etiological agents and environmental factors, certain unknown factors did play a role in the development of periodontal disease. Thus, the focus of determining the disease susceptibility changed to genetics. However, the studies investigating the relation between ABO blood grouping and periodontitis is limited.⁷

Possible mechanisms regarding the effects of ABO blood antigens in developing risk of periodontal disease are included as follows:-

a. According to Malena, the ABO specificity of different bacteria is well-established and antibody titers to those specificities vary with the host blood type. These data suggest that genetic factors may alter oral environment and the process of periodontal disease through limitations imposed by Landsteiner's law: Specific antibody secretion would be expected to be below or undetectable to antigens recognized as "self" and perhaps, more importantly, high to antigens recognized as "non-self." Experimentation is being conducted to further investigate this hypothesis.⁸

b. Al Ghamdi pointed out that the secretion of the ABO antigens into the saliva probably inhibits the ability of

bacteria to attach to teeth surfaces this is because many of these bacteria have surface lectins, which they use to attach to body surface and are often ABO specific.⁹

c. Singh demonstrated that the antigens of ABO system also acting as receptors for infectious agents. Furthermore, Demir found that various ABO blood groups might show differences in significant rates in the colonization number of bacteria that are the main etiologic agents of periodontal disease.¹⁰

In this study, it was determined that there was a relatively higher percentage of B blood group in patients with gingivitis and periodontitis and higher percentage of O blood group in patients with healthy periodontium. Similar study was conducted by Kaslick et al (1971)¹¹ documented that chronic gingivitis is significantly different in ABO blood grouping than the normal periodontium.

In other study Kaslick et al (1971)¹¹ reported that aggressive periodontitis is associated more in blood group-B, but significantly less with blood group-O. Similarly Kaslick et al (1980)¹² found that periodontitis patients were more likely to have A or B blood groups. Ali S T (2009)¹³ found significant relationships between ABO blood type and the severity of chronic periodontitis. Patients with group B were found to be at greater risk of developing more severe form of periodontitis.

Singh also demonstrated that blood group B (43.6%) had a higher incidence of gingivitis followed by A (26.5%), O (15.4%), and AB (12.4%). In addition, Pai showed a relatively high percentage of blood group B and A in moderate/severe gingivitis, while the distribution percentage of blood group O and AB was more in healthy/mild gingivitis.¹⁴

Contrary to our findings, Koregol concluded that blood group A had a significantly higher frequency in patients with gingivitis.¹⁵

The influence of ABO blood types on the risk of developing oral diseases has been the subject of discussion. Some authors claimed that, ABO blood types constituted an increased risk for the development of oral diseases whereas a small group of researchers failed to find this increased risk. Abo-mentioned studies provided preliminary data concerning the associations between ABO blood groups and periodontal diseases.

CONCLUSION

In this it is concluded that the higher incidence of blood group O in subjects with healthy periodontium. The higher incidence of blood group B in group II and group III indicate that these subjects may be more prone to periodontitis. These data are suggestive of a correlation between periodontal diseases and blood groups, which may act as risk predictors for periodontal diseases. However, long term studies on large sample size are needed to make a more comprehensive assessment of the effects of ABO group on periodontal diseases.

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