

BLOOD GROUPS : A PROBABLE LINK TO PERIODONTAL DISEASES

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ABSTRACT

The presence or absence of blood group antigens has been associated with various diseases, with antigens also acting as receptors for infectious agents. There is paucity of literature available in assessing the relative liability of blood group phenotypes to periodontal diseases. The objective of this study was to determine the association of the ABO blood group and Rhesus factor with periodontal disease to assess whether they can behave as predictors of periodontal diseases. The data was collected from randomly selected 100 individuals who were referred to the Department of Periodontics & Implantology, Mahatma Gandhi Dental College & Hospital, Jaipur for periodontal ailment management or for other reasons related to dental health. The subjects were categorized into three groups according to Russel's Periodontal index: healthy periodontium, gingivitis & periodontitis. Blood samples were collected to identify the ABO blood group and Rh factor by the slide method. The effect of blood subgroups on periodontal health, gingivitis and periodontitis was investigated separately. Results & Conclusion: More number of healthy subjects in blood group A. Gingivitis and periodontitis were found more in blood group O and blood group AB, respectively. Rh positive subjects had higher distribution in all study groups.

Key words: Periodontitis, Blood groups, Rhesus factor

INTRODUCTION

At the beginning of the century, Karl Landsteiner first explained the existence of serological differences between individuals, through which he classified people into one of the four groups depending on whether their red cells contained agglutininogen "A," agglutininogen "B," neither A nor B (O) or both A and B (AB).¹ 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.² The other important blood systems are the Rhesus (Rh) and the MN system. The ABO system and the Rh system are the most commonly used blood grouping systems. The antigens of the ABO blood typing system are an integral part of the red cell membrane, this is also found in

plasma and other body fluids. The Rh system is determined by the nature of different proteins present on the surface of erythrocytes.³ The presence or absence of certain antigens has been associated with various diseases and anomalies, with antigens also acting as receptors for infectious agents.¹

There is presence of A/B antigens on spinous cells in the nonkeratinized oral epithelium of blood group A and B persons. Blood group O persons who do not have the A and B gene-coded glycosyltransferase express a fucosylated variant (Ley) of the precursor structure.⁴

The relative liability of some blood group phenotypes to certain diseases has been investigated. Blood group A individuals have been reported to be more susceptible to gall stones, cholangitis and tumors of salivary glands, pancreas as

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well as ovary.⁵ Cardiovascular diseases are more common in blood groups A, O and non-O.⁷ Diabetes mellitus might be higher in subjects of blood groups A and O.

There is variety in blood typing according to races.⁶ Group B in Chinese and Indians, group A is widely distributed in Eskimos, the group O in American and Canadian Indians and Czechoslovakians.⁷ The rate of Rh+ve is reported to be about 85% in all the population.⁷

Although several studies have been carried out to investigate relationships between the ABO blood groups and the incidence of certain diseases in medicine, little investigation has been made to explore the relationships between ABO blood groups and the incidence of oral and dental diseases.⁷ The history of investigations regarding the relation between blood groups, Rhesus (Rh) factor and dental diseases goes back to 1930.⁸ Aitchison and Carmichael⁹ studied the distribution of blood groups within two groups, one of whom were the random patients attending the dental hospital and the other consisting of cases with rampant caries. Barros and Witkop¹⁰, on a large group of Chileans, found no association between the D.M.F scores for caries and ABO Blood groups.

Although bacterial plaque is considered the primary extrinsic etiologic agent in periodontal diseases,^{11,12} knowledge of the ABO blood groups of patients and their association, if any, with the severity of periodontal disease may be important in the development of early treatment strategies, and it would help to target non-responding areas to periodontal therapy of highly susceptible individuals.⁴

The aim of this study was to determine the association of the ABO blood groups and Rhesus factor with periodontal disease to assess whether they could be predictors of periodontal diseases.

MATERIAL AND METHODS

This was a cross-sectional study. The study design was reviewed and approved by the Ethical Committee of the Mahatma Gandhi University of Medical Sciences and Technology, Jaipur, Rajasthan, India. The subjects were selected from the Outpatient

Department of Periodontics at the Mahatma Gandhi Dental College and Hospital, Jaipur (Rajasthan). This study comprised of 100 subjects inclusive of both sexes (52 females, 48 males), aged between 18 and 63 years. The subjects were selected on basis of the following criteria:

1. All subjects had at least 20 teeth.
2. Patients had received no periodontal treatment or antibiotic-related therapy for medical or dental reasons 3 months prior to the study.
3. They had no history of systemic disease such as diabetes, leukemia, metabolic bone disease or epilepsy etc.
4. They were non smokers and non-alcoholic.
5. They had similar socio-economic status.
6. Clinical condition and periodontal scores¹³ (Table 1).

Clinical Condition	Periodontal Scores
Clinically normal supportive tissues	0.0-0.2
Simple gingivitis	0.3-0.9
Beginning of destructive periodontal disease	0.7-1.9
Established periodontal disease	1.6-5.0
Terminal disease	3.8-8.0

Table 1

A standard proforma consisting of details of each subject, such as name, age, sex, medical history, past history, dental history, oral hygiene habits and periodontal index and plaque index were used record the findings. The clinical oral examination was carried out after the subject had been interviewed on behaviour and socioeconomic background. Having been informed about the method and purpose of the study, the patients were asked for their consent to participation. Detailed oral examination was carried out using mouth mirror and explorer. All the clinical measurements were made on the basis of Russel's Periodontal index by using a manual periodontal probe (Williams' periodontal probe) on the gingival area adjacent to the teeth in each patient. The subjects were also examined clinically for the presence of plaque

(Turesky et al modified Quigley Hein Plaque index, 1970).

Based on periodontal index scoring, the study population was segregated into three groups:

- i. Group I = Healthy periodontium (Clinically normal supportive tissues)
- ii. Group II = Chronic gingivitis (Simple gingivitis)
- iii. Group III = Chronic periodontitis (beginning, established and terminal periodontal disease)

INVESTIGATIONS

After obtaining informed consent, blood samples were collected from each patient by a sterile finger prick with a disposable needle. The blood grouping and Rh factor investigation was carried out by slide method.¹⁴ The drop of blood taken was mixed with one of the anti-sera A, B, or D. To help avoid confusion, each of the anti-sera contained a different color dye, blue for Anti-A, yellow for anti-B, and clear for anti-D. Used separate drop of blood for each anti-sera, (Figure 1).

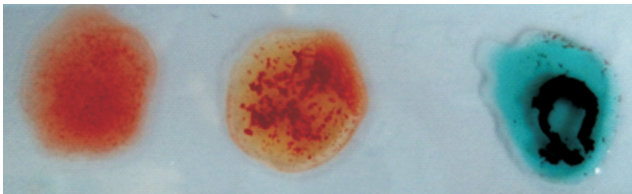


Figure 1: Slide Method used for blood Typing

RESULTS

A total of 100 subjects were examined, of which 36 were healthy, 30 were gingivitis and 34 were periodontitis patients (Table 4). Of the total subjects, 52 were female and 48 were male. Blood groups A, B, AB and O consisted of a total of 22, 45, 7 and 26 subjects, respectively, in each group (Table 2). A relatively high percentage (45.4%) of individuals with blood group A and a smaller percentage (14.2%) of blood group AB patients was observed in the healthy group. Blood group O was found to have the highest (42.3%) of subjects with gingivitis. Similarly, periodontitis subjects were the highest (57.14%) in blood group AB (Figure 2). On examination of the Rhesus factor 92%

subjects were found to be Rh +ve and 8% subjects were Rh-ve (Table 3 & 5).

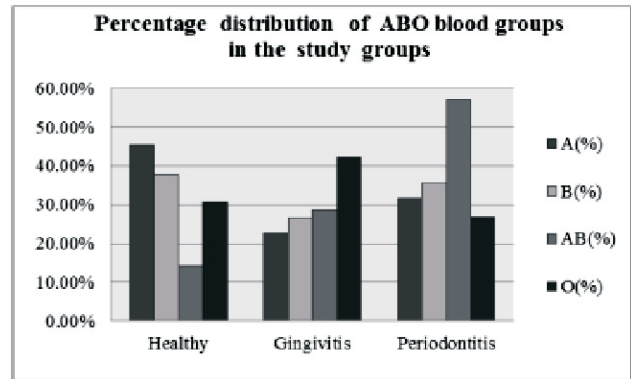


Figure 2: Percentage distribution of ABO blood groups in study groups

Table 2: Distribution of blood groups in study subjects

Blood group	Subjects	%
A	22	22%
B	45	45%
AB	7	7%
O	26	26%
Total	100	100%

Table: 3 Distribution of Rhesus factor in study subjects

Rh Factor	Subjects	%
Rh +ve	92	92%
Rh -ve	8	8%
Total	100	100%

Table 4: Distribution of study subjects in 3 groups

Groups	Subjects	%
Healthy	36	36%
Gingivitis	30	30%
Periodontitis	34	34%
Total	100	100%

Table 5: Percentage distribution of Rhesus factor in study groups

Groups (n)	Rh +ve (%)	Rh -ve (%)
Healthy (36)	33 (35.86%)	3 (37.5%)
Gingivitis (30)	27 (29.39%)	3 (37.5%)
Periodontitis (34)	32 (34.78%)	2 (25%)
Total (100)	92 (100%)	8 (100%)

DISCUSSION

The presence of microorganisms is crucial to the development of inflammatory periodontal disease, but host risk factors may play a role in its

progression. Genetic factors may act as a protective or risk factor. Scanty literature is available that explains the relationship between the ABO blood groups, Rhesus factor and periodontal diseases. It is known that both ABO blood groups and periodontal disease show variations in their proportion in different racial groups. In dentistry, Weber and Pastern (1927) were the first to study the association of various ABO blood groups with periodontal diseases.¹⁵ M.P.Singh et al. 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.¹⁶ Gawrzewska¹⁷ found that individuals with blood group O have greater severity of periodontal disease, whereas, individuals with blood group A have greater resistance to periodontal disease, these findings are similar to the results achieved in the present study as well.. Kaslick et al.¹⁸ found that periodontitis patients were more likely to have A or B blood groups. This finding by Kaslick et al. is also similar to the conclusion of the present study. Frias and Lopez¹⁹ concluded that there is no association between secretor status of ABO blood group and juvenile periodontitis.

CONCLUSION

Considering the results of this study it can be concluded that higher prevalence of gingivitis is found in blood group O. Significant prevalence of Periodontitis is observed in blood group AB. More number of healthy subjects are in Blood group A. Rh positive factor showed a higher distribution in all study groups. These data are suggestive of a correlation between blood groups and periodontal disease. This study is only indicative and a study with larger sample size needs to be conducted in order to reach more consolidated conclusion.

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