

Study The Relationship Between ABO Blood Groups And Gingivitis Disease

دراسة العلاقة بين فصائل الدم ABO ومرض التهاب اللثة

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الخلاصة:

الأهداف: تصميم هذه الدراسة لتحديد ما إذا كانت هناك علاقة بين أمراض اللثة وفصائل الدم ABO. **الطرق:** تم جمع البيانات من 129 شخص الذين تم اختيارهم بشكل عشوائي من الطلاب المشار إليهم في كلية طب الأسنان. اعتمدت هذه الدراسة على حالة اللثة، فصيلة الدم، والتاريخ الطبي. وقد تمت دراسة تأثيرات مجموعات الدم الفرعية على صحة اللثة، التهاب اللثة والتهابات اللثة بشكل منفصل.

النتائج: في هذه الدراسة، تم فصل جميع الحالات الأولى إلى مجموعات على أساس مؤشر Loe و Silness على النحو التالي: المجموعة الأولى (خفيفة) (ابتدائي) التهاب اللثة، المجموعة الثانية (معتدلة) (مبكر) التهاب اللثة، والمجموعة الثالثة (حادة) (الثابتة) التهاب اللثة، وقسمت إلى أربع درجات على أساس مؤشر Ramfjord في اللثة. وقد تم تحليل عينات الدم لتحديد فصيلة الدم وعامل Rh.

الاستنتاجات: مجموعات الدم الفرعية ABO وعامل Rh قد يشكلان عاملاً خطراً على تطوير التهاب اللثة. ومع ذلك، هناك حاجة لدراسات على المدى الطويل لإجراء تقييم أكثر شمولاً لتأثيرات مجموعة ABO على أمراض اللثة.

Abstract :

Objectives : Design this study to determine whether there was a relationship between gingival diseases and ABO blood groups .

Methods : Data were collected from 129 subjects who were randomly selected from students referred to the Faculty of Dentistry .The study based on periodontal condition, blood group, and medical history. The effects of blood subgroups on periodontal health, gingivitis and periodontitis were investigated separately.

Results : In the present study, all the cases were first segregated into groups based on Loe and Silness index as: group I (mild (initial) gingivitis), group II (moderate(early) gingivitis), and group III (sever (established) gingivitis), and were further divided into four grades based on Ramfjord's Periodontal Index. Blood samples were analyzed to determine blood group and Rhesus factor.

Conclusions : ABO blood subgroups and Rh factor may constitute a risk factor on the development of periodontal disease. However, long-term studies are needed to make a more comprehensive assessment of the effects of ABO group on periodontal diseases.

Keywords: ABO, Blood, Periodontal disease, Rh factor, Gingivitis.

INTRODUCTION :

The first human blood group, that is, the ABO system discovered by Landsteiner,⁽¹⁾ is the most commonly used blood system although many blood systems have been identified so far. 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. 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 and they are also found in plasma and other body fluids.

All human populations share the same blood systems, although they differ in the frequencies of specific types. The distribution patterns of ABO and Rh systems are complex around the world. Some variation may even occur in different areas within one small country.⁽³⁾ The blood group distribution also shows variety according to races.⁽⁴⁾

Gingivitis "inflammation of the gum tissue" is a non destructive periodontal disease.⁽⁵⁾ The most common form of gingivitis, and the most common form of periodontal disease overall, is in response to bacterial biofilms(also called plaque) adherent to tooth surfaces, termed plaque-induced gingivitis. In the absence of treatment, gingivitis may progress to periodontitis, which is a destructive form of periodontal disease.⁽⁶⁾

data indicates that periodontitis is always preceded by gingivitis.⁽⁷⁾ While in some sites or individuals gingivitis never progresses to periodontitis,⁽⁸⁾

As defined by the 1999 World Workshop in Clinical Periodontics, there are two primary categories of gingival diseases, each with numerous subgroups:⁽⁹⁾

1. Dental plaque-induced gingival diseases.
 1. Gingivitis associated with plaque only
 2. Gingival diseases modified by systemic factors
 3. Gingival diseases modified by medications
 4. Gingival diseases modified by malnutrition
2. Non-plaque-induced gingival lesions
 1. Gingival diseases of specific bacterial origin
 2. Gingival diseases of viral origin
 3. Gingival diseases of fungal origin
 4. Gingival diseases of genetic origin
 5. Gingival manifestations of systemic conditions
 6. Traumatic lesions
 7. Foreign body reactions
 8. Not otherwise specified

Because plaque-induced gingivitis is by far the most common form of gingival diseases, the following sections will deal primarily with this condition.

The etiology, or cause, of plaque-induced gingivitis is bacterial plaque, which acts to initiate the body's host response. This, in turn, can lead to destruction of the gingival tissues, which may progress to destruction of the periodontal attachment apparatus.⁽¹⁰⁾ The plaque accumulates in the small gaps between teeth, in the gingival grooves and in areas known as plaque traps: locations that serve to accumulate and maintain plaque. Examples of plaque traps include bulky and overhanging restorative margins, clasps of removable partial dentures and calculus (tartar) that forms on teeth. Although these accumulations may be tiny, the bacteria in them produce chemicals, such as degradative enzymes, and toxins, such as lipopolysaccharide (LPS, otherwise known as endotoxin) or lipoteichoic acid (LTA), that promote an inflammatory response in the gum tissue. This inflammation can cause an enlargement of the gingiva and subsequent formation.

Gingivitis can be prevented through regular oral hygiene that includes daily brushing and flossing.⁽¹¹⁾ Hydrogen peroxide, saline, alcohol or chlorhexidine mouth washes may also be employed. In a recent clinical study, the beneficial effect of hydrogen peroxide on gingivitis has been highlighted.⁽¹²⁾ Rigorous plaque control

programs along with periodontal scaling and curettage also have proved to be helpful, although according to the American Dental Association, periodontal scaling and root planing are considered as a treatment to periodontal disease, not as a preventive treatment for periodontal disease.⁽¹³⁾ In a 1997 review of effectiveness data the U.S. Food and Drug Administration (FDA) found clear evidence which showed that toothpaste containing triclosan was effective in preventing gingivitis.⁽¹⁴⁾

In many countries, such as the United States, mouthwashes containing chlorhexidine are available only by prescription.

Researchers analyzed government data on calcium consumption and periodontal disease indicators in nearly 13,000 U.S. adults. They found that men and women who had calcium intakes of fewer than 500 milligrams, or about half the recommended dietary allowance, were almost twice as likely to have gum disease, as measured by the loss of attachment of the gums from the teeth. The association was particularly evident for people in their 20s and 30s.⁽¹⁵⁾

Preventing gum disease may also benefit a healthy heart. According to physicians with The Institute for Good Medicine at the Pennsylvania Medical Society, good oral health can reduce risk of cardiac events. Poor oral health can lead to infections that can travel within the bloodstream.⁽¹⁶⁾

The aim of this study was to investigate whether there is a relationship between ABO blood groups and Rh factor with gingival inflammation diseases .

MATERIAL AND METHODS :

The present investigation was collected from 129 subjects, 59 male and 70 female, aged 20 to 23. Subjects were selected from students in the second stage of the Faculty of Dentistry in University of Kufa .Certain criteria were followed in order to bring forward ABO blood groups of individuals included in the research. It was demanded according to the selection criteria that:

1. All subjects had at least 28 teeth and had received no periodontal treatment or antibiotic-related therapy for medical or dental reasons 3 month prior to the study.
2. They had no history of systemic disease such as diabetes, leukemia, metabolic bone disease or epilepsy.
3. They were non smokers.

The subjects were examined clinically for the presence of plaque, gingival according to index scores, subjects were divided into three groups and such as explained with the table :

Table (1) : Stages of gingivitis.⁽¹⁷⁾

Clinical Findings	Collagen	Predominant Immune Cells	Junctional and Sulcular Epithelium	Blood Vessels	Time (Days)	Stage
Gingival fluid	Perivascular loss	*PMNs	Infiltrated by PMNs	Vascular	2 - 4	I. Initial Lesion
Flow				dilation , Vasculitis		
Erythema Bleeding on probing	Increased loss around infiltrate	Lymphocytes	Same as Stage I Rete peg formation	Vascular proliferation	4 – 7	II. Early Lesion
			Atrophic areas			
Changes in	Continued loss	Plasma cells	Same as Stage II but more advanced	Same as Stage II plus blood stasis	14 - 21	III. Established Lesion color, size, texture, etc

*PMNs, Polymorphonuclear neutrophils

Blood Analysis

Non-fasting venous blood was collected from each subject, and analyzed for determination of ABO blood group and Rh factor.

RESULTS :

Characteristics of the study population are shown in Table 2. The mean age of the study sample was 23 years (± 3). Females constituted about 54.26% of the study sample. About 41.86% of the study samples were group O, whereas only 7.75% were group AB. More than 90.70% of the population was Rh-positive, whereas only about 9.30% were Rh-negative. The data of a study performed in Kufa university, representing the distribution of the blood subgroups among the 2nd stage students of the dentistry college and involving 129 subjects, The observation established the homogeneity and unbiased nature of the study group as well as pointing to the natural distribution that is likely to exist in a population.

Table 2. Characteristics of the study sample.

Blood Group	N	(%)
A	28	21.71
B	37	28.68
AB	10	7.75
O	54	41.86
Rh Factor	N	(%)
Negative	12	9.30
Positive	117	90.70
Gender	N	(%)
Females	70	54.26

Males	59	45.74
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N = Number of Subject. % = Percentage.

Table 3. Relation between ABO Groups (Rh-Positive) and Stages of gingivitis.

ABO Groups	I %	II %	III %
A ⁺	9.40	9.40	1.71
B ⁺	13.68	10.26	2.56
AB ⁺	2.56	3.42	1.71
O ⁺	23.08	16.24	5.98

Table 4. Relation between ABO Groups (Rh-Negative) and Stages of gingivitis.

ABO Groups	I %	II %	III %
A ⁻	16.67	16.67	0.00
B ⁻	16.67	25.00	8.33
AB ⁻	8.33	0.00	0.00
O ⁻	8.33	0.00	0.00

DISCUSSION:

Periodontal diseases, including gingivitis and periodontitis, are serious infections that, if left untreated, may lead to tooth loss.⁽¹⁸⁾ The principal cause of periodontal diseases is bacterial plaque. However, a wide range of background factors such as age, sex, education, place of residence, oral hygiene habits, socio-economic status, genetic characteristics and smoking habits have been identified as risk factors for the occurrence of periodontal diseases.⁽¹⁸⁻²⁰⁾

The ABO blood group and Rh system distributions show marked variation around the world. Some variation may even occur in different areas within the same country⁽³⁾. It has been reported that the O blood type is most common in American and Canadian individuals, the B type in Chinese and Indian individuals, and the A type in Eskimos⁽²¹⁾. In Saudi population, it has been reported that the most common blood group was O (about 51% of the total sample) and the lowest was AB (about 4%)^(22,23). In this study, 41.86% (54 patients) of patients were of group O; 21.71% (28 patients) were of group A; 28.68% (37 patients) were of group B, and only 7.75% (10 patients) were of group AB.

About 85% of general population was Rh-positive. However, the prevalence varies in different countries (for example, 99% in India, 96% in Kenya, 93% in Saudi Arabia, and 90% in Iran)⁽²¹⁻²³⁾. In the present study, it was found that 90.7% (117 patients) of the study population were Rh-positive and only 9.3% (12 patients) were Rh-negative.

Only a few studies have investigated the relationship between ABO blood group and periodontal disease.

Gawrzewska⁽²⁴⁾ 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.

Kaslick et al.⁽²⁵⁾ found that periodontitis patients were more likely to have A or B blood groups.

Frias and Lopez⁽²⁶⁾ concluded that there is no association between secretor status of ABO blood group and juvenile periodontitis. However, Arowojolu et al⁽²⁷⁾ found that all juvenile periodontitis patients had either blood group B or AB and all were Rh-positive, whereas non-juvenile periodontitis patients included those with blood groups B or O who were Rh-positive or Rh- negative and those with blood group AB who were Rh-positive.

The sample sizes in the latter studies were small and the results cannot be generalized. In a recent study, Demir et al.⁽²⁸⁾ investigated the relationship between periodontal disease and ABO blood group. He found a higher percentage of blood type A in patients with gingivitis and a higher percentage of blood type O in patients with periodontitis.

CONCLUSIONS :

Consequently, significant relations were determined between ABO blood types and Rh Factor and gingivitis. Considering the results of our study, it can be concluded that ABO blood subgroups and Rh factor could constitute a risk factor on the development of periodontal disease. However, long-term studies are needed to make a more comprehensive assessment of the effects of ABO group on periodontal diseases.

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