

Relationship between ABO blood group and Rh factor with oral potentially malignant disorder

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Abstract

Introduction: Oral cancer is the most life threatening of all oral diseases. It has a prolonged natural history with oral potentially malignant disorders (OPMD) as the precursor. Recognition and diagnosis of OPMD will help in early treatment, patient survival and in reducing morbidity related to treatment of oral cancer. OPMDs has multifactorial etiologies and is significantly associated with risk factors of the individual's lifestyle, particularly, chronic use of tobacco, spicy food, alcohol and smoking. Genetic factors also play an important role in the etiology of OPMDs. It is proven by many studies like Dermatoglyphics, Salivary miRNA, micronuclei in buccal mucosa etc., one of such kind is ABO blood group and Rh factor. **OBJECTIVE:** Aim of our study is to evaluate if any of the ABO blood group and Rh factor is associated with an increased risk for OPMDs.

Methodology: A cross sectional study was conducted in Sri Rajiv Gandhi College of Dental Sciences included 55 patients with clinical and histopathologically proven OPMD's. Blood grouping was determined for all the patients using standardised agglutination method.

Result: This study showed that people with blood group B+ are 1.46 times at a greater risk to develop OPMDs.

Conclusion: Our study concludes that subjects with B+ blood group and habit of tobacco chewing and smoking are at higher risk to develop OPMDs than subjects with other blood groups.

Keywords: ABO blood group, oral potentially malignant disorders, Rh factor

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INTRODUCTION

The World Health Organization (WHO) defined the term, "Oral Potentially Malignant Disorders" (OPMDs) as the risk of malignancy being present in a lesion or condition either during the time of initial diagnosis or at a future date. Clinically, OPMDs appear as a white or red patch with or without symptoms. It includes oral submucous

fibrosis (OSMF), leukoplakia, erythroplakia, oral lichen planus, actinic cheilitis, some immunodeficiency and some inherited malignancies.^[1,2]

The first author to study the association of ABO blood group and malignancy was Dr. Alexander in 1921. Since

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then, many Indian authors carried out studies pertaining to this subject and their results showed an increased susceptibility of Blood Group A and oral cancer.^[2]

The reason to perform research to find this association is that ABO blood group antigens are expressed in RBCs, endothelial cells and in the oral epithelial cells. The A, B antigens are complex carbohydrate structures found on glycoproteins and glycolipids present on the surfaces of these cells. In OPMDs, there are changes in the cellular differentiation in these epithelial cells and hence bring about the changes in the blood group antigens.^[2,3] The predisposing factors and the etiologies of OPMDs are tobacco chewing, smoking, alcohol, chronic irritation and genetic predisposition.^[1,2]

To prevent OPMDs to convert into malignancy, recognition of the risk factors and etiologies at an early stage are the key. Certain blood groups may have more genetic susceptibility for oral cancer with habits or without having habits.^[2,4] This has to be explained to the patient along with stopping the habits and removal of chronic irritants. Hence, the aim of the present study is to analyze the association between ABO blood group, Rh factor and OPMDs.

METHODOLOGY

A cross-sectional study was conducted in Sri Rajiv Gandhi College of Dental Sciences and Hospital Bangalore in the Department of Oral Medicine and Radiology. A total of 55 patients who were clinically diagnosed with leukoplakia, OSMF and lichen planus were subjected to histopathological confirmation. Blood grouping was determined for all the patients using the standard agglutination method. Ninety patients with no OPMDs were included as controls and their blood grouping was determined. Data (age, sex and ABO with Rh factor) obtained were subjected to the SPSS software version 27, and the Chi-square test was done to find the relationship between ABO Rh blood group and OPMDs and also to find the strength of association between ABO Rh blood groups and OPMDs by their relative risk and odds ratio.

RESULTS

Out of 90 cases, 22 (24.4%) were female and 68 (75.6%)

were male. Among all the cases, 21 (23.3%) leukoplakia, 10 (11.1%) lichen planus and 59 (65.6%) OSMF had reported. Out of 21 leukoplakia cases, 19 were male and 2 female. In 10 cases of lichen planus, 4 males and 6 females and in 59 cases of OSMF, there were 45 males and 14 females.

Table 1 shows the distribution of ABO Rh blood group in cases and controls. Out of 90 OPMD patients, 26 (28.9%) A+, 38 (42.2%) B+, 2 (2.2%) B - and 24 (26.7%) O + . Among 90 participants of the control group, 21 (23.3%) A+, 1 (1.1%) A-, 30 (33.3%) B+, 2 (2.2%) B-, 10 (11.1%) AB+, 1 (1.1%) AB-, 24 (26.7%) O + and 1 (1.1%) O - .

When a comparison was made between blood groups and study participants (case and control groups), the Chi-square analysis established highly significant relationship ($P < 0.05$). W 2 also reveals the strength of association between ABO Rh blood groups and OPMD when assessed by their relative risk and Odds ratio. It was found that people with blood Group B+ had 1.46 times higher risk of developing OPMD. The relative risk for blood Group A+ was 1.24, followed by participants with blood Group B- and O- with relative risk of value 1.

DISCUSSION

The idea of finding the relation between human genetics and OPMD is quite interesting. The state of health and disease in humans can be better understood by exploring human genetics, in the present study an attempt was made to find out the relationship between ABO Blood groups and Rh factor with OPMDs.^[5]

In our study, males were more commonly affected than females. This shows OPMDs are more common in males as it is habit associated such as smoking, chewing tobacco and areca nut.^[2,6] Thus, identifying and treating the disease at earliest is important to increase the life expectancy. There are many other risks factors along with immunologic causes which influence the occurrence of OPMDs.^[7]

In the present study, the distribution of OPMDs was more in B+ Blood group followed by A+ and O+ Blood group. There was a statistically significant association between ABO Rh factor and OPMDs ($P < 0.05$). Among 90 participants of the control group, it was noticed that

Table 1: Distribution of ABO Rh blood group among cases and control

Subjects	A+ (%)	A- (%)	B+ (%)	B- (%)	AB+ (%)	AB- (%)	O+ (%)	O- (%)	Total (%)
Cases	26 (28.9)	0	38 (42.2)	2 (2.2)	0	0	24 (26.7)	0	90 (100)
Control	21 (23.3)	1 (1.1)	30 (33.3)	2 (2.2)	10 (11.1)	1 (1.1)	24 (26.7)	1 (1.1)	90 (100)
									100

Table 2: Chi-square analysis and odds ratio between ABO Rh and oral potentially malignant disorders

Blood groups	Relative risk	OR	95% CI (lower-upper)	P
A+	1.24	1.34	0.684-2.604	<0.05
B+	1.267	1.46	0.796-2.675	
B-	1	1	0.137-7.258	
O+	1	1	0.516-1.936	

**Highly significant. OR: Odds ratio, CI: Confidence interval

the distribution of B+ Blood group was more followed by O+ then A+ .

In a similar study done by Raghavan *et al.* revealed increased susceptibility of blood group A in oral cancer.^[5] A study by Dabelsten and Gao states that various types of cancer are more common in blood Group A and B in which they have not included Rh factor.^[8,9] According to the study done by Jyoti R Byakodi where they included Rh factors in association with OPMDs where their results were statistically insignificant.^[8,10,11] Our study showed significant association between B+ Blood group OPMDs. It also revealed strength of association between ABO Rh Blood group and OPMDs. It was found that people with Blood group B+ had 1.46 times higher risk of developing OPMDs followed by A+ was 1.24 followed by participants with B-and O+ with relative risk of value 1.

As we know that blood group antigens, along with RBC membranes also present on epithelial cells of various tissue including oral mucosa.^[7] In A and B blood groups, the precursor H antigen is converted to A and B antigens, so the protective effect is not seen. As a result, subject with A and B blood group is more susceptible to OPMDs as compared to O.^[11,12]

The relative risk and distribution of ABO Blood group with Rh factor in OPMDs have the strongest association with B+ Blood group. As racial and ethnic distribution of blood groups and size of sample place an important role in predicting OPMDs, we want to state that blood group with other risk factors should be kept in mind.

CONCLUSION

This study demonstrates that people with blood group B+ are 1.46 times at a greater risk to develop OPMDs, followed by those with blood group A+, B- and O+ . During community health programs, by employing simple blood tests we can educate the people with B + blood group who are having habits of chewing, smoking tobacco that they are more prone to develop OPMDs, as compared to other people with different blood groups.

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Conflicts of interest

There are no conflicts of interest.

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