

Prevalence of Oral Potentially Malignant Disorders and Oral Malignant Disorders among various Blood groups

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Abstract

Background: Blood is a body fluid that acts as a transport media, nutrient media, defense media etc. In recent times its diagnostic aspect has improved with the development of liquid biopsy in context to cancer. Establishment of blood group as a risk factor could be used in community programs for patient education to correlate with ill effects of tobacco, furthermore studies will be required to assess the susceptibility of cancer for a particular blood group.

Aim and Objective: To evaluate a correlation between blood groups and potentially malignant disorders & malignant disorders.

Material and Method: A cross-sectional study on 40 histopathologically confirmed cases of Potentially Malignant/ Malignant Disorder, ranging from 20-69 years of age was conducted. The subjects were divided into two groups Potentially Malignant Disorder (PMD) and Malignant Disorder (MD), which were further divided based on their blood groups as Group A, B, AB, and O. The data collected was tabulated and subjected to descriptive statistical analysis as well as Chi-square test.

Result: The overall results showed that in the PMD group, the highest no. of subjects of 10 (50%) belonged to 'B' blood group; whereas in the MD group, it belonged to 'O' blood group with 9 (45%) subjects. The overall prevalence of different blood groups in malignant and potentially malignant disorders was 2.15, 1.72, 1.15, and 0.93 for blood groups 'O', 'B', 'AB', and 'A', respectively and the *p*-value was 0.374.

Conclusion: In the rapidly evolving world, threat of cancer has risen, and the necessity to identify a risk factor can aid in early preventive measures to avoid the high mortality rate associated with the same.

Keywords: Blood group, Potentially malignant disorders, Malignant disorders, Rh factor.

Introduction

Oral cancers are the most common cancers throughout the world, ranking as one of the 10th most common cancers, and with an equal predominance in both the sexes. It accounts nearly 1/3rd of all the cancers in South East Asia, with the highest incidences in India. The incidence is estimated to be around 12.48 cases per 1,00,000 population in males and 5.52 per 1,00,000 populations in females. (1) The term "Potentially Malignant disorders" (PMDs) was defined by World Health Organization (WHO) as the risk of malignancy being present in a lesion or condition either during the time of initial diagnosis or at a future date, and classified the same into two categories a) precancerous lesion, a benign lesion with morphologically altered tissue, which has a greater than normal risk of transforming into malignancy; b) precancerous condition, a disease or patients habit that does not necessarily alter the clinical appearance of local tissues but is associated with a greater than normal risk of precancerous lesion or cancer development in that tissue.(2,3) There is an alarming increase in the prevalence of oral PMDs and Malignant

disorders/ lesions in India (4), which may be due to the varying lifestyle, culture, ethnic, low socio-economic status, geographic factors, (5) but its genetic relation is not yet clear. Blood group plays an important role in the immunogenetic system and is regarded as the most important determinant for transfusion reactions and organ transplantation. The ABO blood type system comprises 4 blood groups: O, A, B, and AB. (6) In humans, the blood group antigens are present on the surface of red blood cells and also on various epithelial cells. It has been seen that changes in blood group antigens are an important aspect of human tumors as they are derived from the epithelial cells. (7) After the discovery of an association between stomach cancer and blood group "A" by Arid and Bentall (1953), there have been several studies on possible relationship between blood groups and certain diseases. (7-9) Very few studies have been done in India to see the association between blood group and potentially malignant disorders and/ malignant disorders. (10) Therefore, the present study was undertaken to find the correlation between blood groups and potentially malignant disorders and malignant disorders.

Material & Method

A cross-sectional study was conducted in the Department which included 40 subjects, both male and females, ranging from 20-69 years of age. The study was approved by the Institutional ethical committee of Teerthankar Mahaveer Dental College and Research Center under Teerthankar Mahaveer University, Moradabad.

The patients with histopathological diagnosis of potentially malignant disorders and malignant lesions were only included in the study, and an informed consent was also obtained from all the included subjects.

The subjects who were not willing to give their blood sample for estimation of blood group were excluded.

A special performa was designed for recording data pertaining to age, sex, socio-demographic factors, clinical findings of oral mucosa and determinations of ABO Rh blood group. The screening was based on thorough case history followed by clinical examination and the histopathological examination of the subjects. The subjects with confirmed histopathological diagnosis of potentially malignant disorder/ malignant lesion were then grouped under two sub-groups i.e., Potentially Malignant Disorder (PMD) and Malignant Disorder (MD).

All the study participants were subjected to blood group testing, using blood group kit (Mediclone Biotech Pvt ltd, Perungudi, Chennai, India), which contained antiserum A, antiserum B and antiserum D, and based on the presence of agglutinin, the blood groups were detected as Group: A, B, AB and O.

The data obtained was tabulated, and subjected to Descriptive statistics to summarize the data and chi square test to find the association between ABO Rh blood group and oral potentially malignant disorders.

Results

A total of 40 subjects were analyzed in the study, and the frequencies/prevalence of blood groups among the two studied groups were analyzed (Table 1). In the PMD group, the highest no. of subjects of 10 (50%) belonged to 'B' blood group than 'O', 'A', and 'AB' blood group with a frequency of 7 (35%), 2 (10%), and 1 (5%), respectively. On the other hand, in the MD group, the highest number was 9 (45%), which belonged to 'O' blood group than 'B', 'A', and 'AB' group in a frequency of 5 (25%), 3 (15%), and 3 (15%), respectively (Graph 1).

Pearson Chi-Square test was used to evaluate the correlation between the Potentially malignant and Malignant disorders group with the different Blood groups. The p-value of Pearson's Chi Square test indicates no significant correlation between the studied groups (Table 2).

The overall prevalence of different blood groups in malignant and potentially malignant disorders, calculated on the basis of total patients attending monthly to the OPD of the institute was 2.15, 1.72, 1.15, and 0.93 for blood groups 'O', 'B', 'AB', and 'A', respectively (Graph 2).

Out of the total patients, the prevalence of Malignant and/Potentially malignant disorders was higher in males than females with a ratio of 19:1 (Table 3). On comparison of the age distribution the higher no. of subjects of 7 (35%) belonged to the age group 20-29 than 30-39, 40-49, 50-59, and 60-69 groups with 6 (30%), 6 (30%), 1 (5%), and 0 (0%) frequencies respectively in the PMD group; whereas, on the other-hand in the MD group, the highest frequency belonged to the age group 40-49 than 30-39, 50-59, 60-69, and 20-29 group with frequencies of 8 (40%), 1 (5%), 1 (5%), and 0 (0%) respectively (Table 3).

A frequency of 38 (97.5%) Rh +ve factor is seen associated with the studied groups (PMD and MD), with only 1(5%) and 0 (0%) subjects belonging to the Rh -ve group of MD and PMD groups, respectively (Table 3).

Discussion

Oral cancers are the most common cancer, with the death rate among sufferers accelerating sharply. The research are been carried out to find a specific, reliable, and easily identifiable biomarker, which may differentiate cancer patients from healthy individuals and also to find out patients with precancerous lesions who have high risk of developing cancer (6). The studies

have also shown that many oral malignancies develop from the PMDs (2, 11, 12), and a lack of awareness about the signs and symptoms of PMDs may be responsible for the delayed diagnosis (2, 11). Therefore, correct diagnosis and timely treatment of PMDs may prevent the malignant transformation (11).

Blood group plays an important role in the immunogenetic system with ABO gene, present at the locus 9q34.2, is also a common region for genetic alteration in case of many cancers. Along with the fact that ABH antigen also expressed on the epithelial cells led the researchers to believe that there might be correlation between blood groups and various cancers (13-15). This led to various studies to establish a basic correlation between various cancers and blood groups.

In India, the prevalence of the oral PMDs and oral cancer is high with leukoplakia varying from 0.2-5.2%, erythroplakia 0.002% and oral submucous fibrosis varying from 0.16-3.2% (4), but very few studies have been done in India to see the association between blood group and potentially malignant disorders and/ malignant disorders (10). Therefore, the present study was undertaken.

Based on the study conducted by Greer *et al.* (16), a correlation was established between high prevalence of A blood group and pancreatic cancer. Similar results were observed in case of breast cancer (17) and oral cancer (18) in which higher prevalence of the same was associated with A blood group. But when overall prevalence of cancers were evaluated in different blood groups, blood group B showed a greater prevalence in case of oral squamous cell carcinoma (OSCC) followed by blood group A (19). According to study conducted by Bhateja S *et al.* (20) oral PMDs were seen to have a greater prevalence in blood group A but Blood

group B demonstrated higher prevalence in a study conducted by Byakodi *et al.* (21).

In the present study, a correlation between various blood groups and potentially malignant and malignant disorders was evaluated. A higher percentage of blood group B demonstrated PMDs which is coinciding with the study conducted by Byakodi *et al.* (21) but not with Bhateja S *et al.* (20). But the higher occurrence of malignant disorder in patients with blood group O is contradictory to previous results which depict that non O blood group show higher prevalence to malignant disorders (OSCC) (22).

The results of the present study showed that cases with B +ve followed by O +ve blood group were more susceptible for the development of oral potentially malignant disorders, and the O +ve followed by B +ve blood group was found to be more susceptible for the development of oral malignant disorders.

Studies of the relative incidence of the ABO blood group in different disease entities have failed to provide a unifying and testable hypothesis as to the basis for the associations observed. It could be the result of population history, environment, diet, and customs (6). The present study draws some clues regarding the trends in oral cancer and precancer occurrence but, the results remain statistically insignificant due to the small sample size. So, large epidemiologic studies should be undertaken and, emphasis on the blood group type with other risk factors in oral precancerous and cancerous patients' needs to be considered together, so that the population at risk could be provided with preventive measures and/ an early diagnosis could lower the mortality rates due to cancer.

The Blood banks as well as Blood donation camps can be utilized as a platform wherein when the blood is collected and blood group is recorded, the donors with

susceptible blood groups can be counseled and regular cancer screening can be planned for such individuals.

Conclusion

The relative frequencies of the ABO blood groups in oral cancer and precancers have the strongest association with blood group “B” and “O”, but the racial and ethnic distribution of blood groups in India is an important factor for predicting the risk. So, to conclude there has been a correlation between blood groups and malignancies but in order to obtain a conclusive result in terms of correlation between blood groups and oral malignancies and oral premalignant disorders, further studies are required.

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Legend Tables

Table 1: Distribution of cases with malignant and potentially malignant disorders according to their blood groups.

GROUP	Blood Group A	Blood Group B	Blood Group AB	Blood Group O
Potentially Malignant Disorder (PMD)	2	10	1	7
Malignant Disorder (MD)	3	5	3	9

Table 2: Pearson chi-square test, likelihood ratio, and linear-by-linear association tabulation of Blood Group with Potentially malignant/Malignant disorders.

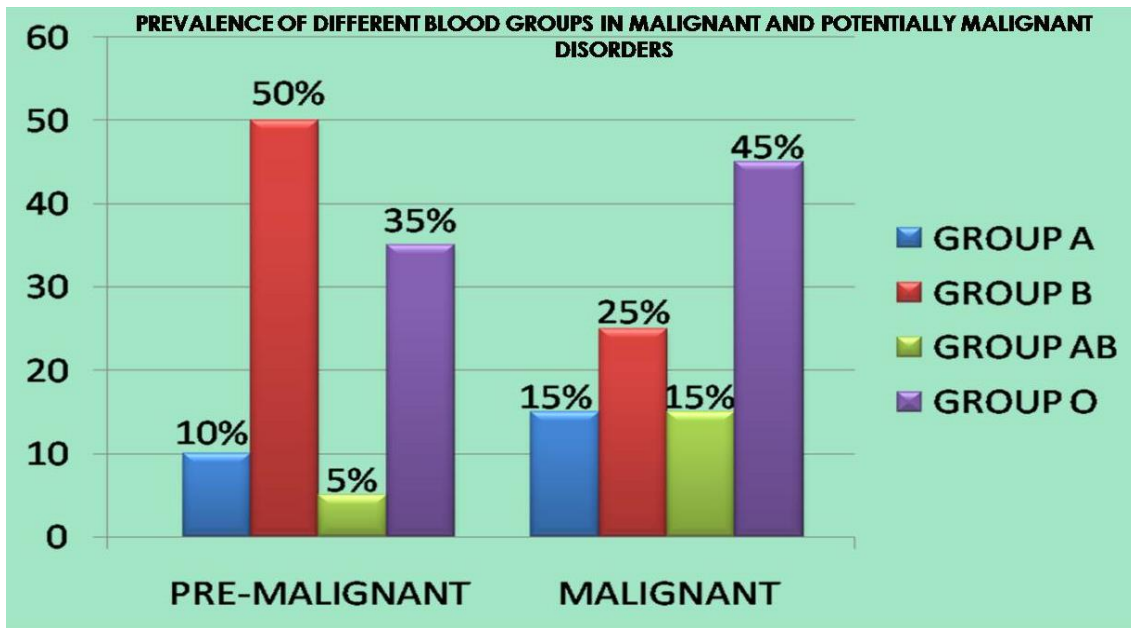
	Value	df	Asymp. Sig.(2-sided)
Pearson Chi-Square	3.117 ^a	3	<i>p</i> =0.374
Likelihood Ratio	3.197	3	.362
Linear-by-Linear Association	.871	1	.351
No. of Valid Cases	40		

df = degrees of freedom, *p*< 0.05 = Statistically significant. Chi-squared value 3.1 at three degrees of freedom. There is a no significant association between Blood Group and Potentially malignant/Malignant disorders.

Table 3: Distribution of cases with malignant and potentially malignant disorders according to their gender, age and Rh factor.

Group (N=20)	Gender		Age (In Years)					Rh Factor	
	Male (%)	Female (%)	20-29 (%)	30-39 (%)	40-49 (%)	50-59 (%)	60-69 (%)	Positive (+) (%)	Negative (-) (%)
Potentially Malignant Disorder (PMD)	18 (90%)	2 (10%)	7 (35%)	6 (30%)	6 (30%)	1 (5%)	0 (0%)	20 (100%)	0 (0%)
Malignant Disorder (MD)	20 (100%)	0 (0%)	0 (0%)	8 (40%)	10 (50%)	1 (5%)	1 (5%)	19 (95%)	1 (5%)

Graph 1: Prevalence of different blood groups in Malignant and Potentially malignant disorders.



Graph 2: Overall prevalence of different blood groups in malignant and potentially malignant disorders.

