

# ***RELATIONSHIP OF ABO BLOOD GROUP AND ORAL CANCER: A STUDY IN SELECTED GROUP OF INDIAN PATIENTS***

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## **INTRODUCTION**

The term “oral cancer” includes a diverse group of tumours arising from the oral cavity. Oral cancer has multifactorial aetiology and is associated with the risk factors of the individual’s lifestyle, particularly chronic use of tobacco, alcohol and smoking. In India and South East Asia, chronic use of betel quid (pan) and tobacco chewing in the mouth has been strongly associated with an increased risk for oral cancer<sup>[1]</sup>.

Cancer in all forms account for around 12% of the deaths throughout the world<sup>[2]</sup>. Oral cancers, more than 90% are squamous cell carcinomas, arise in the mucous membranes of the oral cavity and oropharynx. The estimated rate of oral cavity cancer was relatively large at 2.7 per 100,000 (3.7 in men and 1.8 in women) in 2012<sup>[3]</sup>. The proportion of oral cavity cancer was largest in South-Central Asia (48.7%). India has one third of oral cancer cases in the world<sup>[4]</sup>. Mortality rate for oral cancers in India is 7.2 per 1,00,000<sup>[5]</sup>, while the world mortality rate is 2.9 per 1,00,000<sup>[6]</sup>.

Since the discovery of an association between stomach cancer and blood group “A” by Arid and Bentall, there have been several studies on possible relationship between blood groups and certain diseases. ABO blood group has been proposed to influence the development of oral cancer; certain blood group are

considered more prone to develop malignancy. This is explained by the fact that blood group antigen, in addition to being present on red blood cell membranes, are also found on epithelial cells of various other tissues, including the oral mucosa<sup>[7]</sup>. H antigen is a blood group antigen present in all the individuals irrespective of blood group types. It is the precursor for the formation of A and B antigens. In people belonging to A and B blood groups, the precursor H antigen is converted to A and B antigens, respectively, whereas in O blood group individuals, it remains in its original form. People with O blood group have the highest amount of H antigen which affords protection against oral cancer. Hence, O blood group people are least susceptible to develop oral cancer<sup>[8]</sup>.

Various studies are being conducted to evaluate the association between ABO blood group and oral cancer<sup>[9,10,11]</sup>. Immunohistochemical analyses have demonstrated loss of expression of A or B antigens in more than 80% of patients with oral cancers. Similarly, potentially malignant lesions with epithelial dysplasia have also shown loss of expression of these antigens<sup>[10,11]</sup>. The present study was undertaken to assess the relationship between ABO blood groups and oral cancer, which might contribute to determine the susceptibility of an individual to oral cancer and assess the utility of ABO blood group as a preclinical marker.

## **MATERIALS AND METHOD**

### *STUDY POPULATION*

The present analytical study was conducted at Department of Otorhinolaryngology, VMMC and Safdarjung Hospital, New Delhi from January 2019 to June 2019. A total of 76 patients, who were histopathologically diagnosed of having oral cancer were taken into the study. Informed consent was taken and patients were explained about the study and were ensured about the confidentiality of the data. Blood typing was done for all the patients.

Control group of 90 blood donors who had no systemic illness were randomly selected from the blood bank. The blood type of control subjects was also recorded.

### *STATISTICAL TESTS*

Data were analysed using SPSS version 17 (SPSS Inc., IL, USA) via analytical (chi-square test) statistics. Level of significance was set at 0.05.

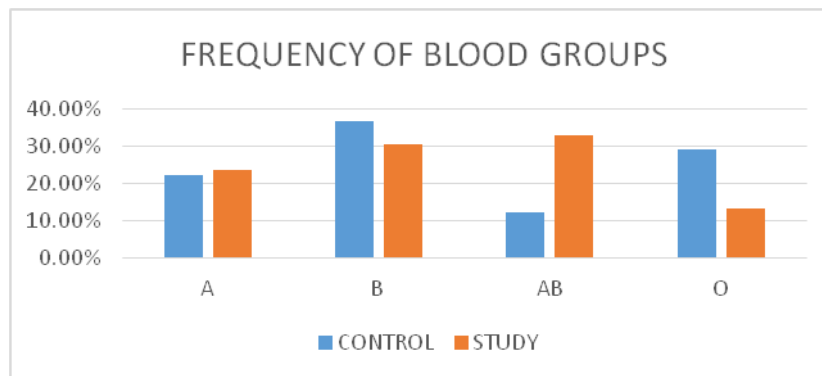
## **RESULTS**

76 patients with oral cancer were evaluated which include 58(76.3%) males and 18(23.7%) females,as shown in Table 1 and Figure 1.

Table 1: Frequency of blood groups among control and study group		
Blood groups	Control group N (%)	Study group N (%)
A	20(22.2)	18 (23.7%)
B	33(36.7)	23 (30.3%)
AB	11(12.2)	25 (32.9%)
O	26(28.9)	10 (13.1%)

Frequency of blood groups among control and study group were analysed in Table 1 and Fig.1

Figure 1



Most common blood group among oral cancer patients was AB blood type followed by B blood type as compared to B blood type followed by O blood type among healthy individuals.

The frequency of blood groups of controls with oral cancer patients revealed that the frequency of AB blood group was significantly higher in patients with oral cancer while the frequency of O blood group was lower among oral cancer patients compared to healthy controls.

Table 2 showed that oral cancer patients had a significantly higher frequency of 'AB' blood type (P=0.007) and the difference was statistically significant. It also showed that the frequency of 'O' blood group was lower among oral cancer patients and the result was statistically significant. However, the results were not statistically significant with other blood groups.

Table 2. 'P' value of blood groups

Blood Group	A	B	AB	O
Cases	18	23	25	10
Control	20	33	11	26
Total	38	53	34	41
P value	0.823	0.481	<b>0.0024</b>	<b>0.023</b>

## **DISCUSSION**

There are more than 20 blood group systems described in literature. ABO blood group system is most commonly used. ABO blood group antigens are genetically mapped to chromosome 9 which can get altered in many malignancies. Due to genetic changes of tumour, the loss or presence of blood group antigens can increase cell motility or facilitate the interaction between tumour cells and endothelial cells of distant organs<sup>[12, 13]</sup>.

Glycolipids or glycoproteins are found on cell membrane, which may undergo changes during cell maturation or malignant transformation as shown by some previous studies. In tumours, changes in glycosylation are found in both glycolipids and glycoproteins<sup>[14]</sup>.

Our study group included 76 patients, 58(76.3%) males and 18(23.7%) females. This study estimated the ABO blood group distribution in patients with oral cancer and showed that blood type AB was the most common (32.9%) among oral cancer patients. The frequency of blood type AB was significantly higher while the frequency of blood type O was significantly lower in oral cancer patients compared to controls.

Sharma et al<sup>[15]</sup> evaluated 82 patients with buccal cancer. Jaleel et al<sup>[2]</sup> studied 235 oral cancer patients (32% males, 68% females). They showed that females were significantly more affected than males. Gao et al<sup>[10]</sup> evaluated 24 OSCC patients (70% males and 30% females). Razavi et al<sup>[16]</sup> 55% of patients were males and 45% were females with a mean age of 52 years. Our results showed higher frequency of OSCC in males,

which was in agreement with the findings of Gao et al<sup>[10]</sup> and Razavi et al<sup>[16]</sup>. This finding may be due to higher frequency of cigarette smoking and tobacco chewing in males.

High incidence of some carcinomas has been reported in patients with A/B blood types, which may be due to high affinity of some microorganisms for these antigens, leading to development of malignancies<sup>[11]</sup>.

In our study, AB blood type was the most common (32.9%) blood type among oral cancer patients. The results showed that the frequency of blood type AB was significantly higher while the frequency of blood type O was significantly lower in oral cancer patients compared to controls. In the study by Sharma et al<sup>[15]</sup>, the frequency of blood type B was significantly higher among oral cancer patients. Jaleel et al<sup>[2]</sup> showed a significant correlation between oral cancer and blood type A. Mortazavi et al<sup>[17]</sup> demonstrated that oral cancer patients had significantly lower frequency of blood type O and higher frequency of blood type B compared to the control group. Other studies<sup>[18, 19]</sup> showed that patients with A and B antigen had more frequency of oral cancer compared to control group. Our findings were similar to Mortazavi et al<sup>[17]</sup> as lower frequency of O blood type was found among oral cancer patients. Our study showed increased incidence of oral cancer in patients with A and B blood group antigen which was also consistent with the previous studies.

This study tells about the susceptibility of different blood groups specifically for oral cancers. Hence regular cancer screening for patients of susceptible blood groups should be advised and patient can be encouraged to quit tobacco smoking or betel-nut chewing.

## **CONCLUSION**

The presence of A and B antigens on cells may increase the risk of oral cancer as per our study, while blood group O had a significantly lower and blood group AB had a significantly higher frequency among oral cancer patients in our study compared to controls.

As studies indicate the susceptibility of A and B antigens to the development of oral cancer, early and regular cancer screening has to be advised to patients of susceptible blood group. Blood donation camps can be utilised as platforms wherein patients can be counselled for regular screening of oral cancers.

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