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Correlation between ABO Blood Group, Age, Gender and Site Predominance in Patients with Oral Squamous Cell Carcinoma: An Institutional Study

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Abstract

Introduction: Oral cancer, one of the most common types of malignant neoplasms, poses a significant economic and clinical burden worldwide. According to data collected by the Global Cancer Observatory (GCO), there were 377,713 cases of Oral Squamous Cell Carcinoma (OSCC) worldwide in 2020, with the majority occurring in Asia. OSCC affects more males than females, with middle-aged to elderly men being the most susceptible. More than a century ago, Karl Landsteiner first described ABO blood group system. Since then as many as 36 blood group systems have been recognized. The association between ABO blood groups and malignancy was first explored in 1921 by Alexander. In India, studies done by Gilmiyarova et al., Mittal and Gupta, Ewald and Sumner, and Baruah and Gogoi have shown that individuals with blood Group A have predisposition for oral cancer.

Aim: The aim of this study was to determine the prevalence of ABO blood group, age, gender & site predominance in oral squamous cell carcinoma (OSCC) patients and to evaluate the relationship between ABO

blood group with OSCC patients age, gender and site predominance.

Materials and Methods: This institutional based descriptive, analytical study evaluated 30 patients who reported to us with oral lesions. Histopathologically confirmed cases of OSCC were included in study. The study was conducted after approval from the of institutional Ethical committee. Informed consent was obtained from all patients.

Results: A total of 30 patients with OSSC were evaluated in which 26 were males (86.7%) and 04 were females patients (13.3%). The mean age of patient was 45.8years (30 years to 60 years). Tongue was most commonly involved site observed and A+ve blood group types was most commonly affected. Data was analyzed using analytical or descriptive statistics (IBM SPSS Version 21).

Conclusion: Patient with Blood group A+ve were found to have a greater tendency to develop OSCC while blood group O has the least. The most common age group of oral cancer was 51–60 years with male predominance. Hence, by employing simple blood grouping test during community field programs, public health program must be undertaken for the prevention of oral cancer and a multidisciplinary approach should be followed in early diagnosis of OSCC.

Keywords: OSCC, ABO Blood Group, Gender, Site, Prevention, Diagnosis.

Introduction

Oral cancer, one of the most common types of malignant neoplasms, poses a significant economic and clinical burden worldwide[1]. Approximately 377,713 cases of oral squamous cell carcinoma (OSCC) worldwide collected by the Global Cancer Observatory (GCO) in 2020, with the majority occurring in Asia. OSCC affects more males than females, with middle-aged to elderly men being the most susceptible[2]. There are noticeable geographic disparities in the incidence of oral cavity squamous cell carcinoma (OSCC) with approximately two thirds of the cases occurring in the developing.[3] OSCC is the most common form of cancer in oral cavity because it is frequently exposed to many carcinogenic agents such as tobacco, alcohol, betel nut, and virus (human papilloma virus) which serve as major etiological factors. About 75% of all OSCCs are attributable to tobacco use and alcohol consumption with recent rise in cases of HPV. The dietary deficiencies, poor oral hygiene, genetics, and lower socioeconomic strata of society also contribute to the development of OSCC[4].

More than a century ago, ABO blood group system was first described by “Karl Landsteiner”. Since then, up to 36 blood group systems have been identified[5]. The correlation between ABO blood groups and malignancy was initially investigated by Alexander in 1921. In India, studies done by Gilmiyarova et al., Mittal and Gupta, Ewald and Sumner, and Baruah and Gogoi have shown that individuals with blood Group A have predisposition for oral cancer[4]. According to the reports of the World Health Organization, oral cancer ranks sixth among all malignancies in the world[6]. Incidence rate is 12.8% men and 7% women. In oral cavity, tongue and buccal mucosa have been noted to be quiet common sites in India[4].

Thus, the knowledge of the varied presentations of OSCC and an experienced eye can go a long way in decreasing the high morbidity and mortality associated with oral cancers. Various classifications have been proposed to categorize OSCC and treatment planning are given based upon them. Usually, chemotherapy, surgery,

and radiotherapy are the most common form of treatment given, and prognosis is dependent on age, gender, site, and histopathological grading[7].

The range of oral cancer presentation differs depending on the geographic area. With this background, the present study was planned with the rationale to assess the relationship between ABO blood groups, Age, Gender and site predominance for oral cancer, which might contribute to ascertain an individual's vulnerability to oral cancer and evaluate the effectiveness of using ABO blood group as a preclinical indicator.

Aims & Objectives

The aim of this study is to determine the prevalence of ABO blood group, age, gender and site predominance in oral squamous cell carcinoma (OSCC) patients

The objective of the study is to analyse the relationship between ABO blood group with patients age, gender and site predominance in OSCC.

Materials and Methods

Retrospective analytical institutional based study was conducted on 30 histopathologically confirmed cases of OSCC who reported to our institute. The study was conducted after obtaining approval from Ethical committee of institute. Informed consent was obtained from all patients and Inclusion and exclusion criteria was made.

Inclusion criteria

- Age group (18-60 years)
- Histopathologically confirmed cases of OSCC.
- Patients who were willing to participate in study and provided informed consent.

Exclusion criteria

- All head and neck cancers other than oral cavity.
- Patients who refused to participate and didn't provide informed consent.

Results

A total of 30 histopathologically confirmed cases of OSSC were evaluated, in which 26 were males (86.7%) and 04 were females patients (13.3%). The mean age of patient was 45.8years (range 30 years to 60 years). Tongue was most commonly reported site of OSCC followed by buccal mucosa and gingiva (Fig1a,1b,1c). Blood group type A+ve was most commonly affected than other types. Most of the cases were reported in 50 to 60 years (40%) age group, followed by 36.6% in 41-50 years and 23.3% in 30 – 40 years age group (Graph-1). Most of the OSCC patient were reported in men about 26 cases (86.7%) and 4 cases in women representing 13.3% of cases (Graph-2). Tongue (46.6%) was most common site followed by buccal mucosa (40%)and gingiva (13.3%) (Graph-3). Blood group type A was the most common blood type (Graph-4).

Discussion

Oral cancer is considered to be the sixth most common cancer worldwide, with India having highest prevalence[8]. The good understanding of the risk factors and epidemiology of Oral Cancer can be helpful in early identification and prompt treatment of these patients. Early detection of oral cancer and prompt early therapy is needed for a better prognosis. Delayed detection and diagnosis of Oral Cancer are directly proportional to increased morbidity and mortality[9]. The male: female ratio (6.5:1) was reported higher than in most of other studies, except for a Greek populated-based study, where they found a ratio of 9.2:1[10].

The mean age recorded for Oral Cancer patients is 65 years according to US National cancer Institute[11]. In the present study, the most predominantly affected age group was 51–60 years, youngest of all Oral Cancer

patients reported was 32 years old, and the oldest was 59 years.

In a study conducted by Chattopadhyay[12] in Eastern India, the mean age for OSCC patients was 52.07 years which was almost same as 45.8 years as in the present study. Sankaranarayan found that the peak age frequency of occurrence of oral cancer in India was fifth decade of life, which is similar to average age reported in the present study[13].

The occurrence of OSCC differs widely according to various epidemiological studies. In this study, tongue (46.6%) were the most frequent site. A study in western Uttar Pradesh reported that the buccal mucosa was the most common oral cancer site, followed by retro molar area, floor of mouth, lateral border of tongue, and palate[14]. But in the present study, buccal mucosa (40%) was reported as the second most common site of oral cancer. The widespread consumption of chewable tobacco can be associated with the relatively frequent occurrence of buccal tissue involvement, given the presence of potentially precancerous mucosal lesions in the cheeks are also more common in South Central Asian countries, possibly related to the tobacco chewing habits[15]. The posterior lateral border of the tongue has the highest incidence of OSCC, accounting for an estimated 50% of all OSCC cases due to persistent exposure to various risk factors, including tobacco, alcohol, betel quid (BQ) and chronic irritation due to ill-fitting dental prosthesis[16].

Many researchers have studied the relationship between ABO blood groups and oral cancer[17]. More than twenty genetically determined blood group systems are known today, but ABO blood groups are sensitive than other blood grouping systems in detecting antigen responsible for cancers as ABO blood group genes are mapped at 9q34.2 region, in which genetic alteration is common in many cancers[18]. The present study clearly demonstrates that people having blood group A+ve were found to have a greater tendency to develop oral cancer while blood group O has the least. This phenomenon can be attributed to the presence of blood group antigens, which, aside from being present on the membranes of red blood cells, are also found on epithelial cells of various tissues including the oral mucosa. The relative down regulation of glycosyl transferase that is involved in the biosynthesis of A and B antigens as seen in association with tumour development[19]. Moreover, 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 into A and B antigens, respectively, whereas O+ve blood group individuals, it remains in its original form[20]. Hence, people with O blood group have the highest amount of H antigen which affords protection against oral cancer.

Our study encountered several limitations that warrant consideration. Firstly, the retrospective design, relying on records from a single hospital, may limit the generalizability of our findings to the broader community. Additionally, our study lacked a control group of healthy subjects, which would have provided a comparative baseline to better understand the specific risk factors and prevalence of oral cancer. We need more such studies to be done on a larger population and using multicentric approach in future.

Conclusion

Our study findings revealed a noteworthy association between blood group A+ve individuals and a heightened susceptibility to oral cancer, while individuals with

blood group O exhibited the lowest propensity. Additionally, our analysis indicated that the most prevalent age group affected by oral cancer was between 51 and 60 years, with males exhibiting a predominant incidence rate.

Given these significant findings, we advocate for the integration of simple blood grouping tests into community field programs as part of proactive public health initiatives aimed at oral cancer prevention. By leveraging the accessibility and simplicity of blood grouping tests, we can identify individuals at higher risk of developing oral cancer and provide targeted interventions, including education on lifestyle modifications and early screening.

Furthermore, we emphasize the importance of adopting a multidisciplinary approach in the early diagnosis of oral cancer. Collaboration between healthcare professionals from various specialties, including dentists, oncologists, pathologists, and primary care providers, is essential for timely detection, accurate diagnosis, and effective management of oral cancer cases.

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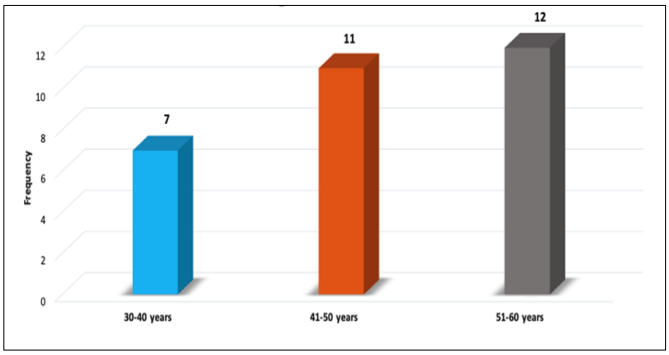
Legend Figures & Graphs

Figure 1(a, b, c) show the sites of lesion.

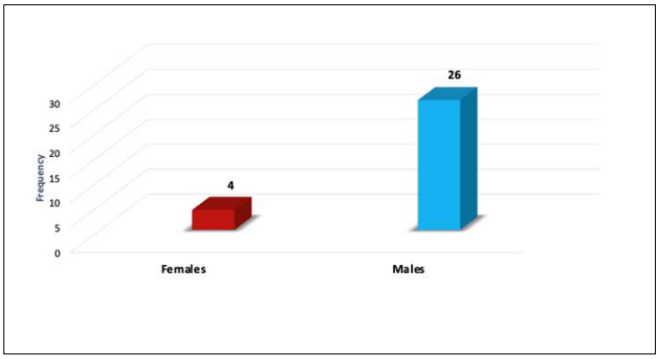
Figure 1 a:

Figure 1 b:

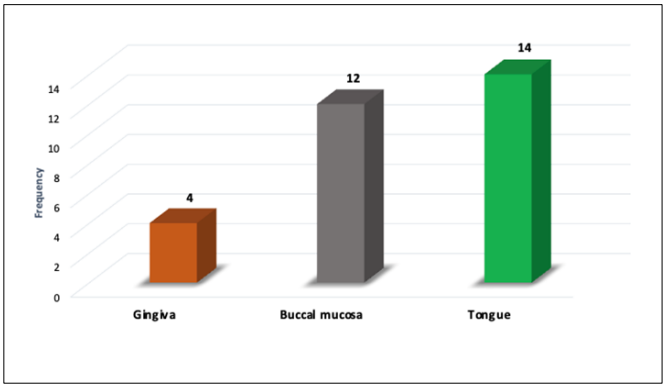
Figure 1 c:



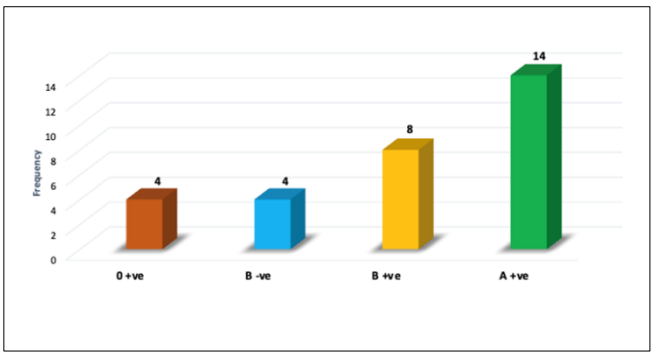
Graph 1: Age distribution of patients.



Graph 2: Gender specific distribution of OSCC



Graph 3: Frequency distribution of OSCC patients according to the locations of OSCC



Graph 4: Frequency distribution of OSCC in different blood group types