Original Research Article

ANALYSIS OF BLOOD GROUP PARAMETERS AS AN EARLY AND MINIMALLY INVASIVE METHOD FOR SUSCEPTIBILITY PREDICTION OF ORAL SQUAMOUS CELL CARCINOMA.

ABSTRACT

AIM: The purpose of this study was to evaluate the correlation between ABO blood grouping and oral squamous cell carcinoma and to stratify the patients in accordance with the susceptibility as noted.

MATERIALS AND METHODS: This retrospective study included the demographic data of the patients having reported to the Department of Oral and Maxillofacial Surgery, Yenepoya Dental College and hospital, and Department of Oncology, Yenepoya Medical college and Hospital, Mangalore, Karnataka between January 2017 to December 2021. A total of 161, histopathologically proven oral squamous cell carcinoma patients, between the above time frame of 5 years, were recruited and were analyzed for the study.

RESULTS: Patients with A Rh positive blood group had the maximum enrollment (80 patients out of 161) i.e. 49.6%, followed by an equal share of O Rh positive and B Rh positive with 31 each, i.e. 19.25% of each group. Only 8 patients had AB Rh positive blood group, followed by O Rh negative in 6 patients, A Rh negative in 3 patients, and least of B Rh blood group in only 2 patients.

CONCLUSION: Our study reflects that as simple as a blood group test, a routine and a regularly followed investigation, can help to sought and stratify the patients, with oral squamous cell carcinoma, who already are on a higher spectrum of falling under the radar of malignancy susceptibility.

Keywords : ORAL SQUAMOUS CELL CARCINOMA, PROGNOSIS, BLOOD GROUPING, PREDICALBILITY, BLOOD PARAMETERS

INTRODUCTION

Cancer, also referred to as a malignant neoplasm in medicine, is a group of disorders characterized by uncontrollable cell division and proliferation that can invade

neighboring organs and tissues[1]. It may even result in death of the individual if it has unavoidably advanced to the point where it cannot be adequately treated. Around 18% of fatalities worldwide are caused by cancer[2]. Oral cancer is the third-leading cause of death in India, with oral squamous cell carcinoma having maximum enrollments. According to estimates, India has between 1.5 to 2 million cancer cases at any given point of time. Data from population-based registries under National Cancer Registry Programme have well versed and documented that the leading sites of cancer are oral cavity as seen equally amongst men, as well to a lower extent in women[2][3]. The multifactorial aetiology of cancer has been linked to an increase in cancer-related morbidity and mortality, particularly lifestyle variables like smoking, drinking alcohol and eating spicy food for an extended period of time[4].

It is impossible to overstate the importance of genetics and inheritance in the aetiology of cancer in addition to these lifestyle factors. One such genetic factor that has been proposed as the cause of a number of chronic diseases is the ABO blood group[2][3][4]. Anderson et al. were the first researchers to examine the potential link between ABO blood groups and cancer. Since then, blood group O has consistently been linked to malignancies originating from the colon, uterus, ovary, pancreas, kidney, bladder, and cervix, whereas blood group A has been linked to a high prevalence of cancers including neurologic tumours and salivary gland-originating tumors.[3][4]. The 9q region, where genetic alterations are frequently found in malignancies, is where the ABO blood group genes are located.

With roughly 40% of all malignancies of the body and a vast population affected, oral cancers are one of the top causes of death in India[3][4].The genesis of oral cancer has been linked to genetic and hereditary influences in addition to lifestyle-related factors.One such genetic component that has been investigated for its potential link to oral cancer is the ABO blood group[2][3].According to research by Gupta et al. those with blood type A are more susceptible to get oral cancer[1][5].In patients with oral cancer, Hakomori et al. found that histo-blood group antigens A and B were less expressed[1].

We tried to ascertain the relationship between the ABO blood grouping and oral squamous cell carcinoma from the patients who had reported to our institute, taking into account the wide population, high genetic vulnerability, and considerable number of variations seen even across the same subtypes of populations and families.

This study would not only shed more light on genetic susceptibility and variability, but it would also undoubtedly pave the way for a more accurate and efficient screening procedure for patients who are already at a higher risk of developing oral cancer[2][3].

AIM AND OBJECTIVES

The aim of the current study was to evaluate the correlation between ABO blood grouping and oral squamous cell carcinoma, with the main objective of, stratifying the patients in accordance with the susceptibility as noted, after the results.

MATERIALS AND METHODS

After obtaining ethics and research committee approval, patients having visited Department of Oral and Maxillofacial Surgery, Yenepoya Dental College and hospital, and Department of Oncology, Yenepoya Medical college and hospital, Mangalore, Karnataka, between January 2017 to December 2021 for treatment of oral cancer were included in the study. Sampling method, chosen for this study was the simple random sampling method.

Patients with adequate demographic data available, and histopathologically proven cases of malignancies were included in the study, whereas, patients without adequate demographic data, histopathologically unproven cases of oral squamous cell carcinoma and malignancy apart from oral cancer were not enrolled up for this study.

STATISTICAL ANALYSIS

Descriptive Statistics**,** with mean and standard deviation for continuous variable and frequency and percentage for categorical variable were utilized. ANOVA, was utilized for comparing the different types of blood groups.

RESULTS

BLOOD GROUP	COUNT OF THE BLOOD GROUP(FRIQUENCY)	COUNT OF BLOOD GROUP(IN%)
A-	3	1.86%
A+	80	49.69%
AB+	8	4.97%
B-	2	1.24%
B+	31	19.25%
O-	6	3.73%
O+	31	19.25%
TOTAL	161	

TABLE 1: THE VARIOUS BLOOD GROUPS, WITH THE COUNTS IN NUMBERS AND PERCENTAGE AS NOTED.

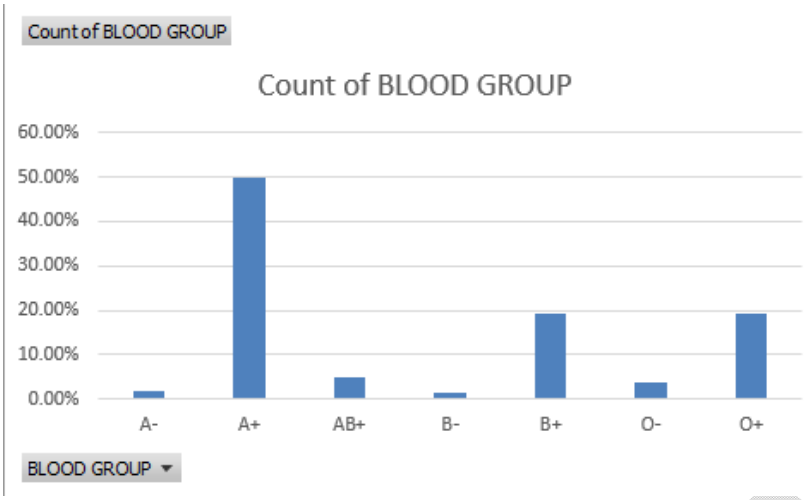

FIGURE 1: A BAR DIAGRAM, REPRESENTING THE COUNT OF INDIVIDUAL BLOOD GROUPS IN PERCENTAGE FORM.

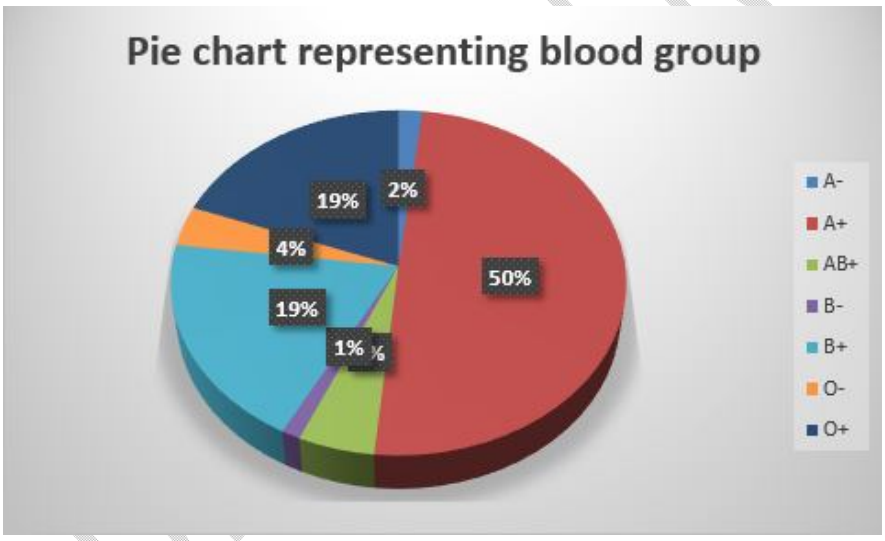

FIGURE 2: A PIE CHART, REPRESENTING THE COUNT OF INDIVIDUAL BLOOD GROUPS IN PERCENTAGE FORM.

A total of 161, histopathologically proven oral squamous cell carcinoma patients, between the time frame of 5 years, i.e., between January 2017 to December 2021 were recruited and were analyzed for the study.

Patients with A Rh positive blood group had the maximum enrollment (80 patients out of 161) i.e. 49.6%, followed by an equal share of O Rh positive and B Rh positive with 31 each, i.e. 19.25% of each group. Only 8 patients had AB Rh positive blood group(4.97%), followed by O Rh negative in 6 patients(3.73%), A Rh negative in 3 patients(1.86%), and least of B Rh blood group in only 2 patients(1.24%).

DISCUSSION

Blood group types A, B, and O were discovered in 1900 by Karl Landsteiner, and blood group AB was brought into light in 1902 by Pupils Von Decastallo and Sturli.[6]Blood group antigens, which are noted over the surface of red blood cells, along with various epithelial cells, are the chief alloantigens in humans. Literature has numerous documentations over the changes in the blood group antigens, as a part of the pathogenesis of the malignancies originating from epithelial cells[7][8][9]. According to the International Agency for Research on Cancer (IARC), the prevalence of cancer is rising, with the overwhelming burden over the economy along with the health services. Within the next 20 years, a 50% increase in cancer rates is anticipated. In India, oral cancer (OC) makes up roughly 40% of all cancers of the body, with squamous cell originating carcinomas, ranking at the top levels. [10][11]. Studies have shown increasing deaths due to pharyngeal and oral carcinoma as three to fourfold. The mortality rate in India is 7.2/100,000[12] while the world mortality rate is 2.9/100,000[13]in the running current scenarios. Early detection of these oral cancers would definitely incite to lowering both the morbidity as well as the mortality rates. In 1921, Alexander looked into whether there might be a link between certain ABO blood types and cancer. Later, Aird et al. showed in 1953 that there is a connection between blood group A and gastric carcinomas. Further investigations revealed the connection between OCs and ABO blood groupings in various places of the world.[14][15].

Alterations in the glycosylation of the proteins and lipids on the cell surface are frequently pin pointed as for the growth of tumour. These cell-surface glycoconjugates frequently contain carbohydrate structures linked to the Lewis and ABO blood group antigens in their peripheral region [2][3].The kind of epithelial differentiation, decides the fate of how histo-blood group antigens are expressed in normal human tissues. A reduction in the expression of histo-blood-group antigens A and B is a crucial occurrence, as noted in the majority of human carcinomas, including oral carcinomas. Though a definitive ground has not been laid upon as to why the alternations occur, but, with the formation of tumours, oral carcinomas exhibit a relative down-regulation of the glycosyltransferase that are involved in the production of both A and B antigens. The events leading to loss of A transferase activity are related, in some instances, to loss of heterozygosity (LOH) involving chromosome 9q34, which is the locus for the ABO gene, and in other cases, to a hyper methylation of the ABO gene promoter [8][9][16]. It is also of a possibility, that hyper methylation be a particular tumor-related event given that it only affects the ABO locus and not the other genes. However, as LOH or hyper methylation cannot account for all instances of lack of expression of A/B antigens, other regulatory mechanisms beyond the

ABO promoter may be functional in the transcriptional regulation of the ABO gene. Malignant oral tissues with altered blood group antigens may have enhanced cell migration[5][6].

One of the most prevalent cancers of the head and neck is oral squamous cell carcinoma (OSCC), which is known for having a high fatality rate. The long-term survival rate for individuals with OSCC is still less than 60%, despite the abundance of therapeutic options, surgical methods, and significant advancements in this field. In India, oral cancer makes up around 40% of all malignancies of the body, is a serious public health issue, and is increasingly becoming a fatal disease[3].The causes of oral cancer are multifaceted and as the genes have been linked to the formation and progression of oral cancer, numerous studies have shown that genetic variables also have an impact on the aetiology of cancer. The majority of oral cancer patients have been discovered to have mutations in the p53 gene[5][6].

A 1973 study by E. Dabelsteen and colleagues at the Department of Oral Pathology, Royal Dental College, Dental Department, University Hospital, Copenhagen, Denmark, examined the presence of blood group antigen A in tissues from 12 cases of oral squamous cell carcinoma, and positive findings were made[6].In a study conducted in 2014 by Khushboo Singh et al., 400 controls and 362 diagnosed cases of various head and neck cancers were chosen from four hospitals in New Delhi, India, to examine the relationship between ABO blood groups and the various types of head and neck cancers in the Indian population. Oral cancer patients showed maximum number in blood group O followed by B, A and AB[4]. At the Kidwai Memorial Institute of Oncology (KMIO), Bangalore, Bushranaaz et al. did a study in 2021 to determine which ABO blood groups are linked to an elevated risk for oral cancer. 235 oral cancer patients made up the study sample, and it was discovered that those with blood group A had a 1.46 times higher risk of developing the disease than those with other blood types[3].

We here sought to establish a link between the ABO blood grouping and oral cancer from the patients who had reported to our institute, keeping in mind the enormous population, large genetic susceptibility, and high amount of variances observed even among the same subtypes of populations and families.

Not only this study highlighted more onto the genetic susceptibility and variability, but surely paved onto a better and an effective screening process to the patients that are already on the higher end of oral cancer susceptibility.

CONCLUSION

In conclusion, our study reflects that as simple as a blood group test, a routine and a regularly followed investigation, can help to sought and stratify the patients, with oral malignancy, viz, oral squamous cell carcinoma, who already are on a higher spectrum of falling under the radar of malignancy susceptibility. A prospective in time study with active implication in mass screenings would, definitively bore promising patient education, motivation and awakenings.

Also, a nationwide, individual regional study would throw more light over the impact of genetic makeup of an individual and their susceptibility to the oral malignancies.

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