

THE FREQUENCY OF COMMON HISTOLOGICAL TYPES OF ORAL AND MAXILLOFACIAL MALIGNANCIES

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ABSTRACT

Malignant neoplasms of the oral and maxillofacial region are amongst the commonest malignancies reported worldwide with significant variation seen across continents. There is a dearth of publications regarding this topic from the Asian continent therefore a gap in knowledge exists regarding the most prevalent type of carcinomas and sarcomas in this region. The objective of this study was to determine the frequency of common types of oral and maxillofacial malignancies in patients presenting with malignant tumors. This descriptive study was carried out from July 2013 to April 2015. One hundred and forty six patients were included in this study who presented to the Department of Oral and Maxillofacial Surgery at Khyber College of Dentistry, Peshawar. Demographic data such as age, gender and data pertaining to frequency and histological type of malignancy were noted in a customized proforma. The diagnosis and type of malignancy were confirmed via histopathological examination of a biopsy specimen. There was a male predilection amongst patients presenting with oral and maxillofacial malignancies with a male to female ratio 2.1:1. The mean age of the sample was 52.37±17.16 years. Majority of the malignancies were diagnosed as carcinomas (86.9%). Amongst carcinomas, Squamous cell carcinoma was the most common (91.4%). Overall, the most common malignancy was squamous cell carcinoma (79.5%), whereas Burkitt's lymphoma was the most common sarcoma (52.6%). It was concluded that more male patients were affected with oral and maxillofacial malignancies. The 4th and 5th decades of life were the most common age group that presented with oral and maxillofacial malignancies. Carcinomas were more common than sarcomas in Khyber Pakhtunkhwa, Pakistan. The most common histologic type of carcinoma was squamous cell carcinoma and the most common type of sarcoma was Burkitt's lymphoma.

Key Words: Frequency, Squamous cell carcinoma, Maxillofacial malignancies.

INTRODUCTION

Malignant neoplasms of the oral and maxillofacial region constitute the sixth to eighth most common malignancy worldwide.^{1,2} Its epidemiology varies from continent to continent and different methods of its assessment have been used by several authors, thus making it difficult to establish standardized frequencies of its incidence.³ In addition to the afore mentioned problem, only a small amount of work has been done on the frequency and histological typing of oral and

maxillofacial malignancies as researchers tend to focus more on benign tumors of the oral and maxillofacial region due to their higher occurrence as compared to their malignant counterparts.^{4,5,6}

Nonetheless, oral and maxillofacial malignancies tend to affect every age group, though it is infrequent in children.⁷ These malignancies show a diverse racial and ethnic variability, as representing only 0.8-1.2% of all cancers in the North American population,⁸ whereas Asian populations show an incidence rate of 3%.⁹ Most of the research on malignant oro-facial neoplasms has come from the African continent who have reported a frequency of 40-51% for such tumors, and showed a high predilection towards the incidence of sarcoma's. Statistics obtained from South Africa, Nigeria and Libya all point to the low frequency of carcinoma's (10.6%) and a predominance of sarcoma's as the leading oro-facial malignancy diagnosed (31-90%).¹⁰⁻¹³ Ajayi¹² and Chaudhary¹⁴ report that amongst the sarcomas, the leading malignancy was Burkitt's lymphoma with a relative frequency of upto 56-88% followed by osteosarcoma

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(15%). Existing literature from the Asian continent has come mostly from Iran where carcinoma's have been found to be most prevalent (54.5-70%).^{9,15} Among the carcinoma's, the predominant malignancy in Asia and Africa was Squamous cell carcinoma (44-50.6%) followed by salivary adenocarcinomas such as mucoepidermoid and adenoid cystic carcinoma (23.1%)^{9,12,13,15,16} Overall there is very little, if any, data available about the histological type and relative frequencies of malignant oro-facial tumors from the Asian subcontinent, much less from Pakistan itself.

The rationale of the study was to provide a local data on the histological typing (i.e. carcinoma or sarcomas) and relative frequencies of oral and maxillofacial malignancies as there is very little literature available on the subject in the region. This in turn will increase awareness about such conditions amongst dental professionals and help them in diagnosing and treating such patients at an earlier stage.

METHODOLOGY

This descriptive study was carried out following approval from the Institutional Ethical Review Committee at Khyber College of Dentistry. The sample size was 146, using 10.6% proportion of carcinoma¹³, 95% confidence level and 5% margin of error under WHO software for sample size determination. Informed

written consent was obtained from all the patients regarding his/her participation in the study. In case of a minor, the consent was obtained from the patient's parents or official guardian.

A detailed history followed by clinical examination of the patient was performed to exclude recurrent malignancies and metastasis from other sites to the maxillofacial region. The data was collected using a customized proforma, which collected the patient's biographical data in addition to the study variables such as the frequency and histological typing as per histopathology report. The collected data was analyzed using Statistical Package for Social Sciences (SPSS) version 17. Frequency and percentages were calculated for categorical variables like gender, carcinoma, sarcoma and common types of carcinomas (Squamous cell carcinoma, Mucoepidermoid carcinoma, Adenoid cystic carcinoma) and sarcomas (Osteosarcoma, Burkitt's lymphoma). Mean ± standard deviation (SD) were calculated for numerical variables like age. Common types of carcinoma and sarcoma were stratified among age and gender using the Pearson chi square test (level of significance set p-value <0.05).

RESULTS

A total of 146 patients with oral and maxillofacial malignancies were included in the study. Among these,

TABLE 1: CROSS TABULATED FREQUENCIES OF ORAL AND MAXILLOFACIAL MALIGNANCIES ACCORDING TO GENDER

Gender	Types of carcinoma						Types of sarcomas			
	Squamous cell carcinoma		Mucoepidermoid carcinoma		Adenoid cystic carcinoma		Burkitt's lymphoma		Osteosarcoma	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Male	80	19	3	96	3	96	6	93	7	92
Female	36	11	2	45	3	44	4	43	2	45
Total	116	30	5	141	6	140	10	136	9	137
p-value	0.556		0.704		0.326		0.584		0.509	

TABLE 2: CROSS-TABULATED FREQUENCIES OF ORAL AND MAXILLOFACIAL MALIGNANCIES ACCORDING TO AGE GROUPS

Age groups (in years)	Types of carcinomas						Types of sarcomas			
	Squamous cell carcinoma		Mucoepidermoid carcinoma		Adenoid cystic carcinoma		Burkitt's lymphoma		Osteosarcoma	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
1-20	0	12	0	12	1	11	6	6	5	7
21-40	12	9	4	17	0	21	2	19	3	18
41-60	66	8	1	73	4	70	2	72	1	73
61-80	38	1	0	39	1	38	0	39	0	39
Total	116	30	5	141	6	140	10	136	9	137
p-value	0.000		0.000		0.573		0.000		0.000	

99 patients (67.8%) were male and 47 (32.2%) belonged to the female gender. The male to female ratio observed was 2.1:1. The age range of the sample was between 4-80 years with a mean age of 52.37 ± 17.16 years. The modal age was 60 years. A decade wise breakdown of the sample revealed that oral and maxillofacial malignancies were most common in the 4th to 5th decade of life (50.7%) followed by those in the 6th to 7th decade of life (26.7%). The 1st to 2nd decade of life was the least common group reported with malignant tumors of the oral and maxillofacial region. Out of a total 146 cases, 127 were classified as carcinomas (86.9%) and 19 were classified as sarcomas (13.1%). Among the carcinomas, squamous cell carcinoma was the most prevalent type (91.4%) and the least common was mucoepidermoid carcinoma (3.9%). Burkitt's lymphoma was the most common sarcoma (52.6%) and the least prevalent was Osteosarcoma (47.4%). Overall, the most common malignancy was squamous cell carcinoma (79.5%), followed by Burkitt's lymphoma (6.8%). The least prevalent malignancy was mucoepidermoid carcinoma (3.4%).

Male patients showed a higher percentage of malignancies diagnosed as squamous cell carcinoma (68.9%) as compared to females, giving a 2.2:1 male to female ratio. In case of mucoepidermoid carcinoma, a 1.5:1 male to female ratio was reported, whereas a 1:1 ratio was reported in the case of adenoid cystic carcinoma. As far as sarcomas are concerned, tumors diagnosed as Burkitt's lymphoma also showed 1.5:1 preference for the male gender, and a 3.5:1 male predilection was noted for cases diagnosed as osteosarcoma. Details of the gender and malignancy cross tabulation are given in Table 1. The role of gender was evaluated as factor for the development of malignant tumors of the maxillofacial region, and the test of significance was applied. An overall p-value of 0.778 was obtained, signifying that neither the male nor the female gender had any predilection towards the incidence of any specific malignancy.

Squamous cell carcinoma was reported mostly amongst patients in the age group of 41-60 years (56.9%) followed by patients in the 61-80 years age group (32.7%), no cases were reported in the 1-20 years age group. Mucoepidermoid carcinoma was reported with the highest frequency from patients belonged to the 21-40 years age group (80%), whereas Adenoid cystic carcinoma occurred mostly in patients belonged to the 41-60 years age group (66.7%). Burkitt's lymphoma (60%) and osteosarcoma (55%) were found to affect patients in the age group of 1-20 years. A few cases were reported for both sarcomas amongst the 41-60 and 61-80 years age groups. The details of the distribution are given in Table 2. The Pearson chi square test was applied to check if a statistically significant relationship existed between age and the maxillofacial

malignancies with a p value set at <0.05 . A p-value of 0.00 was obtained for all malignancies suggesting age was a highly significant factor in the development of such tumors, except for adenoid cystic carcinoma (p-value = 0.573).

DISCUSSION

Malignant tumors of the maxillofacial region comprise a pathology whose treatment can beset the patient with significant esthetic and functional handicaps, not to mention death itself. Staging of the tumor is an important aspect of determining the extent of surgical intervention and also the expected overall survival rate among such patients. Worryingly, majority of the patients in our study reported with advanced age as well as advanced stage of disease therefore a compromise on treatment outcomes are already made before a surgeon can lift the scalpel. In order to tilt the balance in favor of the surgeon, a radical shift towards preventive and interceptive measures needs to be taken.

This study has found squamous cell carcinoma as the most prevalent carcinoma affecting the oral and maxillofacial region by some distance (91.4%). This was followed by almost equal parity between mucoepidermoid carcinoma and adenoid cystic carcinoma (5 and 6 cases each respectively). This is in conformity with results of the SEER (Survival, Epidemiology, End Result) data program in the United States of America pertaining to squamous cell carcinoma only.¹⁷ Further data from a study conducted in Chile reveals that squamous cell carcinoma comprised 58.4% of all epithelial malignancies reported.¹⁸ An African study conducted in Ghana report nasopharyngeal carcinoma as the most common carcinoma followed by squamous cell carcinoma, but this study included all head and neck tumors so a true picture of oral and maxillofacial malignancies is hard to discern.¹⁹ Asian studies, particularly those conducted in Japan, India and Pakistan report over 80% of all maxillofacial malignancies as squamous cell carcinoma, followed by adenoid cystic carcinoma and mucoepidermoid carcinoma.^{20,21,22}

This study found an almost equal frequency of Burkitt's lymphoma and osteosarcoma (10 & 9 cases respectively). In contrast, literature emanating from Argentina reports Hodgkins Lymphoma as the most sarcoma (35.71%) followed by osteosarcoma (28.57%).³ Another South American study conducted in Chile concluded that atypical lymphocytic proliferation consistent with lymphoma (n = 51) followed by Kaposi sarcoma (n = 13) were the most common sarcomas amongst their sample population.¹⁸ A Nigerian study conducted by Ajayi et al and a Kenyan study authored by Okumu and co concluded that Non Hodgkin's Lymphomas, 75% of which were Burkitt's lymphomas were the most prevalent malignancy followed by osteosarcoma. The

Kenyan study reported rhabdomyosarcoma as second most common malignancy, but as our study did not account for rhabdomyosarcoma, a comparison cannot be justified.^{10,23} Similar findings were also seen in studies conducted in Iran and Northern Jordan.^{20,24} No similar study was conducted in Pakistan for comparison of these findings. Overall, carcinomas were much more common worldwide than sarcomas.

Our study found a male predilection towards the development of both carcinomas and sarcomas. Similar results were seen in the data gathered from the American population (male to female ratio 3:1).²⁵ South American studies reported a male to female ratio of 1.6:1 which is in concordance with our study. African studies showed a male preponderance in the ratio of 1.4-1.9:1.^{13,26} Similar findings were also seen in studies conducted in Indonesia, India and Pakistan, some of those studies report upto three times more prevalence of carcinomas amongst the male gender. The overall male predominance worldwide and higher ratio of males affected as compared to females is partially attributed to limited mobility afforded to females in this region of the world.^{21,27}

The mean age of our study sample was 52.37±17.16 years, signifying that “wear and tear” in regulatory genes plays a major role in this process. Similar results were reported from the SEER program data in the United States of America as well as Chile.^{1, 18} Barring a study conducted in Nigeria whose sample mean age was 11.0±4.5 years, other African studies also report the 41-60 years age as the most common group afflicted with oral and maxillofacial malignancies.^{10, 26, 28} Literature published from the Asian subcontinent also yielded data which conformed with the findings of this study.^{21,22}

CONCLUSION

- 1 Males were more affected with oral and maxillofacial malignancies as compared to females.
- 2 The 4th and 5th decades of life were the most common age group that presented with oral and maxillofacial malignancies.
- 3 Carcinomas were a lot more common than sarcomas in Khyber Pakhtunkhwa, Pakistan.
- 4 The most common histological type of carcinoma was squamous cell carcinoma and the most common type of sarcoma was Burkitt’s lymphoma.

RECOMMENDATIONS

- 1 Initiation of cancer screening and prevention programs with specific focus on elimination or reduction of use of carcinogenic containing items such as paan, naswar and other socially acceptable forms of tobacco due to the heavy burden of squamous cell carcinoma,

- 2 Conducting such studies in other centers of Khyber Pakhtunkhwa, Punjab, Baluchistan, Sindh and Gilgit Baltistan to find the most common cancers provincially as well as nationally.
- 3 Conducting such studies repeatedly after 5 or 10 years to gauge our success or failure in controlling the burdens of specific malignancies such as squamous cell carcinoma. This will also help us in knowing trends among their relative frequencies and formulate action plans accordingly.

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- 1 Fahad Qiam:** Execution and generation of idea for the study. Principal Author.
- 2 Muslim Khan:** Supervisor of the study and helped in reference citation as well as discussion writing.
- 3 Qiam ud Din:** Helped in design of study, data collection, results and methodology writing.