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A Retrospective Analysis on Types of Flap Design Used in Maxillary Carcinoma

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ABSTRACT

Introduction: The removal of various maxillary tumors and further reconstruction is considered as a difficult phase.

Objective: The aim of the study is to investigate the flap design used in maxillary carcinoma at Saveetha Dental College.

Methods: This study was conducted for the patients who visited the Department of oncology between 1st June 2019-1st April 2020. Data was extracted by reviewing the information of the patient.

Results: Out of 57 patients 17 patients (30%) were diagnosed with maxillary carcinoma. There was male predilection in this sample with 58.82% males and 41.18% females. Weber-Fergusson approach along with the modifications was used in 76.47%, midfacial degloving in 17.65% and palatal swing approach in 5.68% of the patients with maxillary carcinoma.

Conclusion: We conclude that maxillary carcinoma resection was done predominantly among males and the most common age group which underwent surgical treatment for the same were in the age group of 41 to 50 years. Among various flaps used to resect the tumor, Weber-Fergusson (76.47%) was used in the majority of cases. Association between gender and age and type of flap used of maxillary carcinoma resection was tested using Chi-square analysis and it was found to be not significant.

Key Words: Maxillary, Carcinoma, Incision, Flap, Weber Fergusson

INTRODUCTION

Maxillary carcinoma, where oral squamous cell carcinoma represents 90-95% of all malignant neoplasms in the oral cavity.¹ The classical cause of this disease has a high correlation with alcohol and tobacco consumptions.² This maxillary carcinoma accounts for 56% of the oral cancer. Malignancies of the nasal cavity and paranasal sinuses are rare, accounting for only 3% of head and neck carcinoma and about 0.5% of all malignant disease. The annual incidence rate is 0.5–1.0 per 100,000 population. These tumors are two times more frequently observed in men than in women, mainly between 50 and 70 years old. Of these malignancies, 80% originate from the maxillary sinus and histologically, 60–90% of these cases have been shown to be squamous cell carcinoma. The surgical treatment for tumor invading the maxilla with adequate surgical margins is challenging because of the anatomic complexity of the maxillofacial region.³ The removal of various maxillary tumors and further reconstruction is considered as a difficult phase. These are treated by the com-

bined approach of surgery, chemotherapy and radiotherapy.⁴ The surgical resection therefore remains as the initial treatment which is used as the treatment of choice for all tumors of nasal, paranasal, and sinuses. Henceforth the incisions and the approach should be suitably done depending on the stage of the tumor.⁵ However, advanced techniques and experience in surgical tumor resection and reconstructive techniques has afforded many patients the opportunity for curative surgery than in previous decades.⁶

Out of many approaches to the maxillary region, the commonly used approaches are the Weber-Fergusson's incision and the Midfacial degloving incision. A controversy exists regarding who described these incisions first. Few authors consider Weber-Fergusson incision was first described by Gensoul 1893 later the technique was popularized in 1960 by Weber and Fergusson. The others argue that it was first described by Weber in the German literature and was later modified by Fergusson in the English literature. And some people believe that Sir William Fergusson was the person

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who described the technique and Weber has described the mandibular procedure. However, these standard techniques underwent various modifications depending on the extent of the tumor.⁷

This article aims to study the flap design used in surgical management of maxillary carcinoma in a University setting.

MATERIALS AND METHODS

Subjects were the patients who visited Saveetha Dental College and Hospitals, Department of Oncology and these patients are all grouped according to the gender and design of flaps used in the treatment for tumor resections

This study was approved by the ethical committee for research at Saveetha Dental College: SDC/SIHEC/2020/DI-ASDATA/0619-0320.

Data according to the patient was collected by reviewing 86,000 patients, where 57 tumor patients were screened and 17 maxillary tumor patients were included in the study. The patient intra oral photos, history presenting illness, and systematic diseases were accessed.

Inclusion Criteria

Patient with maxillary carcinoma

- Squamous cell carcinoma
- Venomous carcinoma
- Lymphoma
- Mucosal melanoma
- Kaposi sarcoma
- Odontogenic sarcoma

Exclusion Criteria

- Mandibular carcinoma
- People under 18 years of age
- Physically challenged
- People who underwent radiotherapy and chemotherapy treatment

Statistical Analysis

The data was tabulated and analyzed using IBM SPSS version 2.0. Non-parametric data were analyzed using descriptive statistics measuring percentage and frequency. The association between Type of flap used in Maxillary Carcinoma, age, and gender was done with Pearson's Chi-square test.

RESULT

The charts and records from the oncology department case records identified 17 (30%) maxillary carcinoma patients from 57 over all cases of carcinoma in oral cavity between 1st June 2019 - 1st April 2020. Gender distribution was as-

essed and a male predominance noted with an incidence of 58.82% and females accounting for 41.18% (Figure 1). Patients involved belonged predominantly to elderly age group ranging from 40 to 70 years. The mean age of the patient was 46 years (Figure 2). The flap designs used to excise carcinoma was predominantly Weber Fergusson in 76.47% of cases, followed by midfacial degloving in 17.65% of cases and palatal swing approach in 5.88% of cases (Figure 3). The association between flap design and gender of the study population was found using Chi-square test and it was statistically not significant [Chi-square value-0.909; p-value- 0.635 ($p>0.05$)] (Figure 4). Association between age and design of flap was found using Chi-square test and it was statistically not significant [Chi-square value-1.308; p-value- 0.860 ($p>0.05$)] (Figure-5).

DISCUSSION

According to this study, a male predominance (58.82%) was noted in the sample, which could be explained by extensive proof in literature regarding high incidence of carcinoma cases in males. The mean age of patients who got operated for maxillary carcinoma was 41-50 years. Weber fergusson flap design was used in the majority of cases to approach and excise the carcinoma (76.47% cases) and other incisions used were midfacial degloving (17.65% cases) and palatal swing approach (5.88% cases). This correlates with the study done by Rajasekar et al. and Kranti bhavan 86% of the patients treated with the Weber-Fergusson method, midline degloving accounts to 14% of the incision. It was evaluated for the overall advantage and disadvantage of the approach, with regards to physiological functions, aesthetic outcome and complications.⁸ The study conducted by Cario university showed that the majority of the patients underwent the mid facial degloving approach showed no significant complications which is not in accordance to our results.⁹

The genesis and the progress of oral carcinoma is a complex process involving enormous pathological changes in the form, structure and function of the region involved. Maxillary carcinomas can lead to both aesthetic disfigurement and functional disability; hence extreme care should be exercised when a surgical planning is performed. The surgical approach for maxillary tumors depends on the spread and simultaneous involvement of important structures by the tumor. Primary aim of the approach should provide adequate exposure without damaging the functional tissue and to provide cosmetic integrity.

Few commonly used surgical approaches for maxillary exploration and carcinoma management are transoral-vestibular approach, Trans-palatal approach, Weber-Fergusson approach were made to perform maxillectomy procedures.¹⁰ The Weber Ferguson approach was introduced in the 1960's

and is still being widely used due to its advantages like excellent exposure and minimal scarring as they follow natural skin crease healing. This approach is generally used with the various modifications.

Weber Ferguson incision

Weber Ferguson incision with Lynch extension

Weber Ferguson incision with lateral subciliary extension

Weber Ferguson incision with subciliary and supraciliary extension.

The modifications are chosen based on the carcinoma size, site, spread, adjacent structures involved, and extent of exposure needed. However handling the soft-tissues during Weber Fergusson incision is challenging and complicated during resection.

Transpalatal approach for nasopharyngeal tumor offered good exposure to mid third of face with excellent cosmetic results. It provides a wide and comfortable exposure to the midfacial region. This approach generally has a high tendency of bleeding causing damage to vital structures and formation of hematoma which can lead to secondary infections. Among various approaches used in the maxillary region and paranasal region, the most commonly used approach was the Weber-Fergusson flap design and the midline facial degloving approach.¹¹

Considerable studies have been conducted in the field of Surgery with relevance to the current population under study.¹²⁻²⁶ This study is based on a limited sample size from South-Indian population, performed in a shorter span of one year. To improve the scope of the research, in future studies can be planned including a larger population and longer follow up.

CONCLUSION

Within the limitations of this study, we conclude that maxillary carcinoma resection was done predominantly among males and most common age groups which underwent surgical treatment were in the age group of 41 to 50 years. Among various flaps used to resect the tumor, Weber-Fergusson 76.47% was used in the majority of cases, followed by midline degloving and transpalatal approach. Association between gender and age and type of flap used of maxillary carcinoma resection was tested using Chi-square analysis and it was found to be not significant. Several approaches have been used for the resection of the tumor in maxilla, but each of them has got inherent advantages and disadvantages. Preserving the vital structure and improving the ease of operating technique remains the objective of successful treatment which is achievable with Weber Ferguson approach and its modification.

AUTHORS CONTRIBUTION

First author (Harini G) performed analysis, interpretation, and wrote the manuscript. Second author (Dr. Kathiravan Selvarasu) contributed to conception, data designs, analysis, interpretation, and critically revised the manuscript. Third author (Dr. Bala Krishnan R N) participated in the study and revised the manuscript. All the three authors have discussed the results and contributed to the final manuscript.

Conflict of Interest: There are no conflicts of interest

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Figure 1: Bar Graph showing the gender distribution. X-axis corresponds to the gender and Y-axis corresponds to the number of patients with maxillary carcinoma. Pink denotes females and blue denotes males. A male predominance was noted. Males - 58.82%, Females - 41.18%

Figure 2: Bar Graph showing the age distribution. X-axis corresponds to the age and Y-axis corresponds to the number of patients with maxillary carcinoma. The color pale pink denotes 41-50 years, pastel green denotes 51-60 years and black denotes 61-70 years of age. The highest number of patients was seen between the ages of 41-50 years of age (46.15%).

Figure 3: Bar Graph showing the flap design used in maxillary carcinoma. X-axis corresponds to the design of flap and Y-axis corresponds to the number of patients. The mustard color denotes Midline degloving, magenta denotes palatal approach and saffron denotes Weber-Fergusson. The most commonly used flap was Weber-Fergusson 76.47%.

Figure 4: Bar graph showing the association between flap design and gender of the study population. X-axis corresponds to the gender affected and Y-axis corresponds to the number of patients. All three flap design was used in males (Weber-Fergusson (saffron) - 41.18%, Midfacial-degloving (mustard) - 11.76%, palatal approach (magenta) - 5.88%) and females with (Weber-Fergusson - 35.29%, midfacial degloving-5.88%). Chi-square test was done to find the association between gender and flap design and was found to be statistically not significant [Chi-square value-0.909; p-value- 0.635 ($p > 0.05$)].

Figure 5: Graph showing the association between age and design of flap used. X-axis corresponds to the age and Y-axis corresponds to the design of flap used. The color mustard denotes midline degloving, magenta denotes palatal approach, and dark orange denotes Weber-Fergusson flap. 41-50 years had a higher prevalence of lesion and Weber-Fergusson (41.18%) and midline degloving (11.76%). Chi-square test was done to find the association between flap design and age group and was found to be statistically not significant [Chi-square value-1.308; p-value- 0.860 ($p > 0.05$)].