

TYPES OF MAXILLARY TUMOURS AND THE RESULTING POST-SURGICAL DEFECTS IN PATIENTS AT A TEACHING HOSPITAL

Nida Murad¹, Zakirullah², Fazal Ghani³

ABSTRACT

Objective: To report the frequency of the types of maxillary tumours and the resulting post-surgical defects based on Aramany classification. Study design, duration and setting: This descriptive study was done during the period of 5 years (2005-11) at the Otorhinolaryngology & Head and Neck Surgery Unit, Khyber Teaching Hospital Peshawar.

Methodology: A pre-structured proforma was used for data collection. Data recorded included patients' age, gender, type of maxillary tumour, type of maxillectomy and approach for resection, Post-surgical defect based on Aramany classification for acquired maxillary defects, neck dissection, radiotherapy, and prosthetic rehabilitation. Data were computed for descriptive statistics including frequencies, percentages and mean values.

Results: Patients (n=53) had a male to female ratio of 1.7. Some 26.4% patients belonged to the age group of 31-40 years. Maxillectomy was done for inverted papilloma, a benign tumour in 1.9% patients as compared to malignant squamous cell carcinoma in 66% patients. Maxillary resection for fibrous dysplasia was done in 3.8% patients who were relatively younger. Maxillectomy in all cases was performed using Weber-Fergusson incision approach. Surgical resection resulted in Armanay class I defect in 73.58% patients. In 92.5% patients a surgical obturator was provided to patients at the time of maxillectomy.

Conclusion: Maxillectomy was mainly performed for resecting malignant tumours using Weber-Fergusson incision with the fitting of immediate surgical obturator. The resulting defect was mainly Aramany Class I defects.

Key words: Tumours of maxilla, Weber-Fergusson incision, Acquired surgical defects, Aramany classification.

This article may be cited as: Murad N, Zakirullah, Ghani F. Types of Maxillary Tumours and The Resulting Post-surgical Defects in Patients at A Teaching Hospital. J Postgrad Med Inst 2012; 26(1): 106-10.

INTRODUCTION

Tumours that originate in maxilla are of various types including benign and malignant. Of

these, benign tumours accounts for 41% as compared to malignant with a figure of 59%^{1,2}. Among the tumours of maxilla, sinonasal papilloma has been seen as the most common benign tumor as compared to the malignant squamous cell carcinoma tumor invading the bone³. Other carcinomatous lesions of the jaws are mucoepidermoid carcinoma, and adenoid cystic carcinoma. Poorly differentiated adenocarcinoma is extremely rare malignancy of maxilla^{4,5}. Majority of these tumors occur in the 5th to 7th decades. Ewing's sarcoma, osteosarcoma, giant cell tumor, multiple myeloma, and metastatic tumors of maxilla are other rare malignant tumors. Ewing sarcoma affects children and young adults^{6,7}. Developmental defects also affect the maxilla. Fibrous dysplasia of the facial skeleton involving the maxilla commonly involve one maxilla⁸.

When the tumor is small it may be removed through an incision in the bucco-alveolar sulcus. However, those larger require the use of a lip-splitting Weber-Fergusson incision for adequate exposure. Complete extirpation is essential to

¹ Department of Oral and Maxillofacial Surgery, Khyber College of Dentistry, Peshawar - Pakistan

² Department of Otorhinolaryngology and Head and Neck Surgery Unit, Khyber Teaching Hospital Peshawar - Pakistan

³ Department of Prosthodontics, Khyber College of Dentistry, Peshawar - Pakistan

Address for Correspondence:

Dr. Fazal Ghani,
Department of Prosthodontics,
Khyber College of Dentistry, Peshawar-Pakistan
E-mail: fazalg55@hotmail.com

Date Received: June 1, 2011

Date Revised: November 17, 2011

Date Accepted: November 22, 2011

prevent recurrence⁹. Palliative excision may be considered for patients with intractable pain to provide rapid decompression of vital structures, or to de-bulk a massive lesion, thus freeing the patient from discomfort, inconvenience and social embarrassment. En-block resection of the primary tumor and metastatic lymph nodes is the principle surgical procedure for patients with oral cancer. However, in cases of maxillary cancer, because of extremely aggressive biologic behavior of malignancy, radical surgery, including wide resection of the tumor is required^{10,11}. Tumours of advanced stage require multimodal therapy, incorporating combination of chemotherapy, radiotherapy in addition to surgical resection. Bone or cartilage invasion requires regional lymph nodes dissection in addition to surgical resection of the primary lesion because of the high risk of nodal spread. If the primary site is treated surgically, then postoperative radiation to the cervical lymph nodes is delivered if there are high-risk features, such as multiple lymph nodes with cancer or extracapsular extension. Postoperative radiation is preferred over preoperative radiation, because of the poor healing potential of irradiated tissues. Recent studies have shown that adjuvant radiotherapy along with chemotherapy when treating cancers in the neck region improve regional control of the cancer and an enhanced survival of the patient^{12,13}.

The ideal approach to the rehabilitation of patients with acquired defects of the maxilla is the surgical reconstruction including the principles and concepts of tissue engineering¹⁴. But this option is not feasible for many because of one or other reason including the compromised medical condition of the patient, large size of the defect or lack of expertise (Memon and Ghani 2006).¹⁴ In addition, absence of teeth and the location, type, extent and remaining natural teeth have a tremendous influence on the rehabilitation of patients with a prosthetic obturator. Therefore, surgical resections for maxillary tumours need to be carefully planned with prior consultation of the prosthodontist¹⁴.

A classification system proposed by Aramany¹⁵ has been well acknowledged by the profession. This classification categorizes the various types of defects as well as it gives guidelines for the design of obturator framework. The frame design and arrangement of clasps is critical to the retention of a maxillary partial denture obturator¹⁶.

After maxillectomy, the aim is to alleviate the patient problems of experiencing major dysfunction in speech, swallowing and mastication having a very negative psychological effect¹⁷. Rehabilitation of the maxillectomy defect has been well defined for prosthodontists and surgeons¹⁸. The

primary goal of prosthetic obturation is closure of the defect and separation of the oral cavity from the sino-nasal cavities. A successful prosthetic design for functional restoration of the maxillectomy defect utilizes the remaining palate and dentition to maximize the support, stability, and retention of the obturator prosthesis^{19,20}.

This study aims to report the frequency of the types of resected tumours of maxilla as an absolute indication and of the distribution of the type of post-resection defects using Aramany classification. The patients were those who were operated and presented for prosthetic rehabilitation at the Otolaryngology & Head and Neck Surgery Unit at Khyber Teaching Hospital Peshawar and Prosthodontics Department, Khyber College of Dentistry Peshawar (Pakistan).

METHODOLOGY

Fifty three patients who underwent maxillectomy and prosthetic rehabilitation during the period 2005-2011 were included in the study. The hospital record of the patients with benign and malignant maxillary tumor who underwent various types of maxillectomies at the Otorhinolaryngology and Head & Neck Surgery Unit, Khyber Teaching Hospital (KTH) Peshawar were included. Data of patients who had maxillary defects due to trauma and congenital defects were not included. Patients who underwent initial maxillectomy and then developed recurrences were also excluded from this study. A pre-structured data collection was used to record the patient data including age, gender, types of maxillary tumours, type of maxillectomy and approach for resection, Aramany classification for resultant maxillary defects, neck dissection, radiotherapy, and prosthetic rehabilitation. Data were analyzed using descriptive statistics. Frequencies, percentages and mean values were calculated.

RESULTS

The age range was 10-75 years, with a mean age of 37 ± 5 (S.Dev) years. Most of the patients (30%) belonged to the age group of 41-50 years (Figure 1). There were 62.3% males as compared to 37.8% females. The male to female ratio was 1.7.

Most of the patients reported with malignant tumours (94.3%) than benign tumours (1.9%) of maxilla (Figure 2).

Fibrous dysplasia of maxilla was found in 3.8% patients (Figure 2). It was found in relatively younger patients with their ages ranging between 10 to 20 years.

The only benign tumor of maxilla was sinonasal tumor (inverted papilloma) in 1.9% patients and medial maxillectomy was performed

for the complete excision. Squamous cell carcinoma of maxilla was seen in 35 (66%) as the most common malignant tumor followed by adenoid cystic carcinoma in 13 (24.5%) patients which required partial maxillectomy of right maxilla in 29 (54.7%) patients. These tumors were more prevalent in patients belonging to the age group of 25-75 years (Figure 3). Right side maxillary resection was performed in 2 (3.77%) patients. Ewing sarcoma was another malignant tumor of maxilla found in 2 (3.8%) patients belonging to the age group of 12-18 years and resulted in maxillectomy of anterior and posterior maxilla (Fig 3). The distribution of the various types of tumours is shown in Figure 2.

Weber-Fergusson incision was used for all patients to expose the tumors. Irrespective of the type of tumour, Aramanay class I defect resulted in 39 (73.58%) patients upon resection of the tumor (Table 2).

Neck dissections were performed in only 2 (3.77%) patients. Immediate surgical obturator was planned and fitted for 49 (92.5%) patients. Delayed surgical obturator was provided in only 4 (7.5%) patients. In all cases, the basic aim of the surgical obturator was to promote the healing process, maintain oral functions and facilitate psycho-social esteem of the patient. Pre-radiotherapy was given only in one patient. Post radiotherapy was given to 34 (64.2%) patients.

Figure 1: The distribution of patients in the various age groups (n=53)

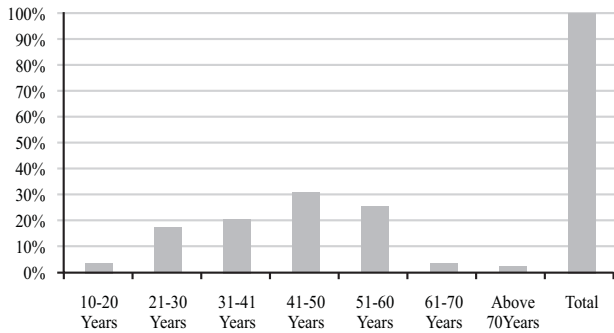


Figure 2: Categories of Tumours presented by Patients (n=53)

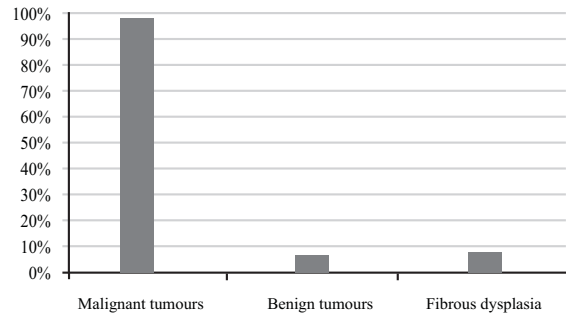


Figure 3: The distribution of various types of tumours in age groups shown in patients (N=53)

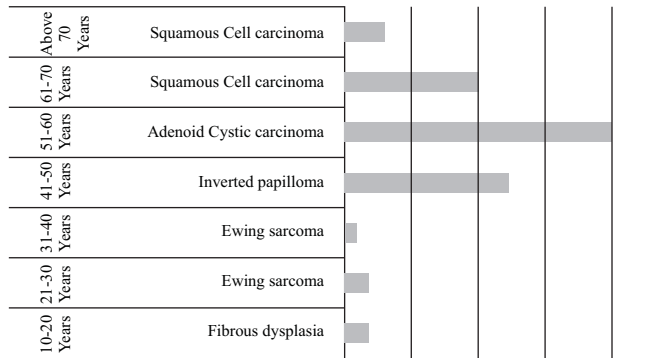


Table 1: Percentage distribution of the various types of tumours of maxilla (N=53)

Tumors of maxilla	Patients (n)	% age
Squamous cell carcinoma maxilla	35	66.0
Adenoid cystic carcinoma	13	24.5
Fibrous dysplasia	2	3.8
Ewing sarcoma	2	3.8
Inverted papilloma	1	1.9
Total	53	100.0

Table 2: Distribution of the various types of post surgical maxillary defects (N=53)

Armanay classification	Patients (n)	% ages
Class I	39	73.6
Class II	8	15.1
Class III	-	
Class IV	4	7.5
Class V	-	
Class VI	2	3.8
Total	53	100.0

DISCUSSION

Tumours of the maxilla are infrequent in incidence, making up less than 10% of lesions in the head and neck region. Surgery for tumours of the maxilla can be technically challenging. However, adequate ablation in the focus partial and total maxillectomy can achieve cure in even locally advanced tumors. The difficulty lies in giving the patient an oncologically sound resection while preserving important adjacent structures, without causing cosmetic deformity.

Malignant tumours of maxilla are more common than benign tumors³. Majority of these are patients older than 40 years^{6,7}. Men were affected more than women (Figure 2)⁶. In the study of Rehan and Kazi²¹ carried out on 30 patients, the incidence was high in 5th and 6th decades of life. Males were more affected than female with ratio of 3:1. In our study, most of cases presented during third and fourth decade of life (26.41%) and males were more affected than females with ratio of 1.7:1. This compared favorably with studies carried out by other authors^{4,5}.

It has been indicated that the common benign tumor of the maxillary sinus was inverted papilloma (50%)³ and the squamous cell carcinoma (35%) as the commonest malignancy followed by sinonasal undifferentiated carcinoma (24%). Other malignant tumours were osteosarcoma (18%), adenoid cystic carcinoma (6%), mucoepidermoid carcinoma (6%), fibrosarcoma. Almost comparable findings have been given by other studies of the kind²¹⁻²³.

In this study malignant tumors were also common than benign tumors i.e.; 92% and 2% respectively (Figure 3). Inverted papilloma was seen in one (1.9%) patients and squamous cell carcinoma was most common malignant tumor in 35 (65%) patients.

Maxillectomy has been the workhorse procedure for both benign and malignant lesions of the maxilla. Woodson et al²⁴ considered medial maxillectomy as the best approach in patients with inverted papilloma that extends in the maxillary sinus. For more extensive tumours inferior

maxillectomy, partial or total maxillectomy through Weber fergusson incision is most desirable approach^{3,4}. In this study medial maxillectomy was performed for resection of one (1.9%) inverted papilloma. Inferior maxillectomy was performed in squamous cell carcinoma of maxillary alveolus in 2 (3.77%) patients. The remaining of patients had partial maxillectomy for complete excision of tumours.

Combination of resection of the tumour and neck dissection is the rule of thumb in the management of extensive malignancy²¹. In our study neck dissection was performed in 2 (3.77%) patients.

James¹² and Hayter et al¹³ reported that postoperative radiation usually is preferred over preoperative radiation, because radiated tissues heal poorly. In this study postoperative radiotherapy was also preferred for 34 (64.2%) patients.

Various studies have reported Aramany Class I defect as the most frequent post-surgical maxillary defect and consider this as the classical hemi-maxillectomy defect^{22,25-26}. In our study the Aramany class I defect was also the most common of the resulting defects seen in our patients with a frequency of 73.6%.

Minsley et al¹⁷ preferred the use of immediate surgical obturators to reduce both postsurgical morbidity and the length of the patient's hospitalization. In this study 49 (92.45%) patients were fabricated with immediate surgical obturator.

CONCLUSION

Maxillectomy was mainly performed for resecting malignant tumours using Weber-Fergusson incision and the fitting of immediate surgical obturator. The resulting defect was mainly Aramany Class I type defects.

Grant Support, Financial Disclosure and Conflict of Interest

None Declared

REFERENCES

1. Sajid S, Devandra A, Sanjay D, Anil K. Squamous cell carcinoma of maxillary sinus: a Tata Memorial Hospital experience. *Indian J Cancer* 2006;43:26-9.
2. Kim GE, Chung EJ, Lim JJ, Keum KC, Lee SW, Cho JH, et al. Clinical significance of neck node metastasis in squamous cell carcinoma of the maxillary antrum. *Am J Otolaryngol* 1999;20:383-90.
3. Harrison DF. The management of malignant tumors of the maxillary and nasal sinuses. *Otolaryngol Clin North Am* 1990;33:417-22.
4. Ledermann M. Tumors of the upper jaw natural history and treatment. *J Laryngol Otol* 1970;84:369-401.
5. Ohngren LG. Malignant tumors of the maxilloethmoidal region: a clinical study with special reference to the treatment with electro surgery and irradiation. *Acta Otolaryngol* 1993;19:332-5.
6. Wood RE, Nortje CJ, Hesseling P, Grotepass F. Ewing's tumor of the jaw. *Oral Surg Oral Med Oral Pathol* 1990;69:120-7.
7. Berk R, Heller A, Heller D, Schwartz S, Klein EA. Ewing's sarcoma of the mandible: a case report. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1995;79:159-66.
8. Georgiade N, Masters F, Horton C, Pickrell K. Ossifying fibromas (fibrous dysplasia) of the facial bones in children and adolescents. *J Pediatr* 1995;46:36-43.
9. Kim DD, Ord RA. Complications in the treatment of head and neck cancer. *Oral Maxillofac Surg Clin North Am* 2003;15:213-27.
10. James SB. Maxillary reconstruction. Regional maxillofacial service at Aintree Hospital Liverpool United Kingdom. *Ind J Plast Surg* 2011;6:17-34.
11. Jesse RH. Pre-operative versus postoperative radiation in the treatment of squamous cell carcinoma of the paranasal sinuses. *Am J Surg* 1995;110:552-6.
12. James WH. Treatment of cancer of the paranasal sinuses and nasal fosse. *Arch Otolaryngol* 1998;68:604-8.
13. Hayter JP, Vaughan ED, Brown JS. Aesthetic lip splits. *Br J Oral Maxillofac Surg* 1996; 34:432-5.
14. Memon MR, Ghani F. Obturator prosthesis for rehabilitation of congenital and acquired maxillary defects: treatment report of four cases. *J Pak Dent Assoc* 2006;15:160-3.
15. Aramany MA. Basic principles of obturator design for partially edentulous patients. Part I: classification. *J Prosthet Dent* 1978;40:554-7.
16. Aramany MA. Basic principles of obturator design for partially edentulous patients. Part II: design principles. *J Prosthet Dent* 1978;40:656-62.
17. Minsley GE, Warren DW, Hinton V. Physiologic responses to maxillary resection and subsequent obturation. *J Prosthet Dent* 1997;57:338-44.
18. Watson RM, Gray BJ. Assessing effective obturation. *J Prosthet Dent* 1985;54:88-93.
19. Lyons KM, Beumer J, Caputo AA. Abutment load transfer by removable denture obturator obturator framework in different acquired maxillary defects. *J Prosthet Dent* 2005; 94:281-8.
20. Borlase G. Use of obturators in rehabilitation of maxillary defects. *Ann R Australas Coll Dent Surg* 2000;15:75-9.
21. Rehan A, Kazi M. A study of 30 cases of carcinoma of maxilla with emphasis on management. *Depts Oncol Masina Ind* 2000;2:42 -8.
22. Azad AA, Amjad A, Shariff M, Ibrahim A, Hasan SH. Pattern of acquired post-surgical maxillary defects for prosthodontic rehabilitation in patients at AFID. *J Pak Dent Assoc* 2011;20:35-9.
23. Mazlina S, Putra SH, Shiraz MA, Hazim MY, Roszalina R, Abdul AR. Maxillary sinus tumours: a review of twenty- nine patients treated by maxillectomy approach. *Med J Malaysia* 2006;61:284-7.
24. Woodson GE, Robbins KT, Michaels L. Inverted papilloma: consideration in treatment. *Arch Otolaryngol* 1985;111:806-11.
25. Umino S, Masuda G, Ono S, Fujita K. Speech intelligibility following maxillectomy with and without a prosthesis: an analysis of 54 cases. *J Oral Rehabil* 1998;25:153-8.
26. Sullivan M, Gaebler C, Beukelman D, Mahanna G, Marshall J, Lydiatt D, et al. Impact of palatal prosthodontic intervention on communication performance of patient's maxillectomy defects: a multilevel outcome study. *Head Neck* 2002;24:530-8.

CONTRIBUTORS

NM, Z and FG contributed equally to the research and preparation of the manuscript. All authors listed contributed significantly to the research that resulted in the submitted manuscript.