Original Article

Maxillectomy and Quality of Life: Experience from a Nigerian Tertiary Institution

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Abstract

Introduction: Maxillectomy is a surgical procedure for managing tumors affecting the maxilla; the goal of maxillectomy however should not be limited to tumor extirpation but should include restoration of oronasal function and facial contours, as failure to do these may give rise to psychosocial and functional challenges. This study aimed to appraise the pattern of maxillectomies, challenges of management, and quality of life (QOL) of a proportion of the study population. **Materials and Methods:** This was a cross-sectional study carried out at the Department of Oral and Maxillofacial Surgery, University College Hospital, Ibadan. Patients' case files from year 2000 to 2016 were retrieved and reviewed. Data extracted for analysis included age, gender, site of lesion, and histologic diagnosis; lesions were grouped as benign or malignant. Contacts were made with patients or their next of kin for a clinic review appointment where QOL was assessed with the University of Washington Quality of Life version 4 Questionnaire. Data were analyzed and result presented as means and frequencies. **Results:** Out of the 78 cases of maxillectomy recorded in the department within the study period, records were available and adequate in 67 cases. There were 37 (55.2%) females with a mean age of 35.88 ± 14.9 years. Swelling was the most common reason for presentation (63, 94%). The mean period between onset of disease and presentation for treatment was 3.66 ± 3.35 years. Distribution of lesions was benign 35 (52.2%) and malignant 32 (47.8%). Hemi-maxillectomy was the commonest surgical procedure (23, 34.8%). While majority had some prosthetic rehabilitation, 31 participants (48.5%) obtained no prosthesis. Eight participants gave scores of ≥75% when comparing their present health-related QOL (HR-QOL) with a month before surgery; the overall QOL was ≥60%. However, HR-QOL and overall QOL in the last 7 days before assessment were rated as good in 55.6% and 66.7%, respectively. Chewing was the most important domain to participants. **Conclusion:** The pattern of presentation and indications for maxillectomy in this series are similar to that from previous studies. The uptake of prosthetic rehabilitation was low and overall QOL was rated as fair. QOL should be considered as part of treatment outcome measure for maxillectomy.

Keywords: *Indications, maxillectomy, quality of life, rehabilitation*

Introduction

The maxilla bears the maxillary teeth, transmits masticatory forces, and gives support to the orbit and its contents while providing a partition between the oral and nasal cavities. It is also a source of attachment for the muscles of facial expression and mastication.[1] Various pathologies can affect the maxilla and the tissues surrounding it, the management of these conditions by surgical means often results in defects of the maxilla.[2,3] The resulting deficiency on the maxilla on account of treatment may give rise to communication between the oral and nasal cavities and the maxillary antrum.[4] This

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may bring about difficulties in mastication and result in hypernasal speech, fluid leakage, and various degrees of esthetic concerns, which need to be addressed surgically or by prosthetic rehabilitation.[4] The change in physiologic processes with varying degrees of physical, functional, and cosmetic issues may lead to a reduction in the quality of life (QOL) in an otherwise previously healthy individual.[5]

The QOL of a person is the degree of well-being felt by that individual and his/her perception of their position in life in the context of the culture and value system in which they live.[6] It also relates to their goals, expectations, standards, and concerns including the aspects of physical well-being, personal well-being, social and functional activities, and economic influences.[6] QOL with respect to managing patients with maxillectomy is maxillary reconstruction and restoration of oronasal function and facial contours, as orofacial deformities may result in severe psychological and social consequences.[7] Nevertheless, surgical reconstruction and rehabilitation can be quite challenging due to cost and late presentation of patients in resource-poor countries. Other factors such as lack of equipment, materials, and required surgical skill also influence the realization of optimal outcomes.[8] This study aimed to appraise the pattern and challenges of managing patients with maxillectomy and the QOL of a subset of the study population.

Materials and Methods

This was a cross-sectional study performed at the Department of Oral and Maxillofacial Surgery, University of Ibadan/University College Hospital, Ibadan. Seventy-eight case files of patients that had undergone maxillectomy during 2000–2016 at the Department of Oral and Maxillofacial Surgery were reviewed. However, 11 (14.1%) case files that had inadequate information with regard to demographic data and clinical information or had indeterminable or imprecise diagnosis were identified and excluded from the study. Data were extracted from the patients' case files using a data collection form. Among others, the following were extracted: information on age, gender, site of lesion, histologic diagnosis, extent of surgery, complications, and reconstruction/rehabilitation. Surgical extents were grouped into limited, subtotal, total, and extended maxillectomy. Lesions were grouped as either benign or malignant and further categorized into broad diagnostic groups as follows: connective tissue lesions, epithelial, fibro-osseous lesions, odontogenic, and salivary gland tumors.

QOL was assessed in nine patients that consented to present for review appointments after their treatment and participate in the study. QOL was evaluated using the University of Washington Quality of Life version 4 (UW-QOLv4) questionnaire.[9] It consists of 12 single-question domains, these having between 3 and 6 response options that are scaled evenly from 0 (worst) to 100 (best) according to the hierarchy of response. The domains are pain, appearance, activity, recreation, swallowing, chewing, speech, taste, saliva, mood, and anxiety. Another question asks patients to choose up to three of these domains that have been the most important to them. There are also three global questions: one about how patients feel relative to before they had treatment, one about their health-related QOL (HR-QOL), and the other about their overall QOL. With regard to their overall QOL, patients were asked to consider not only physical and mental health, but also many other factors, such as family, friends, spirituality, or personal leisure activities that were important to their enjoyment of life. The whole questionnaire focuses on the current patient health and QOL within the past 7 days. QOL scores were categorized as fair (score of 60), good (score of 80), and very good (score of 100).[9] Data were analyzed using descriptive statistics.

Results

Over the 16-year period, 78 maxillectomies were carried out, with an average of five maxillectomies per year. Out of these, 11 (14.1%) had deficient information in the demographics and/or clinical information, thus details from 67 (85.9%) patients' case files were included in the study. Table 1 shows the demographics and the average period between the onset of disease and treatment. There were more females, i.e., 37 (55.2%); male-to-female ratio was 1:1.2. Their mean age was

Table 1: Distribution of patients by socio-demographic characteristics and time of presentation

Socio-demographics	Frequency	Percentage
Gender		
Male	30	44.8
Female	37	55.2
Age group (years)		
10-20	15	22.4
21-30	11	16.4
31-40	13	19.4
41-50	14	20.9
51-60	12	17.9
≥61	2	3.0
Mean age: 35.88±14.9 years		
Time of presentation for treatment (years)		
<1-2	30	44.8
>2-4	17	25.4
>4-6	8	11.9
>6	12	17.9
Mean 3.66±3.35		

Table 2: Indications for maxillectomy by histologic diagnosis

	Connective tissue tumors 6 (9.0%)	Epithelial tumors 7 (10.5%)	Fibroosseous lesions 20 (29.9%)	Odontogenic tumors 17 (25.4%)	Salivary gland tumors 17 (25.4%)
Benign	-	-	Fibrous dysplasia 16 (80.0%) Ossifying fibroma 4 (20.0%)	Adenomatoid odontogenic tumor 3 (17.6%) Ameloblastoma 5 (29.4%) Ameloblastic fibroma 1 (5.8%) Fibromyxoma 6 (35.3%)	-
Malignant	Chondrosarcoma 1 (16.7%) Hemangiopericytoma1 (16.7%) Osteogenic sarcoma 4 (66.7%)	Squamous cell carcinoma 7 (100.0%)		Ameloblastic fibrosarcoma 1 (5.8%) Malignant ameloblastoma 1 (5.8%)	Adenocarcinoma 2 (11.8%) Adenoid cystic carcinoma 10 (58.8) Mucoepidermoid carcinoma 3 (17.6%) Polymorphous low grade adenocarcinoma 2 (11.8%)

Table 3: Types of maxillectomy and distribution of subjects by prosthesis

Type of maxillectomy	Frequency	Percentage
Hemi- maxillectomy	23	34.8
Hemi-maxillectomy with ethmoidectomy	2	3.0
Limited maxillectomy	9	13.5
Partial maxillectomy	13	19.6
Subtotal maxillectomy	14	21.2
Extended maxillectomy	4	6.0
Total maxillectomy and bilateral fronto-orbital craniotomy	1	1.5
Anterior segmental maxillectomy	1	1.5
Distribution of subjects byprosthesis given		
None	31	48.5
Feeding plate	14	21.2
Obturator	22	30.3

Table 4: Distribution and patients' complications and challenges related to maxillectomy

Complications	Frequency	Percentage
Anemia	5	6.0
Broken obturator	1	1.3
Constipation	1	1.3
Infection	1	1.3
Pain	2	2.6
Loose obturator	1	1.3
Limitation in mouth opening	1	1.3
Tumor recurrence	18	26.9
None	37	55.0
Challenges		
Difficult rehabilitation	2	2.6
Late presentation	26	32.5
Financial constraint	22	27.5
Nil CT scan	43	53.8
Difficult histodiagnosis	1	1.3
None	5	6.2
Transfer between managing hospitals	1	1.3

*Some patients reported more than one challenge

35.88 ± 14.9 years with more (15, 22.4%) individuals in the 10–20 years' age group. The mean period before patient presented to the clinic for treatment was 3.63 ± 3.35 years, with an individual presenting 14 years after the onset of disease. Nearly half (30, 44.8%) of the patients had treatment between 0 and 2 years after the onset of symptoms [Table 1].

Furthermore, there was an almost equal distribution of benign (35 [52.2%]) and malignant (32, 47.8%) lesions as indications for maxillectomy. Fibro-osseous lesions (20, 29.9%) were the predominant benign lesions, with fibrous dysplasia (16, 80.0%) being the highest. The malignant lesions were mainly minor salivary gland tumors (17, 25.4%), and adenoid cystic carcinoma (10, 58.8%) was the most prevalent salivary gland malignancy [Table 2]. Surgical procedures carried out for these patients ranged from limited maxillectomy to total maxillectomy and others that extended beyond the maxilla [Table 3]. Hemi-maxillectomy was the commonest surgical procedure (23, 34.8%), while subtotal maxillectomy was carried out in 14 (21.2%) patients. A little over half of the participants (36, 51.5%) obtained one

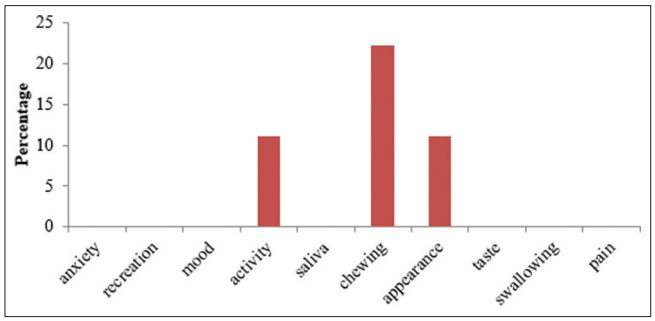

Figure 1: Domains of importance

Table 5: Domain scores of patients after maxillectomy

UW-QOL	Mean (SE of Mean)	% best score
Appearance	61.1 (7.3)	11.1
Activity	91.7 (4.2)	66.7
Recreation	81.3 (6.3)	37.5
Swallowing	97.2 (2.8)	88.9
Chewing	78.1 (3.1)	12.5
Speech	83.3 (4.2)	33.3
Taste	81.3 (4.1)	25.0
Saliva	100 (0.0)	100
Mood	93.8 (4.1)	75.0
Anxiety	94.4 (3.7)	77.8

type of prosthesis or the other (feeding plate only 14, 21.2%); definitive obturator (22 [30.3%]). However, an almost equal number (31 [48.5%]) of patients obtained no prosthesis [Table 3].

Recurrence of tumor was a major challenge attributable partly to the extent of disease and inadequate assessment of it prior to treatment; 43 (53.8%) patients were unable to have a computed tomography (CT) scan [Table 4]. With respect to the QOL of the subgroup of nine patients assessed, only 1 (11.1%) patient reported a score indicating non-affectation of his appearance after maxillectomy. Similarly, one (12.5%) participant reported nonaffectation for the chewing domain, while two (25.0%) patients reported that their taste was not disturbed. Most patients reported low scores in the domains of appearance (8, 88.9%), chewing (7, 87.5%), and taste (6, 75.0%). However, a good number (7, 77.8%) reported high scores for anxiety domain, as well as for change in the QOL relating to mood (6, 75.0%) and activity (6, 66.7%) [Table 5]. In addition, nearly everyone reported high scores with regard to their QOL before and after surgery. Only two (22.2%) patients gave scores indicating that their QOL was very good at present compared with a month before surgery and the same concerning the overall HR-QOL [Figure 1]. Eight patients who participated in the QOL assessment gave scores of ≥ 75% when comparing their present HR-QOL within a month before surgery; however, overall QOL

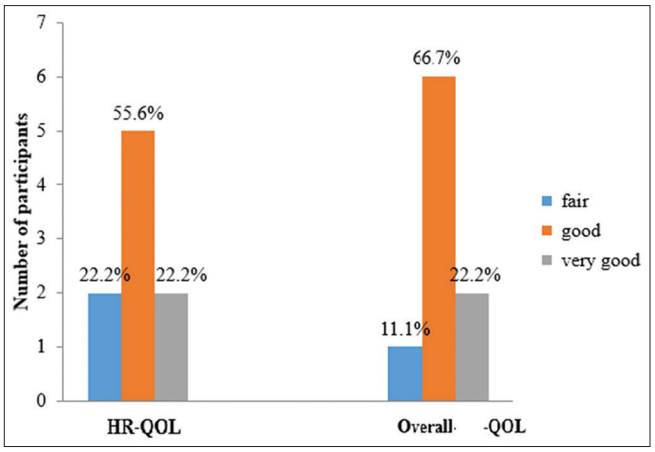

Figure 2: Health-related quality of life and overall quality of life in the past 7 days

was given as ≥ 60%. However, HR-QOL and overall QOL in the last 7 days before assessment were rated as good in 55.6% and 66.7%, respectively. Chewing was the most important domain to patients, followed by appearance and activity. The physical and socioemotional subscale scores were 83.3 ± 17.79 and 66.17 ± 42.14, respectively.

Discussion

Maxillectomy is the surgical removal of a part or the whole maxilla as treatment for a neoplasm; as an extirpative procedure, it results in a defect that could significantly affect function, esthetics, and the individual's QOL.[10-12] The sociodemographics of the patients in this study which showed the mean age as 35.88 ± 14.9 years are in agreement with previous Nigerian reports,[3,8] it is however at variance with that by Mazlina *et al*.[13] and Souza *et al*.[14] who reported 46 and 61 years, respectively. While a male-to-female ratio of 1:1.2 recorded in this study is in consonance with the reports of Eziyi *et al*.[3] and Baliarsing *et al*.,[1] it is at variance with that of Fomete,[8] Mazlina *et al*.,[13] and Souza *et al*.,[14] who reported more males in their studies. Malignancies constituted almost half (32, 47.8%) of the pathologies as indications for maxillectomies in this study, with adenoid cystic carcinoma leading, unlike previous studies that reported squamous cell carcinoma as the more prevalent malignancy.[3,15] Furthermore, benign tumors featured more prominently than what had been reported by Eziyi *et al*.[3] and Mazlina,[13] this observation may be due to the high prevalence of odontogenic tumors, particularly ameloblastoma in this environment, which when diagnosed in the maxilla is treated with maxillectomy. More fibrous dysplasia may have been treated by maxillectomy in this study than the series by Mazlina; for the benign tumors, fibrous dysplasia was the most common indication for

maxillectomy. While this agreed with Fomete *et al*.,[8] it differs from reports that found inverted papilloma as the reason for surgical ablation of the maxillary sinus.[15] Nonetheless, overall, Fomete *et al*.[8] reported the highest indication for maxillectomy as adenoid cystic carcinoma.

More maxillectomies were carried out in the present study than previous reports by Eziyi *et al*.[3] and Ogunlewe *et al*.,[15] it is however similar to that reported by Fomete *et al*.[8] This difference may partly be explained by the period covered by the different studies and the study locations.

The type of maxillectomy carried out depends on several variables including the nature of the tumor, site of the maxilla involved, and the extent of proximal structures affected. Hemi-maxillectomy remains the most commonly performed surgical procedure for patients with maxillary and antral tumors[1,3] and this supports the results of the present study. However, differences in the classification of maxillectomy defects make comparison of results on types of maxillectomy difficult.

Complications, including type and form, are important considerations in any surgical endeavor. Apart from anemia secondary to blood loss and significant pain, most patients had good outcome in the immediate and intermediate periods after surgery. However, delayed complications were not uncommon, the most frequent in this study being tumor recurrence, recorded in 18 (26.9%) cases. This may be related to inadequate preoperative assessment; 43 (53.8%) patients had no CT which may have resulted in inadequate surgery. Second is the suboptimal management related to difficulty in accessing adjuvant radiation therapy when indicated. Other significant challenges that could have affected management were financial constraints and delayed presentation.

The management of the maxillectomy defect is an important component of treatment goals. The reconstruction of maxillary defects and functional and esthetic re-creation of the maxilla are aimed at separation of oral and nasal cavities; restoration of maxillary buttresses; and restoration of function, mastication, and deglutition. Others are the re-establishment of the globe position or addressing an exenterated cavity cosmetically; the maintenance of a patent nasal airway; support and suspension of a dynamic facial soft tissue, including avoidance of ectropion; and restoration of the midfacial contour.[16,17] The problems created by the maxillectomy defect are therefore those of function and esthetics. Surgical reconstruction of the maxillary defect has reached advanced stages in the world. However, anecdotal reports suggest that these advances are not yet fully brought to bear in our centers largely due to inadequate competencies and facilities. In this study, majority (36, 51.5%) of the cases had one form of rehabilitation or the other. Fourteen (38.8%) out of 36 patients who received prosthetic rehabilitation had only temporary prosthesis and only 22 (61.1%) patients went on to have definitive obturators fitted. This is as a result of limited personal resources and possibly lack of governmental support of patients with cancer. Prosthetic rehabilitation was also used by Mazlina *et al*.,[13] Eziyi *et al*.,[3] and Ogunlewe *et al*.[15] as the method of treatment of postmaxillectomy defects in their studies. The use of prosthesis for the management of maxillectomy defect remains a viable option. However, satisfactory functioning is important. Prostheses can significantly contribute to improved psychological well-being and QOL for maxillectomy patients. However, in resource-limited settings such as Nigeria, it can be difficult to provide an acceptable prosthesis in large defects occasioned by extensive disease. Poor retention due to denture bulk, poor residual dentition (both quality and quantity), and poor retentive surfaces can create leakage and oronasal regurgitation.[16,17] Although maxillectomy as a surgical procedure can affect an individual's QOL, the management of the maxillectomy defect may be the more significant factor. Optimum prosthetic rehabilitation, an alternative to surgery, offers a nonoperative rehabilitation, seeking to provide satisfactory esthetics and QOL and thus to facilitate reinstatement of patients into their family situation and social environment.[18-20]

QOL should be part of the outcome considerations with maxillectomy; few patients in this study reported scores indicating satisfactory QOL for global questions. Although appearance, taste, and chewing were the significant domains of importance to the patients, the item of most significance was chewing. This is suggestive of a need to focus attention on the functional state of obturators provided to the patients. Although the HR-QOL and Overall QOL in this series were 56% and 67% respectively [Figure 2]. The direct comparison of these results with previous studies is not possible as these studies utilized different tools and measures to evaluate the QOL. However, the results obtained from the present study are supported by the results of Singer *et al*.[21] However, Kumar *et al*.[22] reported that the patients adjusted better after maxillectomy and rehabilitation with obturator prostheses. The UW-QOL scale is brief and simple, addressing issues that have been important in the last 7 days, which are easy to recollect.[12,14] It provides the clinician with useful information and can contribute to decision-making processes. The availability of open-ended text in the

scale provides another avenue to obtain information regarding individual patients. However, the UW-QOL scale is totally subjective with no room for clinician input. The strength of this study includes the assessment of QOL in maxillectomy patients, as this appears not to have been previously attempted in this environment. Possible weaknesses include the cross-sectional nature of the study and the relatively small sample size. The small sample size also made it impractical to conduct further analysis of the relationship between QOL scores and type of maxillectomy.

We consider it necessary to carry out a larger sample-sized prospective longitudinal study in the future, to address these issues and that of generalization of the application of results obtained in this study.

Conclusion

More maxillectomies were observed in the present study than from previously published Nigerian reports. The uptake of prosthetic rehabilitation was noted to be relatively poor and the overall QOL was modest at above average. Delay in treatment; based on the interval between when the disease was first noted by the patient and the actual treatment ,was a significant finding. There is need for further studies on QOL post maxillectomy.

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Conflicts of interest

There are no conflicts of interest.

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