



Evaluation of quality of life of maxillectomy patients after prosthetic obturator rehabilitation

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Abstract

Background: Surgical resection of orofacial neoplasms has a profound impact on the quality of life (QOL) for patients and their families. Maxillectomy defects are most commonly rehabilitated using obturator prosthesis. The purpose of this study was to investigate and evaluate the QOL of patients with maxillofacial defects after maxillectomy and prosthodontic therapy with obturator prosthesis. QOL is an important consideration that influences the living conditions of society.

Material and Methods: About 16 out of 20 patients were included in the study. The QOL of these patients who underwent maxillectomy and prosthodontic therapy was assessed by applying a standard questionnaire, Obturator Functional Scale.

Results: QOL after prosthetic obturator rehabilitation was assessed to be $59.9 \pm 3.7\%$ on average. QOL of obturator patients was not significantly related to age ($P = 0.9$), and gender ($P = 0.320$). The extent of therapy was correlated positively with QOL. A significantly better average rating was found in patient who underwent surgery (64.75 ± 1.2), followed by patients with surgery + radiotherapy (60.95 ± 2.02) and surgery + radiotherapy + chemotherapy (55 ± 2.36) with a $P = 0.006$. QOL was also significantly related to educational status ($P = 0.001$) in contrast to other parameters like age and gender.

Conclusion: Orofacial rehabilitation of patients with maxillofacial defects using obturator prosthesis is an appropriate treatment modality. To improve the situation of patients before and after maxillectomy, sufficient information about treatment, adequate psychological care, and speech therapy should be provided. The significance of sound functioning of obturator prosthesis for QOL was intensified by the findings of this study and confirmed the results of similar studies.

Introduction

Patients with head and neck neoplasms face severe deficits in speech, mastication, and swallowing after surgical resection. Hypernasal speech, escape of foods, and liquids through nasal cavity severely hampers quality of life (QOL) of such patients. The WHO defines QOL as “the individual perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns.”^[1] QOL is affected significantly by resection, reconstruction and post-operative radiotherapy performed for management of midface neoplasms. Often, surgical treatment involves resection of maxilla and adjacent vital structures (i.e., nasal, orbital, pharyngeal and facial soft tissues).^[2] Rehabilitation of such patients is facilitated by

fabrication of a prosthetic obturator, or reconstruction with a flap. Each treatment modality has its advantages and disadvantages. However, most commonly used treatment modality is obturator rehabilitation. This is associated with less morbidity, low cost, can be modified according to patient’s needs and also allows for prosthetic reconstruction of lost structures, e.g., missing teeth and soft tissues.^[3]

Recent advancements in presurgical planning techniques have facilitated the use of composite free flaps in anatomic reconstruction of bony infrastructure of maxilla. Various reconstructive options available have specific indications and advantages depending on anatomic features of ablative defect. Anatomic features such as size, location, extent of palate resection and involvement of facial soft tissues, infraorbital rim influence the type of reconstruction.

Free flaps are obtained from scapula, anterior iliac crest and fibula for surgical reconstruction which carries a risk of donor site morbidity thereby compromising the QOL. In addition, treatment will be complex, with prolonged recovery time.^[2,3] Making a choice between reconstruction with a free flap or rehabilitation with prosthetic obturator is not well defined, and it will depend on surgeon's expertise for a final decision.

Success with prosthetic obturator rehabilitation is also related in part to the extent of resection of hard and soft palate. The patients with larger obturator face problems associated with retention, stability, and function. However, introduction of various attachments such as magnets, stud attachments, and use of zygomatic implants have improved the treatment significantly.^[4]

Facial esthetics and oral functions are essential for social interaction and have an impact on individual's QOL. QOL of patients with maxillofacial tumors is being considered to evaluate the patient's satisfaction. Literature suggests that studies investigating the QOL of patients with maxillofacial defects after prosthodontic therapy with obturator prosthesis are rare, but some recent studies have shown a strong correlation between obturator function and QOL.^[5-8]

The aim of this study was to evaluate the QOL of patients with maxillectomy after prosthodontic therapy with obturator prosthesis using a standard questionnaire.

Materials and Methods

Patients who received maxillary resection and prosthodontic therapy with obturator prosthesis from July 2013 to August 2016 were included in the cross-sectional study. All patients were provided written informed consent before their participation in the study. All obturator prosthesis was fabricated in Department of Prosthodontics and Crown and Bridge, H.P. Government Dental College, Shimla.

Eligible patients were sent a standardized questionnaire, and telephone interviews were conducted. The study sample consisted of 16 (80%) of 20 eligible patients, 2 had died, and another 2 were not available. The sample consisted of 11 males and 5 females. The questions asked were based on a disease and domain specific QOL Questionnaire Obturator Functioning Scale' (OFS). This questionnaire has been validated and used by other investigators.^[2,5,6,8-10]

Nine domains in OFS questionnaires, including satisfaction with facial appearance, ability to speak, ability to speak in public, leakage with liquids and solids, dryness of mouth, insertion of obturator, chewing or eating, social-family interactions, and overall OFS were scored. Numerical value from 0 to 100 for each response in the questionnaires was used. A score of 0 indicates maximum suffering or dissatisfaction and score of 100 indicates that patient was asymptomatic or satisfied in that particular domain.^[11]

Statistical analyses

Data collected from medical records and patient responses to questionnaires were scored and analyzed. The influence of

selected demographic and treatment variables on patient's QOL was assessed: (1) Age (<60 or ≥60 years), (2) gender (male or female), (3) educational status (educated or non-educated), and (4) therapy of tumor.

The data were processed with IBM SPSS 24 for windows statistical software. Statistical analysis was performed using nonparametric Mann-Whitney *U*-test and Kruskal-Wallis rank sums analysis. For all statistical analyses, probability levels of $P < 0.05$ were considered statistically significant.

Results

The sociodemographic and medical characteristics of 16 patients interviewed are presented in Table 1. There were 11 (68.8%) male and 5 (31.3%) female patients with mean age of 57.8 ± 9.5 years old (range 39-71 years). Among these, 11 (68.75%) were noneducated and 5 (31.25%) were educated. Most participants 11 (68.8%) were retired before maxillary resection or lost their job as a consequence of disease and 31.25% (5/16) remained in employment. Squamous cell carcinoma (62.5%, 10/16) was the most common histological

Table 1: Sociodemographic and medical characteristics of patients ($n=16$)

Patient characteristics ($N=16$)	N (%)
Gender	
Male	11 (68.8)
Female	5 (31.3)
Age in years	
Mean	57.8±9.5
Range	39-71
<60	9 (56.3)
>60	7 (43.7)
Educational status	
Not educated	11 (68.75)
Educated	5 (31.25)
Employment status	
Not retired	5 (31.25)
Retired	11 (68.8)
Tumour type	
Squamous cell carcinoma	10 (62.5)
Adenoid cystic carcinoma	2 (12.5)
Adenocarcinoma	1 (6.25)
Others	3 (18.8)
Therapy	
Surgery	2 (12.5)
Surgery+radiation therapy	10 (62.5)
Surgery+radiation therapy+chemotherapy	4 (25)

diagnosis, followed by adenoid cystic carcinoma (12.5%, 2/16) and adenocarcinoma (6.25%, 1/16).

The global QOL after prosthodontic therapy with obturator prosthesis was found to be 59.9 ± 3.7 on average. Individual scores for specific domain are given in Table 2. Average score for speech (68.12 ± 13.02) and swallowing - leakage with solids (67.8 ± 6.05) was reported as highest among all domains and average score for satisfaction with facial appearance (53.8 ± 10.7) and social family interaction (50.9 ± 9.5) was reported as lowest. QOL of obturator patients was not significantly related to age ($P = 0.9$) and gender ($P = 0.320$).

The extent of therapy was correlated positively with QOL. A significantly better average rating was found in patient who underwent surgery (64.75 ± 1.2), followed by patients with surgery + radiotherapy (60.95 ± 2.02) and surgery + radiotherapy + chemotherapy (55 ± 2.36) with a $P = 0.006$. QOL was also significantly related to educational status ($P = 0.001$) in contrast to other parameters such as age and gender [Table 3].

Discussion

Maxillofacial defects are most commonly rehabilitated using prosthetic obturator and it assists in improving QOL of such patients. This study was conducted to evaluate the QOL of patients with maxillofacial defects after prosthodontic therapy with obturator prosthesis.

Literature suggests that very few publications focus on QOL of maxillectomy patients using obturator prosthesis.^[6,7,12-14] Limitations of this study was its small sample size. Usually, morbidity and mortality measurements are conducted in cancer patients, but QOL is considered more valuable in relation to psychosocial wellbeing of patient.

In this study, impact of specific demographic and treatment variables was analyzed on QOL of patients. As patients with maxillofacial cancers are associated with higher mortality rate, usually small sample sizes are found in studies of maxillectomy

patients. Kornblith *et al.*^[6] interviewed 47 patients, Rogers *et al.*,^[7] 10 patients, Chen *et al.*,^[9] 28 patients.

Global QOL after prosthodontic therapy with obturator was found to be $59.9 \pm 3.7\%$ on average. OFS was used in this study. Several study groups used various other standardized questionnaires such as Psychosocial Adjustment to Illness Scale, Mental Health Inventory and University of Washington - QOL Questionnaire, European Organization for Research and Treatment of Cancer QOL Questionnaire core 30 to assess the health-related QOL in various group of cancer patients.

While investigating the QOL of maxillofacial patients undergoing prosthodontic therapy with obturator prosthesis, a selection bias must be respected. Incorporation of patients who had not received obturator prosthesis might have allowed determining the impact of obturator prosthesis on patient's QOL more distinctly.

In this study, various demographic and medical characteristics have affected significantly the QOL outcome. Extent of therapy was strongest predictor of QOL in maxillectomy patients but much more extensive study involving size of maxillectomy defect and location of defect should be conducted. Kornblith *et al.*^[6] reported that patients who had no more than the third of the soft palate and the fourth of the hard palate resected had better speech scores and overall obturator function. Rogers *et al.*^[7] noted that patients with larger defects had lower scores for activity, recreation, physical function, and overall QOL. Similarly, Okay *et al.*^[15] reported that stability of the prosthesis was compromised as defect size increased, resulting in poor obturator function and QOL. They concluded that defects that involved more than half the hard palate or included the premaxilla, and both canines were poor candidates for prosthetic reconstruction.

The condition of remaining teeth should also be evaluated as it is a strong factor for predicting treatment outcome. Other investigators have documented that the number of remaining abutment teeth, periodontal health, and root form can affect obturator stability and retention. The distance of the direct retainer to the fulcrum line of the prosthesis can also affect

Table 2: Scores of specific domains in OFS questionnaire

Domain	Scoring* (lowest-highest)	Best reported score	Worst reported score	Score Mean±SD
Satisfaction with facial appearance	0-100	70	35	53.8±10.7
Speech	0-100	85	50	68.12±13.02
Speech-ability to speak in public	0-100	75	40	58.75±9.75
Swallowing-leakage with liquids	0-100	75	50	62.18±7.5
Swallowing-leakage with solids	0-100	80	60	67.8±6.05
Chewing/eating	0-100	70	40	56.8±8.9
Saliva-dryness of mouth	0-100	85	50	65.6±9.1
Insertion of obturator	0-100	70	40	55.3±11.8
Social family interaction	0-100	65	35	50.9±9.5
Overall OFS score	0-100	65.6	52.2	59.9±3.7

*A higher score indicates that a patient is asymptomatic or extremely satisfied for all domains in OFS questionnaire. OFS: Obturator functioning scale, SD: Standard deviation

Table 3: Medical characteristics of patients and their influence on QOL (N=16)

Item scales	N (%)	QOL Mean±SD	P
All patients	16 (100)	59.9±3.7	
Gender			
Male	11 (68.8)	59.4±3.4%	0.320
Female	5 (31.3)	61.1±4.5%	
Age			
<60	9 (56.3)	60.07±3.09	0.9
>60	7 (43.7)	59.75±4.7	
Educational status			
Educated	11 (68.75)	55.3±2.2	0.001
Non-educated	5 (31.25)	62.03±1.9	
Therapy			
Surgery	2 (12.5)	64.75±1.2	0.006
Surgery+radiation therapy	10 (62.5)	60.95±2.02	
Surgery+radiation therapy+chemotherapy	4 (25)	55±2.36	

QOL: Quality of life, SD: Standard deviation

the stability of the obturator. QOL is multidimensional and subjective and changes with time and circumstances, therefore, it is difficult to measure.

The results of this study suggest that post-operative radiation therapy was the strongest variable affecting QOL in patients with maxillectomy and prosthetic obturator reconstruction. Further studies are necessary to identify how factors affecting QOL of patients after maxillectomy might influence choice of reconstruction.

Conclusion

Reconstruction of maxillectomy defects by obturator prosthesis is an adequate therapy for rehabilitation of such patients. This study verified the impact of obturator on QOL of maxillectomy patients. The importance of adequate functioning of prosthetic obturator on QOL was emphasized in this study and also it verified the results of similar studies. Future research on other factors such as size of defect and their location affecting the QOL and some alternative reconstruction methods such as application of stem cells may help to overcome the problems typically associated with obturator prosthesis and will improve patients QOL after maxillectomy in future.^[16]

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