Clinical Report

Assessment of Quality of Life in Thirty-seven Cases of Tongue Cancer Defect Patients with Reconstructed with Radial Free Forearm Flap

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Abstract: The purpose of this study was to evaluate the surgical impact on the quality of life in 37 cases of patients who had resections of tongue cancer and reconstruction with a Radial Forearm Free Flap (RFFF). QOL was assessed by FACT-H&N and UW-QOL questionnaires prior to surgical treatment (Group 1) and twelve months postoperatively (Group 2). Thirty-seven of the forty-five questionnaires (82.2%) were returned. Tongue cancer impact QOL on patients' physical, functional, social, and emotional well-being (PWB, SWB, EWB and FWB, respectively) were evaluated using the FACT-H&N questionnaire. Pain, followed by taste and saliva, were considered the most important factors by patients in both groups. In the UW-QOL, mood and shoulder were rated highest in Group 1, compared to pain and anxiety in Group 2. Despite some functional impairment, QOL was preserved after RFFF reconstruction following ablative surgery in patients with tongue cancer. RFFF for reconstruction of defects of tongue significantly influenced QOL.

Key words: Quality of life, Radial Forearm Free Flaps, Tongue cancer

Introduction

Restoration of oral cavity function after ablative head and neck surgery is a continuing surgical challenge—especially after surgery of tongue which enveloped by mucosa containing mucous and serous glands, a special taste sensory end organ, and a general sensory end organ. The mobility of the tongue is critical for mastication, articulation, oral hygiene, and the oral phase of deglutition. A closer look at the anatomy of the tongue puzzles the surgeon and highlights the greatest challenge remaining in oral-cavity reconstruction¹⁾. Now, transfer of free flaps with microvascular anastomoses is the favoured method of reconstruction after major operations for oral cancer, since its first description in 1981 by Yang and colleagues, the Radial Forearm Free Flaps (RFFF) has been used worldwide, particularly for oral and oropharyngeal soft tissue defect reconstruction^{2, 3)}.

Quality of Life (QOL) is a subjective and multidimensional construct defined by the World Health Organization (WHO) as follows: “an individual's 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, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health,

psychosocial state, and level of independence, social relationships, and their relationships to salient features of their environment”^{4, 5)}. QOL has become an increasingly important outcome measure for patients being treated for many illnesses, as it reflects a patient's general sense of wellbeing.

There are a variety of validated questionnaires used to assess QOL in head and neck cancer, but research on tongue cancer aspect were very little. In this study, we use the Functional Assessment of Cancer Therapy-Head and Neck (FACT- H&N) and the University of Washington Quality of Life (UW-QOL) questionnaires before surgical treatment and twelve months postoperatively to evaluate surgical treatment impact the quality of life in thirty-seven cases of patients with tongue cancer and reconstructions with radial forearm free flaps

Materials and Methods

Because this study was retrospective it was granted an exemption in writing by in the First Affiliated Hospital of Zhengzhou University of Ethical Review Board. From January 2002 through January 2012, a total of thirty-seven patients at the Department of Oral and Maxillofacial Surgery, the First Affiliated Hospital of Zhengzhou University underwent RFFF reconstruction after radical surgery for tongue cancer was studied retrospectively. It was granted an exemption in writing by the Zhengzhou

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Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)

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Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	29	78.4
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	24	64.9
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	22	59.5
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	27	73.0
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)		
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	2	5.4
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	6	16.2
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	19	51.4
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	10	27.0
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)		
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	17	46.0
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	5	13.5
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	2	5.4
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	8	21.6
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	3	8.1
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	2	5.4
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)		
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	34	91.9
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	3	8.1
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Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	2	5.4
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Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	17	46.0
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	12	32.4
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)		
Table 1. Patients' demographic and TNM/Clinical Stages (n = 37)	33	89.2

Table 2. Before surgical treatment and 12 months after TFFF operation in University of Washington Quality of Life questionnaire (Mean)

Domain	Number of Cases (n=37)	
	Group1	Group2
Pain	43.8	82.3
Appearance	58.7	61.2
Activity	52.3	42.7
Recreation	54.1	48.6
Swallowing	73.7	69.4
Chewing	71.2	62.8
Speech	73.9	50.8
Shoulder	80.6	68.4
Taste	75.4	49.7
Saliva	78.2	43.1
Mood	81.9	66.3
Anxiety	70.5	88.2

Group1: Before surgical treatment; Group2: 12 Months after TFFF

University and the First Affiliated Hospital of Zhengzhou University of Ethical Review Board. Once patients had been

diagnosed with cancer of tongue they accepted that immediate reconstruction with RFFF was necessary. Patients with recurrent disease were not excluded, when possible, reevaluation of the patients was performed. A total of forty-five patients had resections partly or total of tongue and reconstruction with radial free forearm flap, thirty-seven questionnaires were returned. Eight patients were excluded secondarily from the study for the following reasons: death (one case), tumor recurrence during the first six postoperative months (three cases), free flap failure (two cases) and incomplete data (two cases).

Patients completed the Functional Assessment of Cancer Therapy-Head and Neck (FACT- H&N) and the University of Washington Quality of Life (UW-QOL) questionnaires before surgical treatment and twelve months postoperatively. Most patients completed the questionnaire when they came back to the hospital for regular review. FACT- H&N and UW-QOL at one or two time points during the follow-up periods, patients who were not able to fill in the questionnaires themselves (as a result of dementia or language, completed the form by their families) were not excluded from the study. The patients who did not reply within

Table 3. Before surgical treatment and 12 months after TFFF operation in Functional Assessment of Cancer Therapy-Head and Neck (Mean)

Domain	Entry	Scores range	Group1 1	Group 2	Scoring Method
PWB	7	0-28	24.4	17.6	GP1+ GP2+ GP3+ GP4+ GP5+ GP6+ GP7
SWB	7	0-28	25.9	22.1	GS1+ GS2+ GS3+ GS4+ GS5+ GS6+ GS7
EWB	6	0-24	17.3	18.4	GE1+ GE2+ GE3+ GE4+ GE5+ GE6
FWB	7	0-28	21.9	13.8	GF1+ GF2+ GF3+ GF4+ GF5+ GF6+ GF7
FACT-G	27	0-108	89.5	71.9	PWB+ SWB+ EWB+ FWB
HNS	9+2	0-36	29.7	23.0	hn1+hn2+hn3+hn4+hn5+hn6+hn7+hn10+hn11
Total	38	0-144	118.2	94.9	PWB+ SWB+ EWB+ FWB+HNS

PWB: Physical Well Being SWB: Social family Well Being EWB: Emotional Well Being
FWB: Functional Well Being Group1: Before surgical treatment Group2: 12 Months after TFFF

one month were sent a reminder.

All statistical analysis were performed using statistical package for social science (SPSS), version 16.0 (SPSS Inc., Chicago, IL, USA). Results were record and expressed as the mean $\pm$ SD. $P < 0.05$ was considered to indicate a statistically significant result.

Results

Patient characteristics

The patients' demographic and TNM/Clinical Stages has been listed in Table 1. Of the thirty-seven patients who completed questionnaires, there were 29 men and 8 women in our search, median age is 64 (range 31–84) and 24 cases lower than 65 years, median Karnofsky score is 67 (55–90) and 15 cases more than 70. 27 patients have sharp Stimulus contained sharp teeth or dentures around primary tumor. Patients were staged according to the 2010 American Joint Committee on Cancer (AJCC) staging system; their main clinical characteristics are listed in Table 1. In our research, more than half our patients had had little education, 9 patients could not read or write, and needed help to complete the questionnaire, 2 patients were orphans, and 2 patients lived alone. Only 24 patients had a stable income, the rest needed funding from their families. But even this, thirty-seven of the forty-five questionnaires (82.22%) was completed FACT- H&N and UW-QOL at one or two time points during the treatment and follow-up periods. The time needed for completing both questionnaires is very acceptable and makes it feasible to use them in clinical studies. Data for the FACT- H&N and UW-QOL scales and items in Group1 (Before surgical treatment) and Group2 (12 Months after TFFF) are shown in Table 2 and Table 3. In TNM stages researches, we found that most patients had T3–T4 stage tumors, and only a few T1 and T2 stages. This may be because patients with T1- T2 stage tumors had small tumors that did not need AFFF reconstruction.

UW-QOL

Developed at the University of Washington, the UW-QOL was

intended as a discriminative instrument for a variety of head and neck cancer sites and stages, especially when surgery is used⁽⁶⁾. The instructions of UW-QOL are clear and specify consideration of the last 7 days. It was consisted 12 questions: 9 disease specific items (pain, chewing, swallowing, speech, shoulder disability, appearance, activity, recreation and employment), and 3 general items (compared to the month before developed cancer, health-related quality of life, overall quality of life) measuring global health-related QOL. The scores for 12 disease-specific domains and the importance of each domain are shown in Table 2. Mood and shoulder were the highest scorers before surgical treatment, compared to pain and anxiety after TFFF 12 months in Group 2. The worst scores in the domains were for pain, activity and recreation, all patients being dissatisfied with these domains, especially with the pain in Group 1 because of its characteristics. In the selection of the most important changes of the 3 domains, pain was considered most important in Group 1 and Group 2 followed by taste and saliva.

FACT- H&N

FACT-H&N comprises a core questionnaire called FACT-G, and a disease-specific subscale. FACT-G is self-administered multi-item indices using category-rating scales, consisted of 27 questions in 4 domains: PWB (Physical Well Being), SWB (Social family Well Being), EWB (Emotional Well Being) and FWB (Functional Well Being). The 38 item FACT-H&N includes an 11-item head and neck cancer specific subscale. The overall score ranges from 0 to 144. In all instances, a higher score reflects a better quality of life. Scores are calculated separately for each domain, and a summary score is calculated for the FACT-G and the total FACT-H&N. Distributions of FACT-H&N domain scores at presentation are shown in Table 3. The best domain before surgical treatment scores were 25.9 for SWB, 24.4.7 for PWB, and 21.9 for FWB. The total scores in Group 2 were less than Group 1, similarly to FACT-G and HNS. EWB with patient's satisfaction increased gradually with postoperative recovery after RFFF.

Discussion

Tongue cancer is a serious malignant disease, and the anatomy of the tongue puzzles the surgeon and highlights the greatest challenge remaining in oral-cavity reconstruction. Resection is the cornerstone of management and rehabilitation of these patients with oral cancer can be an emotionally and technically challenging endeavor. Pedicle flaps, such as the pectoralis major musculocutaneous or deltopectoral skin flaps, usually have a limited arc of rotation and the position of the nipple at the donor site becomes distorted which causes esthetic problems, and therefore are of limited use. At present, it is generally acknowledged that free flaps transfer with microvascular anastomosis is the favored method for reconstruction after major oral cancer surgery⁷⁾. Yang et al,²⁾ first made the radial free forearm flap (RFFF) in 1981, which was a major breakthrough in reconstructive surgery, and appreciated in this type of reconstruction. It is a free tissue transfer characterized by thinness, pliability, a long vascular pedicle, contour ability, and maintains consistent volume and surface area over it. AFFF helped to shift focus away from simple coverage of defects towards minimizing morbidity at the donor site, refining the flap, selecting the most appropriate donor tissue, reducing bulk, and reconstructing defects in a functional, three-dimensional manner, and it was recognized as the method of choice for reconstruction of soft tissue defects in the oral cavity and oropharynx, especially in tongue cancer.

In the assessment of any therapy, particularly for cancer patients, analysis of QOL represents the ultimate step of the evaluation process. QOL has recently become a constant preoccupation in the assessment of any therapy in oncology. Some authors describe QOL as welfare state along with patient's satisfaction. Other authors relate QOL as the difference between the patient's expectations and what they can really perceive. Assessment of QOL can now be used in an attempt to improve treatment outcomes and to measure success or failure in cancer treatment has been survival, understood as a period free of disease. Completion of questionnaires can help put into context what other patients report as their outcome after intervention allowing greater patient-doctor interactions and understanding. It also allows expressions of concern that the patient is otherwise reluctant to mention. Nevertheless, few studies have assessed QOL in our field of interest. In our study, we used the UW-QOL and FACT- H&N questionnaires to assess the postoperative QOL of these patients and the possible relation to surgery.

The UW-QOL measure was chosen as the oral-specific questionnaire that provided a broad measure of QOL for patients with tongue cancer with good acceptability, practicality, validity, reliability, and responsiveness. Language is simple, but because individual response options are provided for each question rather than using a standardized scale, the reading burden is high. Each item is scored from 0–100, with higher scores indicating better

QOL, resulting in a summary score of 0–900 for the disease-specific items, and each question has 3–6 response options⁸⁾. It is brief and appropriate so it can be used on a regular basis with low cost. It presents an additional module which evaluates emotional status and anxiety. In our study, a remarkable finding was that the highest score of UW-QOL subscales was in the pain domain (Before surgical treatment: 43.8; 12 Months after TFFF: 82.3), this finding was similar to that reported in previous studies^{9,10)}. As well as the domain of pain, activity and recreation were lower than others before surgical treatment because of tongue cancer characteristics, patients reluctant to communicate with other, especially when sharp stimulus contained sharp teeth or dentures around primary tumor in our study. Other studies^{11,12)} on importance-rating using the UW-QOL questionnaire in patients treated by primary surgery for oral cancer, found that speech, chewing, and swallowing as more important than the other UW-QOL domains. Differently to these studies, we found that chewing, swallowing, and saliva were the most important in our study. This is maybe because in traditional Chinese culture we pay more attention to diet than to speech, and these findings similar to Li W et al.⁹⁾ research.

FACT-H&N is a disease specific QOL instrument which has been developed using sound psychometric principles and the input of patients. It was first developed by Cella DF and his colleagues in 1993¹³⁾ and designed for descriptive, discriminative and evaluative use. The FACT-H&N has been shown to discriminate levels of functioning across the broad spectrum of Head and Neck Cancers, and has demonstrated good inter-rater reliability as well as sensitivity to differences in performance and change over time. BIAN Xue et al found that QOL deteriorated significantly in head and neck cancer patients, cancer in different sites impact on QOL differently especially in patients with tongue cancer¹⁴⁾. FACT-H&N is self-administered and easy to read, with clear instructions and consistent response options. In this study, recovery scale rate and qualified rate was 95%, average completion time is 15 minutes. In a study of 151 head and neck cancer patients, Crohnbach's alpha finding that all subscales showed internal consistency that was acceptable, with excellent values for the total FACT-H&N, physical and functional subscales¹⁵⁾. In our study, distributions of FACT-H&N domain scores at presentation are shown in Table 3. the total scores in Group 2 were less than Group 1, similarly to FACT-G and HNS. EWB with patient's satisfaction increased gradually with postoperative recovery after RFFF, this may be because once the discharged subjects returned home, the improvement in their physical condition and the support from families and friends improved their emotional response.

Because of the rich supply of lymph and blood, tongue cancer more prone to lymph node metastasis and blood metastasis, cervical dissection must be carried out during operation. Worse QL has been found in patients with cervical dissection operation

compared to those who have not have it¹⁶⁾, related to the fact that they are patients in a more advanced stage. The cervical dissection, along with the scar consequence of the surgical reconstruction with a myocutaneous pedicled flap is a combination that in a most important way influences in patient's complaints on esthetic and pain in the reconstructed location¹⁷⁾. Little shoulder dysfunction has been reported with unilateral selective neck dissections (level I to III/IV) as compared with no dissection. During our study, significantly worse shoulder function was also found if selective neck dissections were bilateral or extended to level V.

There were limitations that could influence the result of our findings. We described oral cancer in the study population at one point in time, and so could not fully assess its impact on patients' QOL over the whole postoperative period. Under these circumstances QOL assessment is quite a new area, and the emphasis is placed on clinical practice and research. Considerable effort should therefore be put into it. QOL should be acknowledged as an important outcome, together with traditional biomedical outcomes. Clinically, QOL of PSS-HN and UW-QOL should be used as part of our treatment for giant tumor in head and neck region.

To summarize, RFFF has become a universal flap for reconstruction in the head and neck region. Further research is necessary to determine the value of the RFFF and whether this reconstruction technique achieves the best possible functional outcome. In our experience, there were limitations that could influence the result of our findings. We described tongue cancer in the study population at two points in time, and so could not fully assess its impact on patients' QOL over the whole postoperative period. We have confirmed previous reports in this field of interest and shown that an acceptable QOL could be obtained in most cases, even after extensive ablative surgery. Continuing this study with a larger number of patients should allow more precise and reliable evaluation of their QOL and the factors that influence it.

In conclusion, in tongue cancer postoperative free flap for reconstruction, QOL assessment is quite a new area and the emphasis is placed on clinical practice and research. Therefore, considerable effort should be paid to this area. QOL should be acknowledged as an important outcome parameter, along with the traditional biomedical outcomes. Clinically, QOL should be used as part of tongue cancer treatment and this should be considered for surgical planning. RFFF for reconstruction of defects of tongue significantly influenced QOL.

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