Quality of Life of Patients With Recurrent Nasopharyngeal Carcinoma Treated With Nasopharyngectomy Using the Maxillary Swing Approach

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Objective: To investigate factors affecting the quality of life (QOL) of patients with recurrent nasopharyngeal carcinoma who underwent a nasopharyngectomy using the maxillary swing approach.

Design: Cross-sectional study using self-administered questionnaire data and medical chart review.

Setting: Tertiary cancer referral center.

Patients: Patients with recurrent nasopharyngeal carcinoma who underwent a nasopharyngectomy using the maxillary swing approach between January 1998 and December 2003, had a minimal follow-up of 3 months, and completed the questionnaire.

Interventions: We measured QOL using the validated traditional Chinese version of the European Organization for Research and Treatment of Cancer core questionnaire and head and neck module.

Main Outcome Measures: Descriptive analysis of the results and comparison of scores for each QOL domain, stratified by presence of postoperative trismus, presence of postoperative palatal fistula, sex, age (≤45 years and >45 years), duration of treatment (≤1 year and >1 year), and disease status at follow-up, were performed using nonparametric tests.

Results: Of the 50 eligible patients, 41 (32 men and 9 women; mean [SD] age, 51.5 [10.4] years) participated in the study. The mean±SD global QOL scale score of the participants was 68.7±24.2. Social functioning score was the lowest (64.6±25.9) of the 5 functioning scales. Fatigue and financial difficulties were the most common general concerns. Dryness of mouth, sticky saliva, and limited mouth opening were the most common head and neck problems. Women were found to have significantly lower QOL scores in the fatigue (P=.03), diarrhea (P=.03), and emotional functioning (P=.05) domains than men. The presence of severe trismus after the maxillary swing approach was significantly associated with a low QOL score in the mouth opening (P=.001), sticky saliva (P=.006), mouth dryness (P=.02), and social eating (P=.05) domains. However, the presence of palatal fistula, age, duration of treatment, and disease status at follow-up did not result in any significant differences on the QOL scores.

Conclusions: The QOL of patients treated with nasopharyngectomy using the maxillary swing approach to treat recurrent nasopharyngeal carcinoma was good. Female sex and the presence of postoperative trismus were factors significantly related to some of the QOL domain differences after surgery.


Nasopharyngeal carcinoma (NPC) has a high prevalence among the population of Southeast Asian countries.1 The primary treatment is external beam radiotherapy. Salvage therapy is considered when the tumor persists or recurs after radiotherapy. However, further irradiation is associated with a higher incidence of complications, and the treatment result is not satisfactory.2-4 Surgical resection offers an alternate treatment option.

Nasopharyngectomy using the maxillary swing approach is a relatively new operation for resection of recurrent NPC after previous radiotherapy.5 Published data8 suggest that surgical salvage using this method has a higher rate of local tumor control than reirradiation in selected groups of patients. However, postoperative morbidities, including development of postoperative palatal fistula and worsening of trismus, can affect normal speech, eating, and swallowing functions, thus delaying the return of recovering patients into society.

When we compare a new treatment for cancer with an older method to determine which of the 2 treatments is better, we need not only to look at how much longer people survive with each treatment but also to determine how well they have survived during that time. The quality-of-life (QOL) measurement allows us to assess and put realistic numbers on a person’s functioning in the domains of living.
To our knowledge, there have been only a few studies in the literature on QOL issues of patients with NPC after radiotherapy and no reports concerning patients with NPC who underwent nasopharyngectomy. The aim of the present study is to investigate factors affecting the QOL of this group of patients.

## METHODS

### STUDY DESIGN

We conducted a cross-sectional study using a self-reported, health-related QOL questionnaire to evaluate the QOL of patients with NPC who underwent nasopharyngectomy for recurrent NPC after radiotherapy.

### PATIENTS

We reviewed the records of patients who underwent nasopharyngectomy performed at the Head and Neck Division of the Department of Surgery, University of Hong Kong Medical Centre at Queen Mary Hospital, Hong Kong, China, from January 1998 to December 2003. Inclusion criteria of subjects were that the patient had undergone a nasopharyngectomy using the maxillary swing approach to treat recurrent NPC and that at least 3 months had passed since surgery. Patients who had undergone a nasopharyngectomy for other reasons, patients with diagnoses of other types of malignancies, or patients unable to complete the questionnaire because of illiteracy were excluded from this study. Eligible subjects were contacted by telephone and invited to participate in the study. At the same time, their mailing addresses were verified. The questionnaires, the consent form, and a stamped return envelope were mailed to those patients who agreed to participate in this study.

Clinical data, including age, sex, smoking and drinking habits, medical history, type of resection, side of surgery, and length of follow-up period, were obtained from patients’ records. The presence of a postoperative palatal fistula was documented in the record. Moreover, the distance between the upper and lower incisors (interincisor distance) was measured routinely during each follow-up. A value of less than 25 mm was clinically defined as severe trismus.

### QUESTIONNAIRE

The QOL instrument was developed and translated by the European Organization for Research and Treatment of Cancer (EORTC). The questionnaire has 2 parts. The core questionnaire (Quality-of-Life Questionnaire [QLQ]-C30) applies to all patients with cancers, and the disease-specific questionnaire (QLQ-H&N35) is designed for patients with cancer of the head and neck region. The raw scores obtained from the EORTC questionnaires were converted to scores ranging from 0 to 100 using linear transformation according to the scoring procedures. For this study, we used the traditional Chinese version of questionnaires, which had been validated as useful in assessing the QOL of Chinese cancer patients.

The QLQ-C30 includes 30 questions comprising both multi-item scales and single-item measures. The 9 functional scales are physical functioning, role functioning, emotional functioning, cognitive functioning, and social functioning. The 3 symptom scales are fatigue, nausea and vomiting, and pain. There is a global QOL scale. The 6 single-item measures are dyspnea, insomnia, appetite loss, constipation, diarrhea, and financial difficulties. A high score for a scale represents a higher response level. Thus, a high score for a functional scale represents a high or healthy level of functioning, a high score for the global QOL scale represents a high QOL, but a high score for a symptom scale or item represents a high level of symptoms (problems).

The QLQ-H&N35 comprises 35 questions incorporating 7 multi-item scales and 11 single items. The multi-item scales are pain, swallowing, senses, speech, social eating, social contact, and sexuality. The single items are teeth, opening mouth, dry mouth, sticky saliva, coughing, felt ill, pain killers, nutritional supplements, feeding tube, weight loss, and weight gain. For all items and scales, high scores indicate more problems. There are no function scales in which high scores would mean better functioning.

### STATISTICAL ANALYSIS

The transformed raw scores were analyzed with respect to the scales and items of the EORTC questionnaires. Possible significant factors affecting the QOL measurement were tested. They included presence of severe trismus (interincisor distance of <25 mm), presence of a postoperative fistula, sex, age (≤45 years vs >45 years), duration of treatment (≤1 year vs >1 year), and disease status at follow-up (no recurrence vs recurrence).

We used SPSS statistical software (version 12.0; SPSS Inc, Chicago, Ill) in the analyses. Univariate analysis of the median scores between the 6 factors was performed using the Mann-Whitney U test and covariables adjusted using the multiple regression model. The level of significance was set at 5% in all the comparisons, and all statistical testing was 2-sided.
The study complied with the latest version of the Declaration of Helsinki (52nd World Medical Association General Assembly; Edinburgh, Scotland; October 2000) and was approved by the ethics committee of the institutional review board of the University of Hong Kong. We obtained permission to use the QOL questionnaires from the EORTC.

**RESULTS**

**SAMPLE CHARACTERISTICS**

There were 61 nasopharyngectomies performed in the study period. Seven patients underwent operations for reasons other than NPC, and 4 patients refused to participate. Of the 50 patients, 41 (80%) returned questionnaires.

The sociodemographic characteristics of the participants are shown in Table 1. Their ages ranged from 31 to 75 years (mean [SD] age, 51.5 [10.4] years). There were more men than women. Most of the patients were married and had received formal education; however, only a third of them were employed. Use of cigarettes or alcohol was not common. Recurrent NPC was the sole illness in over 80% of patients.

Table 2 lists the cancer-related and treatment-related variables of the participants. In addition to undergoing nasopharyngectomies, 4 patients underwent radical neck dissection for treatment of concomitant metastatic neck lymph node metastasis. Thirty-two patients had curative resection. Patients with palliative resection were referred to other health care practitioners for adjuvant treatments. Seventeen patients underwent surgery within 1 year. During the study period, over 90% of patients did not show evidence of tumor recurrence.

Eight patients (20%) developed postoperative fistulas, and 29 (71%) had severe trismus.

**PSYCHOMETRIC ANALYSIS**

The reliability of the questionnaire in this study was calculated using the Cronbach α coefficient. Alpha coefficients of a magnitude of 0.70 or greater were sought as evidence of adequate scale reliability for use at the level of group comparison. The internal reliability coefficients of the QLQ-C30 and QLQ-H&N35 instruments were 0.88 and 0.79, respectively.
QOL RESULTS

The transformed scores of the QLQ-C30 and QLQ-H&N35 for all the participants are shown in Table 3. The mean±SD global QOL scale score was 68.7±24.2. Among the 5 functioning scales, social functioning had the lowest scores (64.6±25.9). Fatigue (33.6±18.0) and financial difficulties (30.9±35.3) were common concerns of our participants. Dryness of mouth (61.0±29.7), sticky saliva (55.3±32.2), and mouth opening (39.0±34.9) were frequent head and neck complaints.

With regard to the QLQ-C30 assessments (Table 4), we found no significant differences in terms of presence of severe trismus or postoperative palatal fistula, age, treatment duration, and disease status at follow-up. However, women had significantly lower scores than men on certain QOL domains, including fatigue ($P=.03$), diarrhea ($P=.03$), and emotional functioning ($P=.05$).

When analysis was performed with the same factors using the QLQ-H&N35 measurements (Table 5), age, duration of treatment, and disease status at follow-up were not statistically significant. Weight loss ($P=.04$) was worse when a postoperative fistula was present. Mouth opening ($P=.01$), sticky saliva ($P=.006$), mouth dryness ($P=.02$), and social eating ($P=.05$) were poorer when postoperative severe trismus was present.

**COMMENT**

Nasopharyngeal carcinoma is a common cancer among the people of Southeast Asian countries. The primary treatment for NPC is external beam radiotherapy to the primary tumor in the nasopharynx, paranasopharyngeal tissue, and lymph nodes in the neck. Local failure in the nasopharynx occurs in 10% to 30% of patients. Depending on the extent of recurrent disease,
further treatment can be either external irradiation, brachytherapy, or salvage surgery.21,22

However, reirradiation using brachytherapy or external radiotherapy had been associated with significant morbidity, including radiation-induced temporal lobe encephalopathy and further worsening of preexisting radiation-induced complications. The local control of tumors is poor.2-4

The maxillary swing approach described by Wei et al5 allows wide exposure of the central skull base region when the maxillary antrum and the hard palate are retracted laterally. This allows adequate resection of the recurrent tumor and involved paranasopharyngeal tissue (Figure). With this approach, the local control of recurrent tumors in the nasopharynx approached the rate of 60% at 5 years, and the 5-year actuarial survival rate for the curative groups was 55%.8,23,24 However, postoperative severe trismus and development of palatal fistula are common problems that disturb normal speech, eating, and swallowing functions. In addition to the concurrent adverse effects of ir-

<table>
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<th>Palatal Fistula</th>
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*P = .50.
†P = .001.
‡P = .02.
§P = .006.
||P = .04.
Currently, psychosocial research on patients with NPC is limited. To our knowledge, the present study is the first of this kind to evaluate the QOL of patients who had undergone a nasopharyngectomy for treatment of recurrent NPC after primary radiotherapy. However, several limitations should be discussed. First, this is a retrospective study, and the small sample represents a carefully selected group of patients with recurrent NPC that was amenable to surgery. Comparison with other treatment modalities was difficult, and perhaps the patients’ pretreatment QOL status will be much more suitable as an internal control.

Second, the cross-sectional nature of the study means that the cause and effect could not be determined. Some of the physical changes may have already been present before surgery; for example, trismus was common to patients who had had previous irradiation. A prospective longitudinal study and monitoring of serial QOL changes before and after treatment will provide stronger evidence.

Although the response rate of 80% was acceptable for questionnaire study, it is important to determine the exact reasons why some (4) patients refused to participate and some (9) did not respond. There was selection bias from the responders who tended to be healthier and happier, and thus they had better QOL scores.

Finally, because of the intrinsic property of any QOL study, our results, especially for the single-item measures, likely lack both specificity and robustness. This issue can be addressed in future studies by using additional questionnaires or validated questionnaires to specifically evaluate the problem (eg, using the Brief Pain Inventory for evaluation of cancer-related pain and the Fatigue Symptoms Inventory for assessment of cancer-related fatigue).

Our participants reflected the typical characteristics of patients with NPC; that is, it affects a younger population than other head and neck cancers; it is usually not associated with smoking or alcohol abuse; and the patients have a lower incidence of associated comorbidity. From the transformed data, we found that most of the scores for the QOL domains were good and the global QOL scale score was approaching 70. Financial difficulties and fatigue were the most common general concerns. Married middle-aged men formed the largest group in this study, and traditionally they are the income earners in their families. However, many of these patients had unstable incomes as a result of unemployment and their disease, which caused a considerable decrease in family income. Fang et al found that financial resources were important variables in determining a patient’s ability to cope with cancer and treatment complications. Those patients who had a higher economic status and stable employment tended to enjoy a better QOL. Another study, by Ramsey et al, showed that lower income status of cancer survivors was associated with worse outcomes for reported pain, ambulation, and social and emotional status.

Fatigue is a common complaint among patients with cancer. It is very rapid in onset, intense in severity, and constitutes an overwhelming energy drain. Many studies show that untreated cancer-related fatigue can lead to various social, psychological, and cognitive distresses. A further exploration of this problem would be worthwhile.

Owing to financial constraints, cancer-related fatigue, and irradiation-induced oral symptoms, this vulnerable subgroup of patients with cancer was predisposed to difficulties in social and interpersonal adjustments, which might explain why their lowest scores were for social functioning. Although many patients reduce such activities as eating in restaurants, visiting with friends and relatives, and participating in social functions, others resign themselves to a solitary, reclusive life. Hammerlid et al similarly found that social functioning and role functioning were worse after completion of treatment among patients with NPC and that the 3 major concerns were difficulty in enjoying meals, feeling ill, and dryness of mouth.

Among our patients, the most frequent complaints of physical symptoms were dryness of the mouth, sticky saliva, and limited mouth opening, which are common morbidities after irradiation to the head and neck region. In addition, surgery will add extra damage to the irradiated nearby oropharyngeal structures, such as the pterygoid muscles. More tissue fibrosis will result during healing, which explains the high incidence of postoperative trismus.

In our study, the presence of postoperative trismus was significantly associated with difficult social eating. It dras-
tically limited the patient’s choice of food and the type of precious nutrients available to them. Most patients were limited to food pastes or purées and other easily masticated food because they had difficulty eating crunchy or chewy types of food. The normal eating, swallowing, and speech functions are greatly affected as a consequence of deglutition problems, xerostomia, sticky saliva, trismus, and decreased pharyngeal mobility. An active treatment to alleviate the symptoms of trismus is worth considering at an early postoperative phase when fibrosis has not yet been established. Traditionally, radiation-induced trismus is treated with mobilization exercises using mechanical appliances to reduce the severity of fibrosis, hyperbaric oxygen, oral medications, such as pentoxifylline, and surgical release of the fibrotic tissue to ease symptoms. Combining the procedures of fibrosis, hyperbaric oxygen, oral medications, such as pentoxifylline, and surgical release should be considered for severe cases.

The rate of palatal fistulas in our patients was 24%, which is similar to the rates found in the literature. The fistula causes an abnormal change between the oral cavity and the nasal cavity, thus disturbing the normal swallowing and speech functions. The likely reason that the QOL was not affected was that many fistulas were small in size, and the patient could wear an obturator dental plate to compensate for poor oronasal function. However, an incorrectly fitted obturator can cause many problems, including poor hygiene, pain, and sometimes ulceration of the mucosal edge. Furthermore, surgical repair is needed for any large palatal fistula.

A patient’s sex has long been viewed as a particularly important variable in the psychosocial adaptation to head and neck cancer. In this study, women were identified as having significantly lower scores on emotional functioning, fatigue, appetite loss, nausea and vomiting, and diarrhea. In fact, women are believed to experience greater psychosocial difficulties because in most cultures they value facial attractiveness more highly than men do. Moreover, women were found to be frequent users of emotion-focused coping strategies, which is associated with greater mood disturbance, avoidance, self-blame, and psychological impairment.

In conclusion, our study shows that the QOL was good for patients with recurrent NPC treated with nasopharyngectomy using the maxillary swing approach. Although several domains of the QOL assessment instruments were important, some of them, such as dry mouth and sticky saliva, are inherent to previous radiotherapy; other domains, such as financial difficulties and low social functioning, may be related to inequality of resources distributed in society.

Our results suggest that psychosocial support should be provided to female patients because they experience more significant symptoms after surgery than their male counterparts. What is more relevant to clinicians is that this study has identified the significant adverse effects of postoperative trismus on various aspects of the QOL domain. It is worthwhile to alleviate the degree of trismus at an early stage of the rehabilitation period when trismus is still reversible. Surgical release should be considered as a treatment for those patients who have severe, established trismus.

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Trial Registration Required

In concert with the International Committee of Medical Journal Editors (ICMJE), Archives of Otolaryngology–Head & Neck Surgery will require, as a condition of consideration for publication, registration of all trials in a public trials registry (such as http://ClinicalTrials.gov or http://controlled-trials.com). Trials must be registered at or before the onset of patient enrollment. This policy applies to any clinical trial starting enrollment after July 1, 2005. For trials that began enrollment before this date, registration will be required by September 13, 2005, before considering the trial for publication. The trial registration number should be supplied at the time of submission.

For details about this new policy, and for information on how the ICMJE defines a clinical trial, see the editorial by DeAngelis et al in the June issue of Archives of Otolaryngology–Head & Neck Surgery (2005;131:479-480). Also see the Instructions for Authors on our Web site: http://www.archoto.com.