

■ *Original Article*

Quality of life and pain prevalence in postoperative patients with oral malignancy- a prospective longitudinal study

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Abstract

Background: Epidemiology of pain in oral cancer patients, the effects of curative treatment on this pain, and the impact that the pain experience may have on the patient's quality of life is an overshadowed topic. **Methods:** A prospective and descriptive study on prevalence of pain, with its impact on quality of life (QOL) was carried out in 36 diagnosed cases of squamous cell carcinoma (SCC) of oral cavity, and were treated with a curative intension. QOL assessment was done using a questionnaire followed by clinical examination at 6months and 12 months post-treatment. Pain was assessed using memorial pain assessment card and pain faces. **Results:** 42 patients enrolled for this descriptive study but at the end of one year study period only 36 patients completed both the questionnaires. We observed that QOL in our patients, was significantly influenced by mode of soft tissue reconstruction, tongue mobility, speech intelligibility, cosmesis and oral competence. At 6months 16.7% patients reported no pain but at 12months this proportion increased to 52.8%. Severity of pain reduced significantly over time with significant improved pain relief. We observed significant correlation between pain, QOL and mood scale at 12months post-treatment. **Conclusion:** This study has clarified and statistically confirmed some principles on the residual QOL for patients treated by surgical resection and flap reconstruction for cancer of the oral cavity already presented in the literature. Pain is common among those presenting with curable head and neck cancer. Pain can be reduced by curative treatment.

Keywords: pain, quality of life, oral cancer

Introduction

Pain is a word which is often used synonymously with cancer and is one of the most feared and burdensome Head and Neck Cancer (HNC) symptom and as many as 72% of patients who die of cancer, die with pain.¹ The impact of untreated or poorly treated pain can be overwhelming as it affects physical functioning, psychological well-being, and social interactions.² Persistent pain is devastating for the quality of life of those suffering from cancer

and this fear has aided the drive for the agenda for physician-assisted suicide.³

Previous surveys have evaluated the pain experience either from retrospective analysis of medical records or from the views of health care professionals.⁴ This survey was designed to specifically explore the experience of pain from the patient's perspective; hence providing a more direct insight into the impact of pain on patients, their families and care givers.

Thus the present study is aimed to examine the prevalence, severity and pattern of pain in head and neck cancer patients followed prospectively at

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6month and 12 month intervals postoperatively. It correlates pain experience with patient and disease parameters and examines the factors that are associated with and predict ongoing pain. The impact of pain on patient's psychological distress and general well being is also reported. The study also aims to determine the postoperative quality of life of patients having undergone ablative surgery of oral malignancies with regard to surgical parameters such as tumor stage, site of lesion, extent of surgery and reconstruction in a prospective longitudinal fashion.

Methods

Patient

This prospective longitudinal study included all the biopsy proven or otherwise diagnosed (clinically) cases of squamous cell carcinoma (SCC) of oral cavity. Patients those who were blind, mentally retarded, demented as a result of senility, or unable to fill the questionnaire by other reasons were excluded. Before inclusion, the WHO performance status (PS) and mental status were assessed. Forty two patients (M=30, F=12) who consented for the study were recruited as per the study design. All patients were treated with surgery as the primary modality of therapy.

Instrument

Patient examination proforma as designed and published by Bundgaard et al⁵ was translated from the original English version into three vernacular languages (Kannada, Tulu and Malyalum) and was used for clinical assessment of patients. Patients also filled the Memorial pain assessment card designed on 8.5 by 11 inches card. The validity of the Memorial Pain assessment card has been previously evaluated.⁶

Study design

Each survivor was screened for time since completion of initial cancer treatment. The questionnaire was self reported, being completed by patients at two intervals: 6 months after completion of definitive treatment and again at 12 month interval post treatment. Previous studies⁷ have shown that almost all recurrences of intraoral SCC present within one year after treatment therefore, patients who had no evidence of disease (NED) at the time of re-examination will probably remain disease free and require no further treatment.

Patients were asked whether they had pain that day, within the last few days, the last week, the last month, or more than a month ago. They then were asked to score their most recent pain attributable to their cancer. Pain more than a month ago was not rated. A research nurse assistant obtained informed consent and asked each patient to fill in the questionnaire. The nurse was not part of the treatment team but was responsible for approaching each patient, explaining any areas of confusion regarding the questionnaire. Relevant clinical details including age, sex, stage, site of index cancer, and interval since treatment and surgical details were recorded from the hospital case files.

Approval of the study was granted by the Institutional Ethics Committee.

Data Analysis

The statistical software programme SPSS 11.5 for windows was used for the descriptive analysis. Kruskal Wallis test was calculated to determine correlation between surgical parameters and functional parameters. One way analysis of variance (ANOVA) was performed to compare the differences between quality of life scores with regard to functional parameters and subjective problems. Crosstab was used to analyse the association between different studied parameters. Paired samples test was used to evaluate the change in the scores of different parameters over time.

Results

General demographics: At the end of the study period there were 36 patients (25 male and 11 female) with the mean age of 56.33 year with a range of 27 years to 88 years. Of the 36 patients stage I (7), stage II (7), stage III (4), and stage IV (18). Site distribution was anterior two third of tongue (12), mandibular alveolus(4), retromolar trigone (2), floor of mouth (1), maxillary alveolus (1), lip (4), skin (1), buccal mucosa (2), mandibular alveolus and floor of mouth (1), mandibular alveolus and buccal mucosa(7), retromolar trigone and soft palate (1). Because of the small number of subjects enrolled in the study, these results should be regarded as descriptive in nature.

Effect of tumour stage: The TNM staging has a statistically significant ($p<0.05$) effect on tongue mobility, intelligibility of speech and cosmetic appearance of the patient, with larger lesions showing the worst cosmesis. Larger lesions also had least

scores for tongue mobility and speech intelligibility. The TNM staging had a highly significant ($p < 0.01$) effect on subjective problems like food pocketing and chronic pain with higher number of advanced stage cancer patients reporting for chronic pain.

Effect of treatment: The mode of soft tissue reconstruction either with primary closure, local flaps or with distant flaps had a statistically significant ($p < 0.05$) effect on tongue mobility, speech intelligibility, oral competence and highly significant ($p < 0.01$) cosmesis and with highest score for primary reconstruction in each domain. Mode of soft tissue reconstruction had a significant effect on secondary subjective problems like spillage, food pocketing and chronic pain.

Tongue mobility, speech intelligibility, cosmesis, and oral competence had statistically significant ($p < 0.05$) effect by mandibular defect, with discontinuity defects showing worst results.

Factors determining QOL: Tongue mobility, speech intelligibility, cosmetic outcome, and oral competence had a statistically significant ($p < 0.05$) effect in determining QOL of patients both at 6months interval and at 12months interval. Problems with food pocketing

at 6 month and eating outside at 6month and 12month had a statistically significant effect on QOL. Spilling had no significant effect in determining QOL.

The TNM stage had no significant association in determining QOL both at 6months and 12months interval. Association of discontinuity defect with QOL was found to be insignificant both at 6 months and 12 months interval. But however, mode of reconstruction of the soft tissue defect had a statistically significant ($p < 0.05$) effect in determining QOL at both the intervals

Effect of time: Changes in functional parameters and secondary subjective problems between 6months and 12months interval were compared using paired sample test (Table 1). Tongue mobility and intelligibility of speech highly significantly ($p < 0.01$) improved from 6months post treatment to 12 months post-treatment. Secondary subjective problems like spilling, and food pocketing significantly improved over time from 6months to 12 months post-treatment. In the present observation cosmetic, oral competence and trend towards eating outside failed to show any statistically significant improvement over time.

Table 1: Paired samples test

	Paired differences		t	p
	Mean	Std. Dev		
Tongue mobility at 6mnth-12mnth	-0.500	0.736	-4.070	<0.001
Speech intelligibility at 6mnth-12mnth	-0.694	0.749	-5.560	<0.001
Cosmetic at 6mnth- 12mnth	-0.027	0.166	-1.000	0.324
Oral competence at 6mnth-12mnth	-0.083	0.554	-0.902	0.373
Recurrence at 6mnth-12mnth	-0.055	0.232	-1.435	0.160
Spilling at 6mnth – 12mnth	0.166	0.447	2.223	0.032
Food Pocketing at 6mnth- 12mnth	0.111	0.318	2.092	0.044
Eats out at 6mnth- 12mnth	-0.055	0.333	-1.000	0.324
	Paired differences		t	p
	Mean	Std. Dev		
Pain face scale at 6mnth-12mnth	1.277	1.446	5.301	<0.001
Pain scale at 6mnth- 12mnth	1.980	1.533	7.774	<0.001
Pain description scale at 6mnth-12mnth	1.555	1.318	7.076	<0.001
Pain relief scale at 6mnth-12mnth	-1.091	1.144	-5.725	<0.001
Mood scale at 6mnth – 12mnth	-0.922	0.961	-5.756	<0.001

There was a highly significant ($p < 0.01$) decrease in head and neck pain from 6months to 12 months. Overall, the proportion of patients with no pain increased from 16.7% at 6 months to 52.8% at 12

months post-treatment. Patients significantly ($p < 0.05$) showed an improvement with reporting less pain over time from 6months to 12months as represented by decreasing values for pain in visual

analogue scale over time. There was a highly significant ($p < 0.01$) increase in pain relief over time as reported by patients. Mood scale also showed highly significant ($p < 0.01$) changes over time with improvement from 6 months to 12 months.

Correlation: Even though at 6 months evaluating correlation between QOL, pain scale, and mood did not show any statistically significant correlation, but these three variables did have some association among them. But however, there was a strong correlation between them at 12 months interval. In patients with better QOL, when pain scale decreased mood scale increased on visual analogue scale significantly reflecting that mood does have an impact on pain perception or vice versa.

Recurrence: Data related to recurrence was separately evaluated. Due to smaller number of patient statistical analysis could not be implemented in this group of patients. Out of 36 patients none of the patients presented with recurrence at 6 months follow-up, but 2 out of 36 presented with recurrence at 12 month follow-up interval. One of them was a 53 year male with stage III SCC of retromolar trigone. He complained of strong pain at 6 months follow up visit and excruciating pain at 12 months follow-up visit. He had reduced ratings for mood scale on VAS from 6 months to 12 months. Other patient was a 53 year male with stage IV SCC of tongue. He reported moderate pain at 6 month but severe pain at 12 month visit. An observation of reduced pain relief was made based on the readings on the VAS.

Discussion

Oral SCC has a poor prognosis⁷ and treatment entails some disablement. The 5 year crude survival rate is about 50% in various studies.⁷ Survival correlates with the T and N status. Treatment results are not satisfactory. Worldwide, there seems to be no real variation in the prognosis despite various methods of treatment. Nor is there much hope that progress in surgical techniques or radiotherapy alone will improve the gloomy outlook. Advanced tumors have a particularly poor prognosis. Possible avenues towards better management could include a more aggressive and combined initial approach, but this

would invariably raise the burden of side-effects to unacceptable levels.

Oral function has an impact on QOL, as it influences psychological activity. Problems with disfigurement, swallowing, speaking, and chewing can all have a deleterious effect on QOL. The problem with complete restoration of oral function after intraoral ablation of malignancies forms the background of a discussion about the “treatment of choice” in head and neck cancer patients. Surgery must be the primary treatment of all stage I and most stage II tumours, and resort to supplementary radiotherapy should be confined to cases where prognostic indicators are poor.⁸

“Quality of life” reflects a measure of the difference, or “gap” between one’s perceived reality and one’s expectations or wishes.⁹ Greater the gap, the poorer the QOL. Measuring the gap requires a multidimensional health evaluation, usually encompassing physical, functional, psychological, social, and spiritual domains. The patient is the primary source of the data, because it is the patient’s life that is being measured. Longitudinal studies of head and neck cancer patients have demonstrated that measurable QOL can change over time. Most subgroups of patients report maximum toxicity 2 months after start of treatment. Improvement starts after treatment, but full recovery (if ever) is not achieved before the assessment at 12 months after treatment. Therefore, it is important that, when QOL is an outcome measure in clinical trials, patients must be followed until they have recovered from the acute and sub-acute toxicity.¹⁰ As recommended by Karvonen-Gutierrez et al,¹¹ routine QOL assessment at baseline (pre-treatment), 6 months (post-treatment), 1 year (stabilization point), and 2 year (disease free or recurrent/persistent disease status) should be done. Variation over time should be assessed, as QOL is such an individual phenomenon that each patient should serve as his or her own “control” rather than be compared in a cross-sectional manner with other patients at different stages along their disease treatment path.

Before attempting an analysis of the results of this study, it is important to emphasize that the results presented here are preliminary because of the small

number of subjects enrolled in the study. The sample was limited by an uneven site distribution of oral lesions and by a limited number of patients. As a result of the small number of cases in each site, one poor measurement or a high percentage of advanced lesions might have distorted the entire group's result. Further because of the selection of patients, the results from a clinical study may not be a representative description of the QOL of the entire head and neck cancer population. In this descriptive longitudinal study, data have been collected from a non-selected population of patients with oral cancer. We think that our results are quite representative for the population in focus.

In the present study, the stage (TNM) had a significant effect on mobility of tongue, intelligibility of speech, and cosmetic appearance of the patient. In most patients with stage IV lesions mandible and buccal mucosa was involved making them the candidates for bony resection and reconstruction with distant flap (PMMC). As reported by Wilson et al,¹² only soft tissue reconstruction of mandibular bony defect results in inferior cosmetic appearance than in comparison with those having bony reconstructions. Treatment of larger lesions also result in inferior intelligibility of speech and reduced tongue mobility as reported in literature.¹³ Previous study has reported a strong association between advanced stage and reduced QOL¹⁰ but in the present study no significant association was observed between stage of disease and QOL at both the intervals 6months and 12months. Brown et al,¹⁴ reported adequate correlation of speech scoring amongst patients, clinicians, speech therapist and lay people. For certain items, clinician-rated observations can mirror those of patients and this is useful in scoring and evaluating outcome.¹⁴

In small defects, local flaps or skin grafts can be used. The size and the site of the tumour dictate the modality of resection and reconstruction. In the present study tongue mobility, speech intelligibility, cosmetic appearance and oral competence were significantly affected by mode of reconstruction. Soft tissue defects after ablative surgery were reconstructed either with primary closure, local flap or with distant flap. Anatomical requirements for

adequate quality of speech and swallowing involve both the intraoral soft tissue lining and the underlying muscles. Mobile and sensitive mucosal surfaces on the cheek, the floor of the mouth and the tongue, as well as interwoven, multidirectional muscle fibres with intact motor nerve supply, are necessary to accomplish the changes in shape and position of the tongue and floor of the mouth required for proper articulation and swallowing. Greater number of patients underwent soft tissue reconstruction with primary closure and had a more favourable functional outcome than in comparison to those who had reconstruction with distant flap. Nasolabial flap was used more commonly as local flap and pectoralis major myocutaneous flap (PMMC) as distant flap. Inferior functional outcome with PMMC flap may be attributed to its bulky nature and loss of motor innervations imparting adynamic character to the flap. Myocutaneous flaps appear to be the least successful mode of reconstruction when functionally evaluated with inferior speech intelligibility.¹⁵ The reason being that they are used not only to cover the defect surface but they are also used to replace the rejected volume.¹³ Patients who had reconstruction with PMMC flap also had mandibular resection which also had an influence over these parameters as reported by previous studies.^{16, 17}

In the treatment of SCC of the mandibular alveolus, block resection that leaves the lower border intact has shown favourable results.^{16, 17} On the other hand, Komisar¹⁸ has shown that restoration of mandibular continuity does not enhance the functional rehabilitation of most patients with oral malignancy. In the present study tongue mobility, speech intelligibility, cosmetic outcome and oral competence were significantly related to mandibular defect, with mandibular discontinuity defect group having worst score. Although it is appreciated that the "Andy Gump" deformity, created by anterior mandibular arch resection, can have a devastating effect on function and QOL, the lateral defect also creates hardship as also observed by Wilson KM et al,¹² As commented by Arnold Komisar¹⁸ cosmesis can be improved if immediate restoration of mandibular continuity is implemented but however, is delayed mandibular reconstruction is implemented cosmesis does not improve due to previous scarring.

36.1% of the surviving patients reported that they would not eat out at 6 months interval but at 12 months interval only 30.6% of patients reported avoiding eating out side. Eating problems may result from the location of head and neck cancer and treatment induce adverse effects (eg: pain in mouth, problems with dentition, decreased saliva, and problems with swallowing). Hence weight loss is reported to affect 35% to 50% of patients with head and neck cancer and is known to increase morbidity or mortality as reported by Bokhorst-de van et al.¹⁹ We observed that trend towards eating outside had a strong influence in determining the quality of life of the studied patients. We observed that problems with eating outside was significantly related to mandibular discontinuity defect.

Data from previous study suggests that patients with better clinical function have a better QOL, irrespective of the size of the tumour or the type of the operation.²⁰ We observed a significant influence of tongue mobility, speech intelligibility, cosmetic appearance, and oral competence on QOL of the studied cancer patients at both the follow-up intervals. The importance of tongue mobility and QOL was reported by Schiiephake,²¹ who showed that it was important to maintain oral soft tissue function when carrying out resection of intraoral tumour. HNC has an enormous impact on the QOL of patients, and the most important physical symptoms associated with speech problems. Speech problems may result in social isolation and depression which may impact self care activities and hence impact on one's life quality.²² As observed in previous study patients with discontinuity resections of the mandible take longer to regain the same level of quality of life as patients without bone resections but we did not find significant association between discontinuity defect and QOL in our patients but rather soft tissue reconstruction had significant association with QOL. As concluded by previous study¹² restoration of mandibular continuity after hemimandibulectomy leads to improved function and a superior quality of life in appropriately selected patients but we observed that patients who underwent reconstruction for discontinuity defect had a similar cumulative score for QOL to those of reconstructed ones. Due to less number of samples in reconstructed group statistical analysis could not be implied. In the present study

we failed to observe significant association between QOL and stage of tumour although previous study reports that advanced stage tumours have worst cumulative QOL score. The implication is that patients with advanced disease need more care and support before and during treatment. This applies also in the time after treatment, when the focus on the regular follow-up visits usually is tumour control rather than the patients life quality.

This longitudinal study shows that patient's QOL improves with time, after the early effects of treatment have passed as also observed by Rogers et al,²⁰ and Graeff et al.²³ The general trend was that QOL deteriorated significantly during treatment, followed by a slow recovery until 12 month follow-up with few exceptions (senses, dry mouth and sexuality) as also observed by Bjordal K et al.¹⁰ Functional parameters like tongue mobility, speech intelligibility significantly improved over time. Secondary subjective problems related with food pocketing and avoiding eating out significantly improved over time supporting the observations made in previous studies.²³ Less number of patients reported positive for chronic pain over time as supported by previous study.²⁴

This study also shows that with control of disease both the prevalence and severity of pain in the head and neck are reduced. Causes of pain includes mucosal pain, temporomandibular pain, and pain of probable neurologic origin. Some aspects of pain are predictable: for example, if the neck has been surgically treated, shoulder pain and discomfort will be worse than if no neck dissection is performed. It is unclear whether the type of neck dissection has any relationship with the occurrence of pain. Lymph node dissection commonly leads to the unavoidable cutting of sensory nerve branches, which can result in neuropathic pain. Most of the patients were subjected to postoperative RT depending upon the stage of disease presentation and clearance margin status. The most severe pain symptoms caused by radiation are early and transient phenomena and they may not have been measured because of the longitudinal nature of this study. Chronic radiotherapy induced pain and discomfort is generally associated with treatment of oral or oropharyngeal lesions, in which xerostomia and effects on the mucosa and mandible are minimised.

We observed change in prevalence and severity of pain from 6 months post-treatment to 12 months post-treatment. Patients reported less scores for pain from 6months to 12 months follow-up interval on the VAS. Increased pain relief was observed from 6months post-treatment to 12months post-treatment. Measures to reduce pain among patients with head and neck cancer include systemic opioid analgesics, nonsteroidal anti-inflammatory drugs, tricyclic antidepressants, topical and coating agents, nerve blocks, or neurolytic procedures to palliate pain.²⁵ Efforts to reduce oral pain, either by limiting the toxicities of interventions (i.e. parotid sparing radiation therapy techniques), or by rehabilitating patients after therapy may have implications for overall well being that are far beyond simply relieving oral symptoms. There has been growing attention to pain and pain management over the past 50 years and our knowledge is increasing. The gap between what is possible in pain control and what is achieved is caused by many different patient centred, care provider centred, and government centred factors. Fear of medication in general and opioids in particular, patients wanting to be “good” patients, lack of knowledge, lack of interest and requests from care provider are well known barrier against adequate pain control as reported in various studies.^{26, 27}

On evaluating the correlation between QOL, pain scale and mood scale we found an insignificant correlation among these at 6months but however, we found significant correlation at 12 months. In patients with high cumulative scores for QOL at 12months there was a strong correlation of QOL with pain and mood scale. Pain has been shown to be an important factor in QOL assessment throughout the literature.²⁴

We observed that patients with recurrences had lower cumulative score for QOL at 12months follow-up interval than patients who has successful primary therapy. It is possible that low QOL score, particularly those on the QOL questionnaire (pain, eating, and speech domains) are reflective of persistent or recurrent disease. Persistent, recurrent, or metastatic head and neck cancer will cause worse pain, dysphagia, weight loss, fatigue, and other symptoms. In the present study two patients had recurrence at 12months follow-up visit. These patients reported

less pain relief and higher pain scores at 6months follow-up visit with higher score no mood scale than in comparison to those patients who remained disease free at 12months interval. They reported high level of problems in all the domains and rated their overall physical condition and overall quality of life as being poor, supporting the observation of previous study.²⁸ As stated by Smit et al²⁹ most patients with proven recurrent disease report pain complaints as the first symptom which was also observed in the present study. The authors also concluded that each pain complaint after intentional curative treatment should be regarded as a warning sign²⁹ and may reflect survival rate³⁰ but however, we can draw any certain conclusions from our study duty to limited sample size in this group of patients. Identifying patients with low QOL may have screening value. If patients with low QOL were followed more closely for recurrence, there might be potential to identify recurrence earlier and perform salvage treatments, thereby possibly improving survival for this group of patients.

In the present study QOL was not analysed with regards to background variables such as age, sex and socioeconomic status. Bjordal et al. reported poorer QOL in women and in older patients.¹⁰ But however, other study reports the observation that patients of older age had higher function score and lower symptom score, an indication of decreasing expectations to physical function with increasing age.³¹ But because of the relatively small number of patients in the present study, differentiation between men and women and age could not be studied. Patients have not been categorized as per different treatment modalities. The results and trends described are limited by small sample of patients completing questionnaire at one year after treatment and limits the strength of any conclusions drawn from the study. We did not compare the observation at 6months and at 12months with those at the baseline (pre-treatment). Another limitation is that we did not know to what extent other pain conditions influenced the reported prevalence of pain.

Conclusion

The prospective study, reported here, has clarified and statistically confirmed some principles on residual QOL for patients treated by surgical resection and

flap reconstruction for cancer of the oral cavity already presented in literature. QOL surveys may offer clinicians the opportunity to improve survival. Pain is common among those presenting with curable head and neck cancer. Pain can be reduced by curative treatment. Severe pain should always be interpreted as a “warning sign” and needs to be addressed by a meticulous physical examination of head and neck.

Even though our series of cases were small in number, the above conclusions can be confirmed with a larger series of cases, conducted over a long term duration.

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