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Evaluation of Clinical Morbidities and Their Influence on Quality of Life in Patients with Oral Cavity Cancer after Radiotherapy

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Background: Oral cavity cancer is the most common cancer in middle-aged men in Taiwan. Radiation fibrosis syndrome and lymphedema are the leading side effects in patients with oral cavity cancer, and can deteriorate their quality of life (QOL). The aim of this study was to prospectively evaluate common morbidities and their influences on QOL in patients with oral cavity cancer.

Methods: 27 patients with oral cavity cancer who received surgery and radiotherapy (RT) were recruited. Clinical evaluations of each patient included the VAS pain scale, the lymphedema scale, facial distance measurement for lymphedema, maximal interincisal distance (MID), range of motion (ROM) of the neck and shoulder, Constant shoulder score, and the EORTC QLQ (QLQ C30, H-N35) shortly after RT, and at 3 months and 6 months after RT.

Results: ROM of the neck and shoulder, and the Constant shoulder score were the worst shortly after RT. The participants had moderately decreased neck ROM, and a deficit in abduction, internal/external rotation of the shoulder and the Constant score, even 6 months after RT. Lymphedema was detected in all patients. The VAS pain score (4.8±2.1) was the worst shortly after RT, and was correlated with the lymphedema scales (p< 0.001), the Constant score (Rt- p= 0.003, Lt- p=0.02) and MID(p = 0.049). In terms of QOL, fatigue, insomnia, financial difficulties, dry mouth, mouth opening and sticky saliva were the predominant morbidities, and showed no significant improvement.

Conclusions: Dry mouth, impaired mouth opening, sticky saliva, insomnia and lymphedema were the major long-term morbidities in patients with oral cavity cancer after radiotherapy. Improvement of neck ROM and shoulder abduction in patients who have undergone extensive neck dissection should be given more clinical attention. (Tw J Phys Med Rehabil 2020; 48(1): 1 - 13)

Key Words: oral cavity cancer, lymphedema, quality of life, rehabilitation, radiation fibrosis syndrome

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INTRODUCTION

Head and neck cancer (HNC) is a common cancer, and the lip and oral cancer is the sixteenth diagnosed cancer worldwide.\(^1\) Incidence of HNC is strongly associated with certain lifestyle risk factors like tobacco and alcohol consumption, and 66% of HNC are diagnosed at advanced stages (III or IV).\(^2,3\) The effective curative treatment for HNC is surgery, radiation therapy (RT) and/or chemotherapy in different combinations.\(^4\) Extensive neck dissection is a standard operation in patients with advanced oral cancer and tongue cancer. However, the presence of pain and deterioration of shoulder and neck function after neck dissection are extreme considerable problems in patients.\(^5-7\) Speksnijder CM et al reported that neck dissection and extensive reconstruction are related to deterioration of shoulder function especially active shoulder abduction.\(^5\) And he also found that impaired lateral flexion of the neck and pain during neck movement in oral cancer patients who received extensive neck dissection even one year after surgery.\(^5\) Pain of HNC patients is the result of multiple generators, including tissue destruction by invasive tumors (or metastases), inflammatory and neuropathic pain, paraneoplastic neuropathic syndromes, and pain from cancer management (surgery, chemotherapy, and radiotherapy).\(^6\) Pain is common in HNC patients with an incidence of 49.5% prior to cancer therapy, 81% during the therapy, 70% at the end therapy, and still 36% 6 months after treatment.\(^9\) Cramer JD concluded that pain remains a significant problem in HNC and is associated with worse quality of life (QOL).\(^10\)

Surgery and RT can disrupt the lymphatic structure and functions, consequently patients with HNC may be at high risk for developing the secondary lymphedema.\(^11,12\)

Lymphedema is a common late effect in patients with HNC, which develops in multiple external and internal anatomical locations.\(^11,12\) Existing evidence indicated that 12~75% patients with HNC developed secondary lymphedema.\(^13-16\) Chronic lymphedema accompanied with post-radiation fibrosis induced trismus that may result in long-term cosmetic, functional, and psychosocial consequences.\(^4,12,17\) Furthermore, lymphedema presence leads to decrease range of motion (ROM), impaired swallowing, neck fibrosis and pain.\(^12,16\)

All these morbidities in patients disturb their QOL, cause negative body image and social isolation.\(^18-21\) The incidence of oral cancer is the most common cancer in Taiwanese middle-aged men,\(^22\) and many of these patients are suffering from morbidities.\(^18-21\)

The endpoint of clinical research is not only on survival but also on patients’ experience and QOL outcome.\(^4\) In this study, we evaluated the progression of common morbidities and their influence on QOL in patients with oral cancer after receiving surgery and RT.

MATERIALS AND METHODS

This is a prospective observation study on oral cancer patients, conducted at a medical center, Changhua Christian Hospital, Taiwan. This study was approved and ethical clearance was obtained from the hospital Institutional Review Board (IRB 120506). All participants provided written informed consent forms for the participation.

For this study, a total of 27 patients (26 males and 1 female) with different stages of oral cavity cancer were enrolled. All patients received surgery and RT treatments between Oct, 2012 and Sep, 2014; they did not receive regular rehabilitation program in study period. Patients with recurrence of cancer, injured shoulder or neck with ROM of shoulder less than 120 degree or ROM of neck less than 50 degree were excluded.

Demographic data including gender, age, body mass index (BMI), staging of cancer, surgical method, the number of removed lymph nodes, and dose of RT were obtained from the participants’ medical records. Participants were underwent evaluation when they were shortly after RT, 3-month and 6-month after RT. Clinical measures, including visual analog pain scale (VAS), ROM of neck (forward flexion, extension, rotation and lateral flexion) and shoulder (flexion, extension, abduction, internal rotation and external rotation), Constant shoulder score, maximal interincisal distance (MID), Földi and Miller lymphedema scale were assessed. Földi scale\(^23\) separated lymphedema as stage 0, 1, 2 and 3; Miller scale\(^24\) graded lymphedema from 0 to 4 depending on the severity; both of them were used to assess the clinical stage of lymphedema. The objective measurement of
lymphedema was evaluated by ultrasonography (US) and face distance measurement. The skin to bone distance (SBD) at seven locations in the face and neck (zygomatic arch, ascending mandibular ramus, and horizontal mandible of both sides; and hyoid bone) was recorded by US.\textsuperscript{25} For tape measurements, seven anatomic marks including tragus, mental protuberance, mouth angle, mandibular angle, nasal wing, internal eye corner, and external eye corner were chosen as the reference points; a sum of each side seven distances were calculated as Piso\textsuperscript{26} used to evaluate head-neck edema. The US measurement was performed by using a device (Siemens, Acuson Antares PE) with a 10-13MHz linear scanner.

Passive ROM of neck and shoulder were measured using goniometry in sitting position.\textsuperscript{27} The shoulder function was assessed using Constant shoulder scale,\textsuperscript{28} which could reliably assess shoulder impairment in cancer patients after neck dissections.\textsuperscript{29} The test included symptom scores (pain, sleep, recreation, and vocational activities), ROM, and shoulder strength. Scoring range from 0-100 with higher scores indicated better shoulder function.

The quality of life was assessed by European Organization for Research and Treatment of Cancer (EORTC QLQ C30 and H\&N35 (head and neck model)) Chinese Taiwanese version, which has been used in numerous studies to evaluate the QOL of cancer patients and the combination of these surveys gives the ability to identify disease-specific side effects.\textsuperscript{19,30} The EORTC was evaluated before RT, shortly after RT, 3- and 6-month after RT.

### Statistical analysis

Descriptive statistics were used for demographic variables. The data were provided as mean ± standard deviations (SD). The differences of VAS pain score, ROM, MID, lymphedema scale, face distance, US measurement and EORTC QOL scores between each evaluation were analyzed using generalized estimating equations (GEE). The Pearson Correlation was used to analyze the correlation between the variables and VAS scores. p values of <0.05 were considered statistically significant. All analyses were conducted with SPSS for Windows, Versions 18.
Table 2. Changes in range of motion of neck

<table>
<thead>
<tr>
<th>Variables(normal value°)</th>
<th>Shortly after RT(SD)</th>
<th>3-month after RT(SD)</th>
<th>6-month after RT(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>27</td>
<td>16</td>
<td>11</td>
</tr>
<tr>
<td>Forward flexion(60)</td>
<td>32.8(6.9)* †</td>
<td>38.3(6.8)* ‡</td>
<td>41 (7.9) †‡</td>
</tr>
<tr>
<td>Extension(75)</td>
<td>34.6(8.8) *</td>
<td>40.7(7.8) *</td>
<td>40.7(8.1)</td>
</tr>
<tr>
<td>Rotation(80)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>31.1(9) * †</td>
<td>37.1(9.5)*</td>
<td>36.5(8.3) †</td>
</tr>
<tr>
<td>Left</td>
<td>32.3(10) * †</td>
<td>38.4(10.8)*</td>
<td>36.9(10) †</td>
</tr>
<tr>
<td>Lat flexion(45)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>23.5(8.4) * †</td>
<td>24.2(5.7) * ‡</td>
<td>25.8(6.2) †‡</td>
</tr>
<tr>
<td>Left</td>
<td>20.9(8.8) * †</td>
<td>21.5(5.7) * ‡</td>
<td>25.3(7) †‡</td>
</tr>
</tbody>
</table>

RT= radiation therapy; Lat=lateral. In Generalized Linear Models analysis:

* p< 0.05 the data of shortly after RT compared with that of 3-month after RT
† p< 0.05 the data of shortly after RT compared with that of 6-month after RT
‡ p< 0.05 the data of 3-month after RT compared with that of 6-month after RT

Table 3. Changes in range of motion of shoulder

<table>
<thead>
<tr>
<th>Variables(normal value°)</th>
<th>Shortly after RT(SD)</th>
<th>3-month after RT(SD)</th>
<th>6-month after RT(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>27</td>
<td>16</td>
<td>11</td>
</tr>
<tr>
<td>Right shoulder</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexion (180)</td>
<td>172.7(8.6) †</td>
<td>175.3(8.1)</td>
<td>175.5 (8.3) †</td>
</tr>
<tr>
<td>Extension (60)</td>
<td>54(25.8)</td>
<td>50.3(5.6) ‡</td>
<td>53.2(8.4) †</td>
</tr>
<tr>
<td>Abduction (180)</td>
<td>162.8(16.1) *</td>
<td>169.4(13.4) *</td>
<td>166.8(16.5)</td>
</tr>
<tr>
<td>Internal rotation (70)</td>
<td>51.6(14.3)</td>
<td>52.4(16) ‡</td>
<td>52.3(16.2) ‡</td>
</tr>
<tr>
<td>External rotation (90)</td>
<td>60(14.9)</td>
<td>57.4(17.7) ‡</td>
<td>59.4(20.1) ‡</td>
</tr>
<tr>
<td>Left shoulder</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexion (180)</td>
<td>171.6(16.1)</td>
<td>172.2(10.8)</td>
<td>172.3 (10.3)</td>
</tr>
<tr>
<td>Extension (60)</td>
<td>53(6.1) * †</td>
<td>56(5.4) *</td>
<td>57.8(6.2) †</td>
</tr>
<tr>
<td>Abduction (180)</td>
<td>163.2(22.5) * †</td>
<td>168.4(15.2) *</td>
<td>169.5(13.1) †</td>
</tr>
<tr>
<td>Internal rotation (70)</td>
<td>50.5(14.7) †</td>
<td>52.3(18.2) ‡</td>
<td>52.8(14.5) ‡‡</td>
</tr>
<tr>
<td>External rotation (90)</td>
<td>61.1(16.9) †</td>
<td>64.5(16.7)</td>
<td>65.7(14.8) †</td>
</tr>
</tbody>
</table>

RT= radiation therapy. In Generalized Linear Models analysis:

* p< 0.05 the data of shortly after RT compared with that of 3-month after RT
† p< 0.05 the data of shortly after RT compared with that of 6-month after RT
‡ p< 0.05 the data of 3-month after RT compared with that of 6-month after RT
Table 4. Measurement of Pain, Lymphedema and Constant shoulder score

<table>
<thead>
<tr>
<th>Variables</th>
<th>Shortly after RT(SD)</th>
<th>3-month after RT(SD)</th>
<th>6-month after RT(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>27</td>
<td>16</td>
<td>11</td>
</tr>
<tr>
<td>VAS</td>
<td>4.8(2.1)* †</td>
<td>1.7(1.0)* †</td>
<td>0.9 (1.1)†</td>
</tr>
<tr>
<td>MID (cm)</td>
<td>4.8(1) * †</td>
<td>5.4(0.7) *</td>
<td>5.6(0.8) †</td>
</tr>
<tr>
<td>Föeldi scale</td>
<td>2.7(0.8) * †</td>
<td>1.7(0.8) *</td>
<td>1.5(0.7) †</td>
</tr>
<tr>
<td>Miller grade</td>
<td>2.4(0.8) * †</td>
<td>1.1(0.3) *</td>
<td>1.1(0.3) †</td>
</tr>
<tr>
<td>SBD-Hyoid bone (mm)</td>
<td>12.5(3)</td>
<td>12.5(3.1) †</td>
<td>11.8(3.7) †</td>
</tr>
<tr>
<td>SBD-Left horizontal mandible (mm)</td>
<td>13(3.8) *</td>
<td>14.6(3.5) *</td>
<td>13.8(3.6)</td>
</tr>
<tr>
<td>Facial distances (cm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>80.5(4.7)</td>
<td>81.8(4.6)</td>
<td>80.9(5.5)</td>
</tr>
<tr>
<td>Left</td>
<td>78.6(5.7)</td>
<td>79.3(5.6)</td>
<td>81.1(4.2)</td>
</tr>
<tr>
<td>Constant shoulder score</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>67.4(8.2) * †</td>
<td>74.1(9.4) *</td>
<td>78.5(6) †</td>
</tr>
<tr>
<td>Left</td>
<td>71.3(9.1) * †</td>
<td>78.1(7.1) *</td>
<td>79.9(5.4) †</td>
</tr>
</tbody>
</table>

RT= radiation therapy ; VAS= visual analog pain scale; MID= maximal interincisal distance; SBD= skin to bone distance. In Generalized Linear Models analysis:

* p< 0.05 the data of shortly after RT compared with that of 3-month after RT
† p< 0.05 the data of shortly after RT compared with that of 6-month after RT
‡ p< 0.05 the data of 3-month after RT compared with that of 6-month after RT

Figure 1.

Preserved spinal accessory nerve (SAN) had better Constant shoulder score at 3- and 6-month after RT, but the significant difference was only noted in Lt Constant shoulder score (p=0.049). 0- sacrificed spinal accessory nerve; 1- preserved spinal accessory nerve
Figure 2. The EORTC QLQ-C30 general health and functional scales
QoL = global health status; PF = physical functioning; RF = role functioning; EF = emotional functioning; CF = cognitive functioning; SF = social functioning.

Figure 3. The symptom scales of EORTC QLQ C-30.
RESULTS

Out of 27 patients, 16 patients completed 2nd follow-up (3-month after RT), and 11 patients completed 3rd follow-up (6-month after RT). The mean age of patients was 56.7±10.3 years, and their BMI was 21.2±3.1 kg/m² (Table 1). Among 27 patients, 21 patients (78%) were identified as advanced stage of oral cavity cancer (stage IVa). Most patients (67%) required extensive surgery and only 33% patients received limited surgery (functional or selective neck dissection, SND). The number of removed lymph nodes was 39.8±16.4. All patients received RT at the radiation dose of 6530±272 cGy and 70% patients received concurrent chemoradiotherapy (CCRT) (Table 1).

Changes in ROM of neck and shoulder

The degree of ROM for neck and shoulder of patients were measured shortly after RT, 3-month and 6-month after RT, and compared with respective normal values. The ROM of neck forward flexion, extension, rotation and lateral flexion were the worst shortly after RT, and these variables were significantly (p< 0.05) improved 3-month after RT. The improvement of neck forward flexion and lateral flexion were further continued until 6-month after RT (Table 2). But the median neck movements were in the range of 25.3 to 41 degrees (normal range of neck, 45–80°), decreased 50% when compared with normal range.

The impaired abduction of right shoulder and extension and abduction of left shoulder shortly after RT were significantly improved 3 months later. The flexion of right shoulder, and all ROM variables of left shoulder (except flexion) were notably improved 6-month after RT when compared with shortly after RT. Furthermore, the
extension, internal rotation and external rotation of right shoulder, and internal rotation of left shoulder at 6-month after RT were significantly better than that of 3-month after RT in patients (Table 3). The median shoulder movements were in the range of 52.3 to 175.5 degrees (normal range, 60–180°),[27] and the range of shoulder flexion was near full range, 10-15 degree deficit in shoulder abduction and 15-25 degree deficit in internal/external rotation at 6-month after RT.

**Changes in pain, lymphedema and Constant shoulder score**

The Constant shoulder score was the worst shortly after RT, and significantly improved 3 months later. But there was no difference between the scores of 3- and 6-month after RT (Table 4). The patients who were preserved spinal accessory nerve (SAN) had better Constant shoulder score than the patients who were sacrificed SAN in 3- and 6-month after RT, but the significant difference was only noted in Lt Constant shoulder score ($p=0.049$) in GEE analysis (Figure 1).

In the lymphedema evaluation, Foldi scale and Miller score were the worst shortly after RT, and significantly improved 3 months later. But there was no difference between the scales of 3- and 6-month after RT (Table 4). The SBD on hyoid bone of 6-month after RT was better than that of 3-month after RT, and SBD on left horizontal mandible bone of 3-month after RT was better than that shortly after RT. But there was no difference of other results in US and tape measurements. In trismus, the MID were the worst shortly after RT, and significantly improved 3 months later. But there was no difference between the MID of 3- and 6-month after RT (Table 4).

The VAS pain score (4.8±2.1) were the worst shortly after RT. Although the mean pain severity was mild cancer pain,[31] but moderate and severe pain were noted in more than half patients,[31] The pain score significantly improved 3 months (1.7±1.0) later and continued improving 6-month after RT (0.9±1.1). There was significant correlation in pain with lymphedema scales ($p<0.001$), Constant shoulder score (Rt- $p=0.003$, Lt-$p=0.02$) and MID ($p=0.049$). We also found the pain was not correlated with most items of QOL, it was only correlated with diarrhea ($p=0.001$) in QLQ-C30 and pain ($p=0.047$) and social eating ($p=0.005$) in QLQ-HN35.

**Changes in QOL**

All EORTC scales and single items were scored and linearly transformed scales of 1 to 100. The EORTC QLQ-C30 general health and functional scales were depicted in Figure 2 and the higher scores revealed better function. In functional scales and global health status, only social function ($p=0.02$) showed difference between before RT and 3-month after RT (Figure 2). For the symptom scales of QLQ C-30, higher scores indicate greater impairment. The nausea and appetite were the poorest when finished RT, and significantly improved 3-month after RT. The diarrhea improved much at 6-month after RT. The constipation was noted before RT, and improved at 3-month after RT. The fatigue, pain, insomnia and financial difficulties were the worst scores in QLQ-C30, and did not improve during the follow-up even 6-month after RT (Figure 3). The difference of more than 10 points on the EORTC subscales were considered clinically significant,[14] which was the case in our study.

The disease-specific QOL was assessed by EORTC QLQ-HN 35 (Figure 4). For the scales of QLQ HN 35, higher scores mean greater impairment. Dry mouth, impaired mouth opening and sticky saliva were the most predominant problems in our patients, and did not improve in the end of follow-up. The pain, speech, impaired mouth opening and sticky saliva were significantly progressed compared before RT with shortly after RT, and did not show any improvement in follow-up. The senses and social contact were the poorest shortly after RT and improved at 6-month after RT.

**DISCUSSION**

In our study, the ROM of neck were the worst shortly after RT, and gradually improved. But the neck movements decreased 50% when compared with normal range even 6-month after RT. This suggests that most of the participants had moderately decreased neck ROM even 6-month after RT. It is grade 2 late radiation morbidity defined by Radiation Therapy Oncology Group (RTOG) criteria.[32] In contrast, Deng J et al.[33] reported that most of participants 3 months or more after HNC treatment had mildly to moderately decreased neck ROM in six directions. Our patients had more restricted neck
ROM because most of them were advanced oral cancer, more extensive surgery, and applied RT in all participants. As a 1-year prospective cohort study of 145 oral cancer patients performed by Speksnijder CM, reported more extended neck dissection induced greater deterioration in neck function and also found the patients treated with bilateral neck dissection still showed impaired lateral flexion of the neck in one year after intervention.[5] As above finding, we should extend the period of regular rehabilitation follow-up in patients with advanced oral cancer to 1 year after RT.

As the ROM of neck, the ROM of shoulder was the worst shortly after RT, and gradually improved. Although range of shoulder flexion is near full range, there were deficits at shoulder abduction, internal and external rotation in the end of follow-up. The limitation of shoulder movement was as grade 1-2 late radiation morbidity in joint by RTOG criteria.[32] This is compatible with Speksnijder’s conclusion that maximal forward flexion of the shoulder returned to the level of healthy controls and significantly lower maximal abduction of the shoulder than controls at 1 year after intervention.[5] In maximal shoulder abduction, trapezius muscle activity is needed to upward rotate and stabilize the scapula, whereas in maximal forward flexion this upward rotation and stabilization is much less important. The extensive neck dissection will disturb the nerve function of SAN and lead to loss of function of the trapezius muscle, even preservation of the SAN.[5,34,35] This is agreed with our result of shoulder function. The Constant shoulder score improved after RT but still 20-25% deficit when compared with control. Chepeha DB reported that patients receiving modified radial neck dissection had significantly worse shoulder function than patients with SND.[29] This is because most our participants received extensive neck dissection and only 15% patients received SND. We also found the group who were preserved SAN had better Constant shoulder score than sacrificed SAN group at 3- and 6-month after RT. As Eickmeyer SM reported that sparing the SAN during neck dissection is associated with significantly less long-term shoulder disability in 5-year survivors of HNC.[36] We could conclude that although neck dissection would disturb short-term shoulder function, but sacrificed SAN would induce more long-term shoulder disability.

Prevalence of trismus after HNC treatment ranges from 5% to 38%, and the criteria varies.[37] A mouth opening of ≤35 mm has been proposed as a functional cut-off point for trismus.[38] The most common cause of oncology-related trismus is radiation-induced fibrosis, while post-surgical scarring may also play a role.[39] Pauli Net al reported the incidence of trismus was 9% pre-treatment and 28% at the one-year follow-up post-treatment, and the highest incidence, 38%, was found at six-month post-treatment.[4] In our study, the MID increased significantly 3 months after radiation, and the mean MID did not reach the criteria of trismus. There were only three patients (11.1%) who met this criteria of trismus just after RT, but improved in follow-up. It might be too few patients to observe the MID change.

Tumor itself, surgical damage, RT, and chemotherapy may disrupt the lymphatic structures, and resulted in lymphedema.[33] Currently, there was no standard criteria and grading system for lymphedema in head and neck cancer, and various tool has been used in previous studies.[16,26,40-42] We chose Foldi’s scale, Miller’s score, tape and US measurement to assess lymphedema. In our study, lymphedema severity by scoring system was significantly improved after RT, but still persisted in all participants. And only the SBD of hyoid and left mandible bone showed difference in the follow-up. There was no difference of tape measurement in three follow-ups. It showed the face tape measurement is not sensitive to detect localized lymphedema change in patients with HNC.

Pain is common in HNC patients, and still 36% at 6-month after treatment.[9] In our study, HNC patient reported mild pain (VAS= 4.8) shortly after RT, but half patients had moderate or severe pain. As Ohrn KE expressed several oral symptoms were noted 1 month after beginning RT,[44] and Epstein JB concluded that pain increases throughout the course of radiation and persists.
following treatment\cite{45}. We found the more severe pain was associated with more lymphedema, and negative effect in trismus and shoulder function. In QOL, most items of QOL was not found to be correlated with pain. It could be explained that the shoulder functional outcome is significantly correlated with pain, but this is not reflected in the scores of QOL questionnaires as Schiefke F’s conclusion\cite{14}. And the pain score of our patients improved in the follow up, it was only 0.9 at 6-month after RT. But Cramer JD had different conclusion that pain remains a significant problem and is associated with worse QOL even years after head and neck cancer treatment\cite{10}.

In QOL, global health and functional scales of QLQ-C30 did not change much. Our finding was similar to Schiefke F’s\cite{14} and Wan Leung S’s\cite{19} results, both of them performed cross-section studies at 2 years later after treatment. The fatigue, pain, insomnia and financial difficulties were the major concerns in HNC patients, not only in our study but also in previous studies\cite{14,19}. The insomnia is still the highest score in whole study period, cognitive behavior training and some medication could be helpful. The nausea and appetite were the worst just finished RT, then gradually improved as the course of mucositis. The oral mucositis can peak near the end of RT and continue for 2 to 4 weeks, then recover over several weeks\cite{18,46}.

In HNC specific QOL-EORTC HN-35, pain, speech, mouth open and stick saliva were significantly progressed shortly after RT and most symptom scores of QOL did not improve in the follow-up. These acute changes after RT range from oral mucositis, mucosal opportunistic infections, neurosensory disorders to tissue fibrosis\cite{18}. Dry mouth, mouth opening and stick saliva were the most predominant problems in our patients, as Pauli N reported dry mouth and sticky saliva were the major problems in HNC patients, no matter with trismus or not\cite{4}. These long term complication was as Stubblefield MD et al described the radiation fibrosis syndrome (RFS) such as trismus, cervicaldystonia, trigeminal neuralgia, cervical plexus neuralgia, radiculopathy, neuropathy, and myopathy will progressed after radiation\cite{47}. These morbidities all presents in EORTC QLQ-H&N35. It means the QLQ-H&N35 could accurately evaluate the long-term complication of RFS in HNC.

In our study, the limitation is the small number of participants, and the high drop-out rate. The patients fulfilling the protocol to 6 months of follow up is 11 patients, which 9 patients was stage IVa oral cancer and 2 patients were stage I oral cancer. Those patients who completed the duration of follow up had advanced stage disease, who have been more heavily treated and more late effects, giving a sort of selection bias in the results. Further investigations should included large sample size, longer follow-up period and to investigate the early intervention to prevent these morbidities.

**CONCLUSION**

We should pay more attention to lymphedema because the high prevalence in oral cancer patients even 6-month after RT. Dry mouth, impaired mouth opening, sticky saliva, fatigue and insomnia were the major morbidities. It needs more encouragement in the neck ROM, shoulder abduction and shoulder function in patients who received extensive neck dissection.

**REFERENCE**

morbidities and quality of life in oral cancer


口腔癌病患放射線治療後之併發症及其對生活品質之影響

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研究背景：口腔癌是台灣中年男性最常見的癌症。口腔癌病患最常見的併發症為放射後纖維化症候群和淋巴水腫，此二者會影響病人之生活品質(quality of life)。本研究之目的為以前瞻性研究方式，來追蹤口腔癌病患治療後之併發症及其對生活品質之影響。

研究方法：前瞻性追蹤 27 位完成手術及放射線治療之口腔癌病患，在追蹤期間並無接受復健治療。在放射線治療結束時、結束後 3 個月及結束後 6 個月追蹤其疼痛量表(visual analog pain scale, VAS)，淋巴水腫量表，淋巴水腫顏面距離，上下門齒間最大距離(maximal interincisal distance, MID)，肩及頸部活動度(range of motion, ROM)，Constant 肩膀量表(Constant shoulder score)，及歐洲癌症治療與研究組織(EORTC)癌症生活品質核心問卷(QLQ-C30)與頭頸癌生活品質核心問卷(EORTC H-N35)。

結果：肩及頸部活動度還有 Constant shoulder score 在放射線治療結束時是最差。所有受試者均有淋巴水腫，受試者在放射線治療後 6 個月其頸活動度仍有中度受限，肩部外展、內轉、外轉及 Constant shoulder score 肩膀量表仍不足。疼痛量表(4.8±2.1)在放射線治療結束時是最差，同時疼痛指數和淋巴水腫指數(p< 0.001)，Constant score (Rt- p= 0.003,Lt- p=0.02)及上下門齒間最大距離(p = 0.049)有相關。在生活品質方面，疲憊、經濟困難、口乾、張口困難及黏性唾液為最明顯之副作用，在追蹤過程並無明顯改善。

結論：口乾、張口困難、黏性唾液、失眠及淋巴水腫為口腔癌病患手術及放射線治療後最常見之併發症。我們需特別注意接受頸部淋巴廓清病患之肩部外展及頸活動度之改善情形。（台灣復健醫誌 2020; 48(1): 1 - 13）

關鍵詞：口腔癌(oral cavity cancer)，淋巴水腫(lymphedema)，生活品質(quality of life)，復健(rehabilitation)，放射後纖維化症候群(radiation fibrosis syndrome)