Occult level IV metastases in clinically node-negative patients with oral tongue squamous cell carcinoma

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Abstract

Objective: The present study was conducted to determine the rate of level IV lymph node involvement among node-negative (N0) necks in patients with squamous cell carcinoma of the tongue.

Methods: The study comprised 32 patients with squamous cell carcinoma of the tongue, with tumour–node–metastasis staging of T1–3N0M0, who were admitted to the Otolaryngology Department at Tehran University of Medical Sciences from March 2012 to March 2014. After a complete diagnostic evaluation, wide primary tumour excision (with 1.5–2 cm margins) and extended supraomohyoid neck dissection (levels I–IV) were accomplished.

Results: Occult metastasis was found in 28 per cent of the patients. Level I, II and III metastases were the most common (18.75, 18.75 and 15.62 per cent, respectively). Level IV metastasis was found in 6.25 per cent of patients.

Conclusion: Supraomohyoid neck dissection appears to be an appropriate treatment for N0 tongue squamous cell carcinoma and there is no need for level IV lymph node dissection in a N0 patient.

Key words: Metastasis; Neck Dissection; Tongue; Glossectomy; Squamous Cell Carcinoma

Introduction

Oral cavity cancers (including tongue lesions) are common worldwide.1 The mean age of patients with an oral cavity cancer is 64 years and there is a male predominance. However, oral tongue squamous cell carcinoma (SCC) (when compared with other oral cavity SCCs) is more frequent in patients aged 35 years or younger.2 Nodal metastasis is one of the most important prognostic factors in oral tongue SCC.3 Forty per cent of patients with oral tongue SCC show cervical metastases at first presentation. Even in patients with T1 and T2 tumours with a clinically node-negative (N0) neck, 20–30 per cent of the specimens reveal pathological involvement.4 The treatment of an N0 neck in early-stage oral tongue carcinoma is controversial. In a study by Byers et al.,5 15.8 per cent of the lateral tongue carcinoma patients had ‘skip metastases’ to lymph nodes of level III or IV.6 Hence, level I–IV (extended supramohyoid) elective neck dissection was recommended in patients with early-stage disease. However, in another study, similar outcomes were demonstrated following selective level I, II and III (supramohyoid) neck dissection in patients with N0 necks.3 The existing evidence indicates controversy regarding the extension of occult metastasis in early tongue carcinoma. It is unclear whether there is involvement of only levels I, II and III, or whether there is also frequent involvement of level IV. This study was carried out to determine the incidence of occult metastases in patients with oral tongue SCC and to detect the pattern of cervical node metastases.

Materials and methods

In this prospective study, all patients with SCC of the oral tongue, referred to Imam Khomeini Hospital Complex from March 2012 to March 2014, were investigated. Patients with a clinically and radiologically staged N0 neck were included in the study. Neck ultrasonography and computed tomography or magnetic resonance imaging were used for radiological examinations. The exclusion criteria were: the presence of any clinically or radiologically positive cervical lymph node; a history of previous radiotherapy or neck surgery; recurrent tumour; the presence of medical contraindications for surgery; and distant metastasis. All
patients filled out the formal consent form to participate in the study.

Thirty-two patients with tumours staged T1–3 and with an N0 neck were included in this study. All patients were treated surgically with a partial glossectomy and extended supraomohyoid (level I–IV) neck dissection. The primary tongue lesion was excised with a margin of 1.5–2 cm; disease-free surgical margins were confirmed using frozen section analysis. The surgeon used methylene blue to mark the exact limit of levels III and IV with regard to omohyoid muscle. Immediately following the surgery, the neck dissection specimen was divided by the surgeon and the boundary of each level was determined according to anatomical landmarks. The neck specimens were sent for pathological assessment in four different containers comprising tissues from levels I to IV. The tongue lesion was also examined pathologically, and the size, thickness, margins of resection, and perineural or lymphovascular invasion of the tumour were determined. All procedures contributing to this work complied with the Helsinki Declaration of 1975, as revised in 2008.

Results

There were 32 patients in this study, including 20 men (62.5 per cent) and 12 women (37.5 per cent). The patients’ ages ranged from 21 to 89 years (average, 54.41 years). The largest diameter of tongue lesions ranged from 0.7 to 6 cm (average, 1.9 cm). About 60 per cent of the patients had a lesion smaller than 2 cm. The thickness of the tumour ranged from 0.6 to 2 cm (average, 1.28 cm). The majority of the lesions (78.2 per cent) were on the lateral aspect of the oral tongue.

The primary tumour was staged as T1 in 19 patients (59.4 per cent), T2 in 12 patients (37.5 per cent) and T3 in 1 patient (3.1 per cent).

Histopathological examination of the neck dissection specimens (n = 32) revealed lymph node metastases in 9 patients (28.12 per cent). Levels I, II and III were involved in six (18.75 per cent), six (18.75 per cent) and five patients (15.62 per cent), respectively. Two patients had metastases in level IV nodes (6.25 per cent). There was no significant relationship between tumour (T) stage and level IV involvement (p = 0.9), or between tumour thickness and level IV involvement (p = 0.2). The potential risk factors for level IV involvement are shown in Tables I–III.

Discussion

There is a high incidence of occult metastasis in early-stage carcinoma of tongue. A study by Samuel et al. reported an incidence of occult metastasis of 40 per cent (as cited in Akhtar et al.). Yuen et al. reported a 27 per cent incidence of micrometastasis, and Akhtar et al. reported a rate of 32 per cent. In the present study, the incidence of occult metastasis was 28.12 per cent.

In recent years, there has been disagreement about the extension of elective neck dissection in tongue cancer patients with an N0 neck. Before 1997, the usual procedure was supraomohyoid neck dissection which includes nodes in levels I, II and III. In 1997, the term ‘extended supraomohyoid neck dissection’ was introduced by Byer et al. They demonstrated skip metastases to lymph nodes in level IV in 15.8 per cent of the patients with oral tongue cancer. This finding suggests that supraomohyoid neck dissection is not sufficient for such patients. Therefore, the authors recommended dissection of level IV lymph nodes in addition to dissection of level I–III nodes in any patient with oral tongue cancer and an N0 neck. In addition, several studies have shown a low risk of occult metastases to level IV.

Dogan et al. found out that among 40 clinically staged N0 patients with oral tongue SCC, 7 (17.5 per cent) had metastatic lymph nodes on pathological examination, but there was no occult metastasis in level IV. Akhtar et al. reported no skip metastases involving level IV. Level IV involvement alongside other levels (I, II and III) was only observed in four patients (13 per cent). Khafif et al. showed metastases to level IV lymph nodes in 4 per cent of patients with T1–3 and N0 oral tongue cancer, but found no skip metastases to this level. In a study by Nithya et al., the incidence of isolated level IV involvement was 0 per cent, and its involvement simultaneously with level III was 6.6 per cent. In our study, skip metastases

<table>
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<tr>
<th>Variable</th>
<th>Total n (%)</th>
<th>Level IV involvement (p-value)</th>
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</thead>
<tbody>
<tr>
<td>Smoking</td>
<td>17 (53.1)</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>6 (18.7)</td>
<td>&gt;0.05</td>
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<tr>
<th>Invasion type</th>
<th>Total n (%)</th>
<th>Level IV involvement (n)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lymphovascular</td>
<td>6 (18.7)</td>
<td>0</td>
</tr>
<tr>
<td>Perineural</td>
<td>8 (25)</td>
<td>0</td>
</tr>
</tbody>
</table>

*There were two patients without lymphovascular invasion and without perineural invasion that had level IV involvement, but there was no significant relationship between these two parameters and level IV involvement.
involving level IV was found in only one patient (3.125 per cent) and the overall incidence of level IV involvement was 6.25 per cent.

Khaif et al. analysed the results of Byer and colleagues’ study and noted that if patients with clinically positive neck nodes were excluded, the real incidence of skip metastases or subsequent recurrence in level IV might decrease to only 4.8 per cent.\(^6\)

In a study by Woolgar, the incidence of histologically confirmed metastatic disease was 21 per cent (32 of the 152 sides of N\(_0\) necks) in patients with oral cavity or oropharyngeal SCC.\(^8\) Four patients with an unpredictable distribution of metastasis had tongue tumours (three cases of lateral tongue disease and one case of ventral tongue disease), including one case of microscopic ‘peppering’ of levels II to IV, two cases of ‘skipping’ to level IV, and one case of skipping from level II to IV. The author reported that about 70 patients out of 189 had oral tongue cancer, but the number of patients in this group assumed to have a clinically staged N\(_0\) neck was not obvious.\(^9\) The findings of Woolgar’s study were used to support the necessity of level IV dissection in oral tongue SCC patients with an N\(_0\) neck in the current study. However, the real incidence of level IV involvement in patients with oral tongue cancer and a clinically staged N\(_0\) neck could not be estimated.

Cran et al. performed extended supraomohyoid neck dissection in 49 patients with oral cancer and a clinically staged N\(_0\) neck.\(^4\) In that series, 14 patients had oral tongue carcinoma. The authors found occult metastases of level IV in five of the pathological specimens (five patients; 10 per cent).\(^9\) This incidence was calculated based on all the patients in the study, not just those with oral tongue cancer. Thus, it seems that our study is one of only a few to focus specifically on oral tongue cancer, and with possibly clearer results.

Kurokawa et al. (as cited in Wein et al.\(^2\)) reported an association between occult cervical lymph node metastases and tumour depth equal to or greater than 4 mm in oral tongue SCC patients. Spiro et al. noted that tumour thickness, and not tumour (T) stage, is important in treatment failure and survival.\(^2\) It is suggested that the depth of invasion can be used to determine the need for elective neck dissection in N\(_0\) oral tongue SCC patients.\(^2\) Perhaps it is possible to use tumour thickness as a guide for the necessity of level IV dissection in elective lymph node surgery for oral tongue cancer. In our study, no significant relationship was found between tumour thickness and level IV involvement; nevertheless, a larger sample size is needed for subsequent investigations, because the number of the patients with level IV involvement was small. In this study, there was no significant relationship between level IV involvement and tumour stage. One of the two patients with level IV involvement had positive nodes in the other levels of the neck, but there was no significant relationship between the involvement of one specific level, or the overall number of positive lymph nodes, and level IV involvement.

In this study, statistical significance was based on a small sample size. A well-designed study comprising a larger number of patients is needed to investigate this controversy further. This might entail examination of survival and recurrence rates in oral tongue cancer patients with clinically staged N\(_0\) necks, in which patients are divided into two groups according to level IV dissection, or a systematic review.

<table>
<thead>
<tr>
<th>Level IV involvement</th>
<th>Average age (years)</th>
<th>Average tumour thickness (cm)</th>
<th>Involved lymph nodes in other levels (n)</th>
<th>Tumour (T) stage (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involved</td>
<td>50.5</td>
<td>1.3</td>
<td>7.5</td>
<td>T(_1) = 1; T(_2) = 1</td>
</tr>
<tr>
<td>Not involved</td>
<td>54.67</td>
<td>1.1</td>
<td>0.3</td>
<td>T(_1) = 18; T(_2) = 11; T(_3) = 1</td>
</tr>
<tr>
<td>p-value</td>
<td>0.75</td>
<td>0.2</td>
<td>&gt;0.05(∗)</td>
<td>0.9</td>
</tr>
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\(∗\) There was no significant relationship between the involvement of different levels of the neck (levels I, II and III) and the involvement of level IV.

The present data indicate that supraomohyoid neck dissection is an acceptable surgical procedure for an oral tongue SCC patient with an N\(_0\) neck.\(^10\) This is because the rate of occult metastasis to level IV is less than 20 per cent, which is considered a cut-off point for elective neck treatment.\(^2\) Therefore, the dissection of level IV in patients where there is no involvement of other levels is not yet mandatory, and can increase the risk of complications such as: thoracic or lymphatic duct injury,\(^9\) prolonged surgical time, longer hospital stay, and elongated skin scarring.\(^11\)

References

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