

Clinicopathological Analysis of Elective Neck Dissection for N0 Neck of Early Oral Tongue Carcinoma

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BACKGROUND: The study aims at evaluation of the efficacy of elective neck dissection as a staging and therapeutic procedure for N0 neck of early carcinoma of the oral tongue by whole organ serial sectioning.

METHODS: There were 50 stage I and II patients. The neck dissection specimens were whole organ sectioned in 3-mm intervals for the evaluation of nodal metastasis.

RESULTS: There were 18 (36%) patients with subclinical nodal metastasis. The total number of metastatic nodes were 31 (1%) among all 2,826 nodes being examined. The metastatic foci had a median size of 3 mm and occupied a median of 6% of the cross sectional area of the involved nodes. The ipsilateral level II nodes were the commonest (26%) site of metastasis. Metastatic nodes were present in 34% patients who had negative preoperative radiological assessment and in 20% patients who had negative intraoperative frozen section sampling of neck nodes. Patients with subclinical nodal metastasis had a high incidence of regional recurrence (62%) and low survival (27%) when postoperative radiotherapy was not given after elective neck dissection.

CONCLUSIONS: Ipsilateral level I,II,III neck dissection is an adequate diagnostic procedure for staging of the N0 neck of early oral tongue carcinoma. Its diagnostic role cannot be replaced by the available pre-operative radiological screening and intra-operative frozen section sampling. However, elective selective neck dissection is an effective but not adequate therapeutic procedure, and post-operative adjuvant radiotherapy and chemotherapy have to be considered for all

pathologically positive necks. *Am J Surg.* 1999; 177:90-92. © 1999 by Excerpta Medica, Inc.

Carcinoma of oral tongue has a high propensity for nodal metastasis in the neck. There is a trend towards elective neck dissection during surgical treatment of tongue carcinoma.¹⁻³ Despite the successful reduction of regional recurrence by elective neck dissection, it is still controversial on its benefits in the eventual regional control and survival compared with the policy of observation.^{1,4,5} The benefit of reduction of regional recurrence by elective neck dissection is challenged by people who believe in the radiological screening of N0 neck.⁶ To many people, elective selective neck dissection is thought to be a diagnostic procedure for staging purpose rather than a therapeutic operation.⁷ Of those people who believe that selective neck dissection is only a staging procedure, intraoperative sampling by frozen section is recommended to guide the intraoperative decision to proceed with radical neck dissection.⁸ There is also unresolved controversy about the indication and efficacy of postoperative adjuvant radiotherapy and chemotherapy for patients with pathological nodal metastasis after selective neck dissection of the N0 neck.^{1,9,10} The clinicopathological analysis of the present study attempts to provide more information on the unresolved questions of elective neck dissection for the clinically N0 neck of early oral tongue carcinoma particularly on its role as diagnostic procedure for staging purpose and therapeutic efficacy on regional control.

PATIENTS AND METHODS

The neck dissection specimens of patients who had surgical treatment for carcinoma of oral tongue were prospectively evaluated by whole organ serial sectioning between January 1991 and October 1997. The patients included in the present analysis were all T1 and T2 squamous cell carcinoma of the oral tongue with clinically N0 neck.

The neck dissection specimens were pinned onto a foam board during fixation with formalin. The preserved specimens were first divided into different levels and were then cut and processed into paraffin blocks in 3-mm intervals transversely. Hematoxylin and eosin slides were prepared and were examined under the microscope.

RESULTS

There were 50 patients including 27 males and 23 females. The median age was 61 years (range 16 to 86). There were 19 T1 and 31 T2 carcinomas. All patients had

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TABLE I

Sites of Subclinical Nodal Metastasis		
Neck Levels	Ipsilateral Neck	Contralateral Neck
I	5 (10%)	1 (2%)
II	13 (26%)	1 (2%)
III	4 (8%)	0
IV	0	0
V	0	0

TABLE II

Pathological Nodal Stage of Clinically N0 Neck					
Clinical T Stage	Patient No.	pN1	pN2b	pN2c	Total pN+
T1	19	3 (16%)	1 (5%)	0	4 (21%)
T2	31	10 (32%)	3 (10%)	1 (3%)	14 (45%)
Total	50	13 (26%)	4 (8%)	1 (2%)	18 (36%)

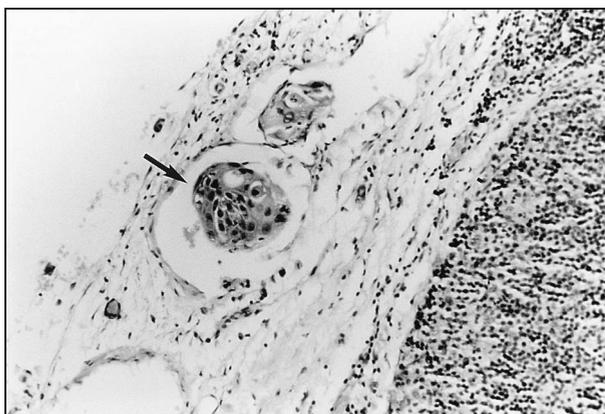


Figure. Micrometastasis (50X magnification) in the capsular lymphatic of the a 1 cm lymph node (arrow).

unilateral carcinoma without contralateral spread crossing the midline of the tongue. There were 29 well, 19 moderately, and 2 poorly differentiated squamous cell carcinomas. All patients had glossectomy for the primary lesion, and the elective neck dissections included 45 selective I, II, III neck dissections (43 ipsilateral, 2 bilateral), and 5 full neck dissections (4 radical and 1 modified radical) including levels I to V. The median follow-up of all patients alive without disease was 25 months.

The median number of lymph nodes examined for each patient was 50 (range 11 to 140). There were 31 (1%) metastatic nodes found among the total number of 2,826 lymph nodes examined. The levels of nodal metastasis are shown in Table I. The number of metastatic nodes were one node in 13 (26%) patients, two nodes in 3 (6%) patients, four nodes in 1 (2%) patient, and 8 nodes in 1 (2%) patient. The pathological nodal stages are shown in Table II.

Of all 31 metastatic nodes, the median size of the metastatic node was 9 mm (range 2 to 23 mm), and the median size of the metastatic foci was 3 mm (range 0.1 to 9 mm). The Figure shows micrometastasis found only at the capsular lymphatic vessel of a 1-cm lymph node. All but one metastatic node were partially occupied by metastatic cancer cells, and the metastatic foci occupied a median of 6%

of the cross-sectional area of the involved lymph nodes. Extracapsular spread was found in 4 (22%) of the 18 pN+ patients. All 4 patients with extracapsular spread had multiple metastatic nodes (2 to 8 nodes).

Preoperative radiological screening including ultrasound, computed tomography, and magnetic resonance imaging were negative in 32 patients (14 of them also had ultrasound-guided aspiration cytology), 11 (34%) patients turned out to have subclinical nodal metastasis in the neck dissection specimens. The other 18 patients had no preoperative radiological screening of the neck, 7 (39%) had histological nodal metastasis. The 5% difference is not statistically significant (chi-square test, $P = 0.75$).

Intraoperative sampling of nodes for frozen section were done in 16 patients, the number of nodes being sampled were 1 node in 8 patients, 2 nodes in 7 patients, 5 nodes in 1 patient. Only 1 patient was found to have metastatic node in one of the two nodes examined by frozen section. Of the other 15 patients with intraoperative negative frozen section result, 3 (20%) turned out to have subclinical nodal metastasis in the whole organ serial section examination of neck dissection specimens.

One patient died of postoperative complication of chest infection 6 weeks after operation and another 4 patients who had follow-up of less than 1 year were alive without recurrence; these 5 patients were excluded from subsequent analysis of recurrence and survival because of short follow-up. Of the 45 patients who were included in the analysis of recurrence and survival, there were 29 pN0 and 16 pN+ patients. Eleven patients developed tumor recurrences including 6 (13%) local, 4 (9%) regional, and 1 (2%) distant recurrences. The median time of regional recurrence was 5 months (range 11 weeks to 11 months) after primary surgical treatment.

Of the 29 pN0 patients who had no postoperative adjuvant radiotherapy to the neck, 1 (3%) patient developed regional recurrence on the contralateral level I node. Of the 9 pN+ (5 pN1, 3 pN2b, 1 pN2c) patients without postoperative radiotherapy, 3 (30%) patients (1 pN1, 2 pN2b) developed regional recurrence on the ipsilateral neck (level III, levels II/III, and levels II/IV/V) and another 2 patients developed local recurrences. The other 7 pN+ (6 pN1, 1 pN2b) patients who were given postoperative radiotherapy had no regional recurrence (there were 1 local and 1 distant recurrence). When postoperative radiotherapy was not given to the pN+ neck, regional recurrence developed in 1 (20%) of the 5 patients with single metastatic node and 2 (50%) of the 4 patients with multiple metastatic nodes. Despite elective neck dissection, the presence of subclinical nodal metastasis was associated with high risk of regional recurrence when postoperative radiotherapy was not given to the neck (chi-square test, $P = 0.002$). Two (33%) of the 6 patients without extracapsular spread had regional recurrence. There is a trend suggestive of better regional control for pN+ neck when postoperative radiotherapy to the neck was given, but the sample size is not adequate for statistical confirmation of the 30% difference with confidence (Fisher's exact test, $P = 0.5$).

Of the 4 patients with regional recurrences, all had salvage radical neck dissection and radiotherapy treatment. The pN0 patient with contralateral spread was alive 38

months after the salvage treatment. Of the 3 pN+ patients with ipsilateral regional recurrences, all died of tumor with residual disease in the neck. The actuarial regional control at the last follow-up was 100% for the patients with pN0 and pN+ with postoperative radiotherapy, and was 38% for the pN+ patients without postoperative radiotherapy (Wilcoxon, $P = 0.001$). The actuarial disease-free survival rates were 87% for the pN0 patients, 60% for pN+ patients with postoperative radiotherapy (pN+/RT), and 27% for the pN+ patients without postoperative radiotherapy (pN+/no RT) (Wilcoxon, $P = 0.039$).

COMMENTS

The pathological incidence of subclinical nodal metastasis for T1 and T2 oral tongue carcinoma was found to be 36% in the present study. The commonest site of nodal metastasis was ipsilateral level II, and 95% metastatic nodes were found in the ipsilateral levels I, II, and III. Therefore, ipsilateral selective I, II, and III neck dissection was an adequate staging procedure for the N0 neck of early oral tongue carcinoma.

The small percentage of metastatic nodes together with the small size of the micrometastasis amidst the large number of normal nodes in the neck would cause significant difficulty in the detection of subclinical nodal metastasis preoperatively. The preoperative imaging assessments were therefore useful but not adequate in the detection of micrometastasis. To date, all available preoperative imaging modalities including computed tomography scan, magnetic resonance imaging, and ultrasound-guided fine needle aspiration cytology cannot replace the role of elective neck dissection as an accurate diagnostic procedure for staging of the N0 neck.

The present study showed that intraoperative sampling with frozen section was sometimes useful but not adequate in the detection of micrometastasis. Since we relied more on postoperative radiotherapy to eradicate the possible residual micrometastasis in the neck, we had lost interest in taking intraoperative frozen section of lymph nodes recently. Intraoperative frozen section sampling of nodes is however still recommended in conditions when postoperative radiotherapy will not be given such as in patients with prior radiotherapy to the neck; in such situation, the finding of positive node by intraoperative frozen section can help us to go ahead for radical neck dissection.

Although elective neck dissection alone without radio-

therapy was 70% effective in the regional control of subclinical pN+ neck, regional recurrence still developed in 30% pN+ patients; the eventual regional control was unsatisfactory in this subgroup of patients. It indicated that elective selective neck dissection alone was an effective but not adequate procedure for therapeutic purpose. There were also reports of high incidence of level IV nodes skip metastasis and regional recurrences in pN+ with extracapsular spread.^{9,10} We currently give post-operative radiotherapy to all patients with subclinical pN+ neck. The indications and efficacy of additional radiotherapy and/or chemotherapy for pN+ neck with respect to the number of positive nodes and features of extracapsular spread of these N0 neck patients, however, needs further prospective study.

REFERENCES

1. Yuen APW, Wei WI, Wong YM, Tang KC. Elective neck dissection versus observation in the surgical treatment of early oral tongue carcinoma. *Head Neck*. 1997;19:583-588.
2. Hughes CJ, Gallo O, Spiro RH, Shah JP. Management of occult neck metastasis in oral cavity squamous carcinoma. *Am J Surg*. 1993;166:380-383.
3. Medina JE, Byers RM. Supraomohyoid neck dissection: rationale, indications, and surgical technique. *Head Neck*. 1989;11:111-122.
4. Vandenbrouck C, Sancho-Garnier H, Chassagne D, et al. Elective versus therapeutic radical neck dissection in epidermoid carcinoma of the oral cavity: results of a randomized clinical trial. *Cancer*. 1980;46:386-390.
5. Fakhri AR, Rao RS, Borges AM, Patel AR. Elective versus therapeutic neck dissection in early carcinoma of the oral tongue. *Am J Surg*. 1989;158:309-313.
6. Friedman M, Mafee MF, Pacella BL, et al. Rationale for elective neck dissection in 1990. *Laryngoscope*. 1990;100:54-59.
7. Henick DH, Silver CE, Heller KS, et al. Supraomohyoid neck dissection as a staging procedure for squamous cell carcinomas of the oral cavity and oropharynx. *Head Neck*. 1995;17:119-123.
8. Rassekh CH, Johnson JT, Myers EN. Accuracy of intraoperative staging of the N0 neck in squamous cell carcinoma. *Laryngoscope*. 1995;105:1334-1336.
9. Byers RM, Weber RS, Andrews T, et al. Frequency and therapeutic implication of "skip metastasis" in the neck from squamous carcinoma of the oral tongue. *Head Neck*. 1997;19:14-19.
10. Pitman KT, Johnson JT, Myers EN. Effectiveness of selective neck dissection for management of the clinically negative neck. *Arch Otolaryngol Head Neck Surg*. 1997;123:917-922.