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Impact of neck dissection in early tongue and buccal cancer without neck extension

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Abstract. *Impact of neck dissection in early tongue and buccal cancer without neck extension. Problem*: The role of elective neck dissection in early stage tongue and buccal squamous cell carcinoma with negative neck lymph nodes is still controversial.
Methods: We retrospectively reviewed patients with T1-2N0M0 buccal and tongue cancer who underwent primary tumour excision with or without elective neck dissection between January 1997 and December 2006.
Results: Elective neck dissection specifically improved disease-free survival of T2N0M0 buccal cancer and overall survival of T2N0M0 tongue cancer.
Conclusion: Elective neck dissection seems to improve the disease-free survival rate of T2N0M0 buccal cancer and the overall survival rate of T2N0M0 tongue cancer but has no beneficial effect on the survival rate of T1N0M0 buccal and tongue cancer.

Introduction

Elective surgical lymph node dissection of the neck in early tongue and buccal cancer is a controversial issue. This study aimed to investigate the impact of neck dissection on the outcome of early stage tongue and buccal cancer (clinical stage N0).

Methods and materials

Two hundred and fifty-nine (259) patients with squamous cell carcinoma (SCC) of the mobile tongue and buccal mucosa previously treated at the China Medical University Hospital, Taiwan from January 1997 to December 2006 were evaluated. Patients were included if they fulfilled the following eligibility criteria: (1) biopsy-confirmed diagnosis of SCC of the oral tongue and buccal mucosa; (2) no previous treatment; and (3) curative surgery as first treatment. All patients were clinically categorized as stage T1/T2 N0 on their first visit. Minimum follow-up time was 60 months or until death. Exclusion criteria were: 1) contraindication for surgery, 2) distant metastasis on admission, 3) presence of synchronous primary tumour(s), 4) treated with neoadjuvant or adjuvant treatment, and 5) refusal to undergo surgery.

Patients were categorized by stage based on physical examination findings combined with computed tomography or magnetic resonance imaging results. Patients were divided into four groups according to the site of the primary tumour and the management of the neck.

Groups were compared in terms of age, sex, primary site of the tumour, duration of symptoms, gender, alcohol consumption, betel nut chewing, smoking, clinical T stage, tumour differentiation, and occult metastasis via univariate and multivariate analysis. The overall survival and disease-free survival curves were calculated using the Kaplan-Meier survival curves with log rank and chi-square tests for statistical analysis.

The decision to perform prophylactic neck dissection was based on several factors, included the patient's wish, family support, general medical condition, tolerance to long duration surgery, major systemic diseases (e.g. HIV), and surgeon's opinion. Ipsilateral selective neck dissection (I-III) was the standard prophylactic treatment for T1/T2N0M0 buccal and tongue tumours.[1-8]

Results

There were a total of 265 patients including 97 newly diagnosed patients with T1-2N0 buccal SCC

Table 1

Univariate and multivariate analysis of the relationship between clinico-pathologic factors and survival rates

	Disease-free survival		Overall survival	
	Univariate HR (95%C.I.)	Multivariate HR (95%C.I.)	Univariate HR (95%C.I.)	Multivariate HR (95%C.I.)
END				
END0	1.00	1.00		1.00
END1	0.55* (0.31-0.97)	0.37* (0.19-0.71)		0.34* (0.17-0.68)
T stage				
T1	1.00	1.00		1.00
T2	1.30 (0.66-2.57)	2.23* (1.03-4.84)		0.74 (0.36-1.55)
Gender				
Female	1.00			1.00
Male	1.37 (0.58-3.22)			0.57 (0.26-1.28)
Age (y)				
< 50	1.00			1.00
≥ 50	0.93 (0.52-1.66)			1.84 (0.85-3.99)
Alcohol				
No	1.00			1.00
Yes	0.88 (0.48-1.59)			0.58 (0.29-1.15)
Primary site				
Buccal	1.00			1.00
Tongue	0.65 (0.37-1.15)			1.33 (0.63-2.80)
Differentiation				
Poor	1.00			1.00
Moderate	0.36 (0.08-1.61)			0.26 (0.06-1.22)
Well	0.64 (0.15-2.76)			0.54 (0.12-2.39)

END1: patient received elective neck dissection.
END0: patients didn't receive elective neck dissection.
*: statistically significant, $p < 0.05$.

and 168 with T1-2N0 tongue SCC. The average age for all participants was 50 years. The pre-operative clinical T-stages were as follows: 56 patients with T1N0M0 tongue cancer, 112 with T2N0M0 tongue cancer, 29 with T1N0M0 buccal cancer, and 68 with T2N0M0 buccal cancer.

All of the patients underwent either partial glossectomy or wide tumour excision. Management of the neck was either by observation only (OBS), which included 81 tongue/buccal cancer patients (34 T1 tongue, 16 T2 tongue, 21 T1 buccal, and 10 T2 buccal), or via elective neck dissection (END), which included 184 patients who underwent selective neck dissection (SND) (I–III).

Table 1 summarizes the distribution of cases by tumour primary site and T and N stages. For further analysis, the patients were divided into four groups: buccal and tongue OBS, buccal END, and tongue END (Table 1). By multivariate analysis, END and advanced T stage (T2) were statistically significant factors in patient survival (Table 2).

Table 3 reports the status of the patients with recurrence, stratified by tumour stage, tumour site, and neck treatment. The occult metastasis rate of tongue cancer was 15.1% (16/112), while that of buccal cancer was 18.2% (12/66). In detail, local and regional recurrence rates of T1 buccal cancer in OBS patients were 19.1 and 14.3%, respectively. There was no cancer recurrence in T1 buccal cancer END patients. In T1 tongue cancer OBS patients, local and regional recurrence rates were 8.8% and 2.9%, respectively; there was no cancer recurrence in T1 tongue cancer END patients (Table 3). The local and regional recurrence rates were 20% and 20% in T2 buccal cancer OBS patients, 12.1% and 5.2%, respectively, in T2 buccal cancer END patients, 18.8% and 18.8%, respectively, in T2 tongue cancer

Table 2

Summary of the recurrent status of the patients stratified by tumour stage, tumour site, and neck treatment

		Total	Local (%)	Regional (%)	Loco-regional (%)
T1					
Buccal					
	OBS	21	4 (19.1%)	3 (14.3%)	0 (0.0%)
	END	8	2 (25.0%)	0 (0.0%)	0 (0.0%)
Tongue					
	OBS	34	3 (8.8%)	1 (2.9%)	0 (0.0%)
	END	22	2 (9.1%)	0 (0.0%)	2 (4.5%)
T2					
Buccal					
	OBS	10	2 (20.0%)	2 (20.0%)	1 (10.0%)
	END	58	7 (12.1%)	3 (5.2%)	1 (1.7%)
Tongue					
	OBS	16	3 (18.8%)	3 (18.8%)	0 (0.0%)
	END	96	13 (13.5%)	1 (1.0%)	0 (0.0%)

Table 3

Summary of five- and ten-year survival rates

				Overall survival rate			Disease-free survival rate		
			N	5-year	10-year	P Value	5-year	10-year	P Value
Buccal mucosa									
	T1	OBS	21	95.0%		0.584	71.3%		0.337
	T1	END	8	100.0%		0.584	71.4%		0.337
	T2	OBS	10	77.8%	77.8%	0.494	55.6%	18.5%	0.034*
	T2	END	58	90.1%	74.1%	0.494	91.7%	46.3%	0.034*
Tongue									
	T1	OBS	34	79.3%		0.075	91.8%		0.483
	T1	END	22	92.9%		0.075	77.7%		0.483
	T2	OBS	16	65.0%		0.002*	71.4%		0.063
	T2	END	90	94.8%	85.8%	0.002*	90.2%	50.9%	0.063

*: statistically significant $p < 0.05$.

OBS patients, and 13.5% and 1%, respectively, in T2 tongue cancer END patients (Table 3). In summary, for T1 stage disease, buccal cancer patients seemed to have higher recurrence rates than tongue cancer patients, and this difference was not seen in patients with T2 disease. Patients with T2 cancer seemed to have higher recurrence rates than those with T1 (Table 3).

Table 4 summarizes the five- and ten-year survival rates. The overall five-year survival rate was 78.7% in OBS patients and 94.7% in END patients ($p = 0.036$). The five-year disease-free survival rate of OBS patients was 78.2%, compared to 93.7% in END patients ($p = 0.001$).

The five-year overall survival rates of T1 buccal cancer OBS, T1 buccal cancer END, T2 buccal cancer OBS, and T2 buccal cancer END groups were 95%, 100%, 77.8%, and 90.1%, respectively. The five-year overall survival rates of T1 tongue cancer END, T1 tongue cancer OBS, T2 tongue cancer END, and T2 tongue cancer OBS groups were 93.0%, 72.9%, 94.8%, and 65.0%, respectively, with a significant difference between the T2 tongue cancer OBS and T2 tongue cancer END groups ($p = 0.002$). Five-year disease-free survival of T1 buccal OBS, T1 buccal END, T2 buccal OBS, and T2 buccal END groups were 71.3%, 71.4%, 55.6%, and 91.7%, respectively. There was a significant difference between the T2 buccal cancer OBS and T2 buccal cancer END groups ($p = 0.034$) (Table 4). Five-year disease-free survival rates of T1 tongue cancer OBS, T1 tongue cancer END, T2 tongue cancer OBS, and T2 tongue cancer END groups were 91.8%, 77.8%,

71.4%, and 90.2%, respectively. There was no significant difference between groups.

Incidences of occult cervical metastasis in the buccal and tongue groups were 12.7% and 10.8%, respectively. The four groups did not differ significantly in terms of age, sex, site of primary tumour, alcohol consumption, betel nut chewing, smoking, tumour stage, and tumour differentiation type. However, they differed significantly with respect to tumour stage and type of treatment of the neck (Table 2). The occult metastasis rates of the buccal cancer END and tongue cancer END groups were 12.7% and 10.8%, respectively, similar to the proportion of Pathak's study, who reported occult metastasis in 11.0% of neck negative oral cancer patients.[9] Clinically, 5 T2 tongue cancer END patients were upgraded to stage N2b, while 11 were upgraded to stage N1. In addition, one T1 tongue cancer END patient was upgraded to stage N1 while two T1 buccal cancer END patients were upgraded to stage N1. Two T2 buccal cancer END patients were upgraded to stage N2b and eight were upgraded to stage N1.

Discussion

Selective neck dissection (I–III) is a sound and effective procedure in the management of patients with SCC of the oral cavity and a clinically negative neck.[10] Yuen *et al.*[11] showed that elective neck dissection improved the survival rate of early stage tongue cancer patients. Huang *et al.*[1] reported a significant difference in both disease-free and overall survival rates between the END group and the OBS group in early stage tongue cancer. In addition, they found no difference in regional control between patients who underwent SND and those who underwent MRND (modified radical neck dissection I-V)[1]. Haddadin *et al.*[12] concluded that patients with clinical T1/2 N0 tongue cancer who underwent synchronous neck dissection had better survival outcome than those that did not.

In contrast, Jang *et al.*[13] showed no significant effect of END on regional control for the patients with early-stage oral cancer. In addition, they concluded that excellent regional control could be achieved with external beam radiotherapy alone. Haddadin *et al.*[12] showed that tongue tumours have a high incidence of subclinical node disease and that the chances of cure are reduced in subsequent clinical presentations. Yu *et al.*[14] reported an occult cervical metastatic rate of 33.6-34.7% in oral SCC with a clinically negative neck, and concluded that supraomohyoid neck dissection was as effective as radical neck dissection in both staging and regional control rate (94.4% in N0 neck and 89.6% in N+ neck).

Pitman *et al.*,[15] on the other hand, showed that END provided invaluable staging information, which guided decision-making for adjuvant therapy. Haddadin *et al.*[12] reported that the five-year survival rate of T1/T2 tongue negative neck cancer was 59.7% without END versus 80.5% with END. Hosal *et al.*[16] concluded that SND was effective in controlling neck disease and served to detect patients who require adjuvant therapy.

Haddadin *et al.*[12] reported an occult metastasis rate of 21% for T1 tongue cancer and 53% for T2 tongue cancer, and a contralateral neck occult metastasis rate of 8% for T2 tongue cancer. Shah[2] reported 34% occult metastasis rate for oral cavity cancer , while Byers *et al.*[17] and Pitman *et al.*[15] reported higher rates of 45% and 41%, respectively.

Givi and Andersen[18] concluded that the rate of occult metastasis and the degree of survival benefit were major considerations before the performance of elective neck dissection. They also suggested SND I-IV as an option in oral cavity tumours with clinically negative cervical nodes. However, Weiss *et al.*[19] recommended elective neck dissection if the probability of occult metastasis was larger than 20%. Byers *et al.*[17] recommended that all patients with T2-4, T1N0 patients with muscle invasion >4 mm, or those with poorly differentiated cancer should undergo elective node dissection.

Conclusions

Based on the results of this retrospective study, END seems to improve disease-free survival of T2N0M0 buccal cancer and overall survival of T2N0M0 tongue cancer. However, END has no beneficial effect on the survival rate of T1N0M0 buccal and tongue cancer. Routine systemic head and neck untrasonography and computed tomography exams revealed recurrent cancer with poor efficiency.[20] Tongue cancer has high risk for neck occult metastasis and buccal cancer has intermediate risk for neck occult metastasis.[21] Therefore, aggressive management such as prophylactic contralateral neck dissection is a valid opinion for patients with tongue or buccal cancer and a clinically negative neck.

Table 4

Brief summary of the related articles

Author	B-ENT. 2011	Primary tumour site, TN stage	Study design	5-yr disease-free survival rate, P value	Regional control rate, P value	Local control rate, P value	Significant predictors	Occult metastasis
Haddadin *et al.*[12]	Head Neck. 1999	Tongue, T1-2N0	END vs observation	81% vs 54%, P = 0.014	89%	97%	1.ND 2.anterior or posterior tongue	41%
Hosal *et al.*[16]	Laryngoscope. 2000	Head and neck cancer, T1-4N0	END		96%	92%	Extracapsular spread	23%
Jang *et al.*[13]	Jpn J Clin Oncol. 2008	Oral cancer, T1-4N0	END vs RT	66% vs 24%, P <0.0001	73% vs 89%, P = 0.11	87% vs 30%, P<0.01	1.Tongue 2.END 3.Treatment modality	T1: 60% T2: 69% T3: 100% T4: 39%
Huang *et al.*[1]	Cancer. 2008	Tongue, T1-2N0	END vs OBS	79% vs 56%, P <0.0001			1. END 2. Tumour stage	T1: 5.2% T2: 14.6%
Yuen *et al.*[11]	Head Neck. 1997	Tongue, T1-2N0	END vs OBS	85% vs 55%, P <0.05	87% vs 53%		END	
Keski-Santti *et al.*[22]	Oral Oncol. 2006	Tongue, T1-2N0	END vs OBS	82% vs 77%, P >0.05	91% P=0.035	93%	T1: 24% T2: 35%	
Liao *et al.*[23]	Oral Oncol. 2007	Buccal	END vs OBS	T1-T2N0: 92%			Tumour depth >6 mm	T1: 11.1%
Mira *et al.*[24]	Otolaryngol Head Neck Surg. 2002	Head and neck SCC T1-4N0	END		pN0 vs pN + = + 100%: 99%	92%		T1: 0% T2: 6.9% T3: 22% T4: 85.7%

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