Original Article / Çalışma - Araştırma

Correlation of tumor thickness with occult neck nodes in buccal and oral tongue early squamous-cell carcinomas

Erken evre bukkal ve oral dil skuamöz hücreli karsinomlarda tümör kalınlığının okült boyun nodları ile ilişkisi

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ABSTRACT

Objectives: The aim of this study is to investigate the frequency of occult neck nodes and their relationship with tumor thickness in early squamous-cell carcinomas (SCCs) of buccal and oral tongue.

Patients and Methods: We retrospectively reviewed the medical records and pathology reports of 77 previously untreated patients of SCCs of the oral cavity (44 buccal & 33 oral tongue) who underwent tumor excision surgery between July 2012 and June 2015. Patients with early lesions (T_1 and T_2) with clinically negative neck were included and their clinicopathological features, number of occult neck nodes and their correlation with tumor thickness were analyzed.

Results: Occult neck nodes were found in 27 patients (46% buccal and 27% oral tongue). In both groups, chances of occult neck disease increased, when the thickness of tumor reached 5 mm or above. Similarly 5 mm was the minimum tumor thickness in both groups in which occult nodes were found up to level III of neck in contrast to level I and II in ≤4 mm lesions.

Conclusion: Tumor thickness of ≥5 mm is significantly associated with occult neck nodes in both early buccal and oral tongue SCCs. Elective neck dissection should be done in such cases.

Keywords: Buccal; occult neck node; oral tongue; squamous-cell carcinoma; tumor thickness.

ÖZ

Amaç: Bu çalışmada erken evre bukkal ve oral dilin skuamöz hücreli karsinomlarında (SHK) okült boyun nodlarının görülme sıklığı ve tümör kalınlığı ile olan ilişkisi araştırıldı.

Hastalar ve Yöntemler: Temmuz 2012 - Haziran 2015 tarihleri arasında oral kavitede SHK (44 bukkal ve 33 oral dil) nedeniyle daha önce tedavi edilmemiş 77 hastanın tıbbi kayıtları ve patoloji raporları retrospektif olarak incelendi. Klinik olarak boyun negatif, erken evre lezyonlu hastalar (T_1 ve T_2) çalışmaya alındı ve hastaların klinik-patolojik özellikleri, okült boyun nodu sayısı ve tümör kalınlığı olan ilişkisi incelendi.

Bulgular: Okült boyun nodları 27 hastada (%46 bukkal ve %27 oral dil) bulundu. Her iki grupta da, tümör kalınlığı 5 mm ve üzerine ulaştığında okült boyun hastalığı olasılığı artmıştı. Benzer şekilde, ≤4 mm lezyonlarda seviye I ve II'ye kıyasla, okült boyun nodlarının seviye III'e ulaşması halinde, 5 mm her iki grupta da minimum tümör kalınlığı idi.

Sonuç: ≥5 mm tümör kalınlığı, erken evre bukkal ve oral dil SHK'de okült boyun nodları ile anlamlı düzeyde ilişkilidir. Bu hastalarda elektif boyun diseksiyonu yapılmalıdır.

Anahtar Sözcükler: Bukkal; okült boyun nodu; oral dil; skuamöz hücreli karsinom; tümör kalınlığı.

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Elective neck dissection of the clinically negative neck in early (i.e. T_1 and T_2) buccal and oral tongue squamous-cell carcinomas (SCCs) is still controversial. In early stage tumors, the incidence of occult neck nodes ranges between 27 and 40%.[1] Previous studies have shown a relationship between the tumor thickness and neck metastasis.[2,3] In the literature, oral tongue carcinoma in which tumor thickness exceeding 5 mm was significantly correlated with neck involvement.[4] Similarly, buccal tumors 4 mm in thickness acted in the same way in all three stages of malignancy, while those >4 mm had a higher rate of neck metastasis.[5]

In this retrospective study, we aimed to investigate the frequency of occult neck nodes and their relationship with tumor thickness in early SCCs of buccal and oral tongue.

PATIENTS AND METHODS

We retrospectively reviewed the medical records and pathology reports of 77 previously untreated patients of SCCs of oral tongue and buccal mucosa at Liaquat National Hospital Karachi between July 2012 and June 2015. Squamous-cell carcinomas of the buccal mucosa and oral tongue (anterior two-third) which were managed by surgery were considered in the study. All patients underwent wide local excision of buccal and oral tongue lesion intra-orally and ipsilateral supra-omohyoid neck dissection (neck levels I-III removed). We only included the cases of oral tongue, in which the lesion was present in the lateral borders and dorsum of the tongue, but not crossing the midline, due to the possible role of bilateral neck dissection in tumors crossing the midline. Similarly, tip and lateral border tongue tumors involving the floor of mouth were excluded. Buccal lesions involving the angle of lip, upper and lower buccogingival sulcus or retromolar trigone were also excluded. The subjects of this study were limited to patients with early SCCs of the oral tongue and buccal mucosa, i.e. T_1 (tumor size ≤2 cm) and T_2 (tumor size >2 cm, but not more than 4 cm) both on clinical and pathological T-stage along with clinically no neck (no palpable lymph node by physical examination or radiologically undetectable lymph node in either ultrasound, computed tomography (CT) or magnetic resonance imaging (MRI) and pathologically all clear margins (i.e. >5 mm margins each). T_3/T_4 tumors, clinically N_+ neck, recurrent tumors, patients who had distant metastasis at the time of presentation and who received neoadjuvant treatment (either radiation or chemotherapy) were not considered for the study. As this was a retrospective study of routinely collected clinical data, a formal consent was not required.

Occult neck node: Neck node which was negative clinically (on physical examination) or radiologically (on ultrasound, CT and MRI), but subsequently became positive in histopathological evaluation.

Tumor thickness: Tumor measurement from the surface of normal mucosa to maximum depth of infiltration, regardless of whether the growth type was exophytic or ulcerative in histopathology.

Statistical analysis

IBM SPSS version 21.0 software (IBM Corp., Armonk, NY, USA) was used for the statistical analysis. The mean and standard deviation (SD) was calculated for quantitative variables. Frequency and percentage was computed for qualitative variables. The Pearson's chi-square test and Fisher's exact test were applied to analyze the association of qualitative variables with primary site (buccal and oral tongue). A p value of ≤0.05 was considered statistically significant.

RESULTS

Clinicopathologic characteristics

Clinicopathological features of patients with buccal and oral tongue SCCs combined (i.e. T_1 and T_2) and separately with T_1 and T_2 are summarized in Tables 1-3. Of 77 patients included in this retrospective study, 44 (57%) had buccal and 33 (43%) had oral tongue carcinomas. There were 10 (23%) T_1 and 34 (77%) T_2 cases of buccal, while 9 (27%) T_1 and 24 (73%) T_2 cases of oral tongue lesion. More than 50% of both buccal and oral tongue carcinomas were in the age group of 41-60 years (range 20 to 86 years). Male sex was dominant with majority of cases of both T_1 and T_2 in this group. Buccal tumors were mostly right-sided, while oral tongue tumors were left-sided. The majority of cases (>70%) of both groups had moderately differentiated tumors. Perineural invasion of tumor was similar, while extracapsular spread of node was more in the

Table 1. Clinicopathological characteristics of early (combine T_1 and T_2) buccal and oral tongue squamous-cell carcinomas

	Total (n=77)		Buccal (n=44)		Oral tongue (n=33)		
	n	%	n	%	n	%	p
Age (year)							0.845
≤40	23	29.9	12	27.3	11	33.3	
41-60	42	54.5	25	56.8	17	51.5	
>60	12	15.6	7	15.9	5	15.2	
Gender							0.127
Male	58	75.3	36	81.8	22	66.7	
Female	19	24.7	8	18.2	11	33.3	
Side							0.188
Right	37	48.1	24	54.5	13	39.4	
Left	40	51.9	20	45.5	20	60.6	
Grade							0.216
Well differentiated	8	10.4	7	15.9	1	3	
Moderately differentiated	59	76.6	32	72.7	27	81.8	
Poorly differentiated	10	13	5	11.4	5	15.2	
Perineural invasion							1.000
Yes	11	14.3	6	13.6	5	15.2	
No	66	85.7	38	86.4	28	84.8	
Extracapsular spread							0.406
Yes	15	19.5	10	22.7	5	15.2	
No	62	80.5	34	77.3	28	84.8	
Tumor thickness (mm)							0.025*
≤4 mm	17	22.1	14	31.8	3	9.1	
5-10 mm	35	45.5	20	45.5	15	45.5	
>10 mm	25	32.5	10	22.7	15	45.5	

Chi-Square Applied; * P value ≤0.05 considered as significant.

buccal group. None of the patient in our study had lymphovascular invasion of tumor. Almost half cases of both buccal and oral tongue had a thickness varying between 5 and 10 mm. Less than 4 mm tumors were more in the buccal group (32%), while more than 10 mm tumors were more in the oral tongue group (45%). Tumor thickness was found statistically significant with the primary site (p=0.025).

Occult neck nodes in early buccal and oral tongue SCCs

Occult neck nodes (N_+) were found in 27 cases overall (Figure 1). A total of 46% of the patients of oral tongue had occult neck disease, compared to 27% in the buccal group (Figure 2). The size of the largest occult neck node in both early buccal and oral tongue patients was 2.2 cm, and the smallest was 0.1 cm. In addition, 80% cases of oral tongue had N_1 disease (1 occult node in any level from I-III), while buccal had N_2 disease (>1 occult nodes in any one or more than one levels from I-III).

Relationship between tumor thicknesses with occult neck nodes

In both group, chances of occult neck nodes increased, when the thickness of tumor reached 5 mm or above (Table 4). Similarly, 5 mm was the minimum tumor thickness in both groups in which occult nodes were found up to level III of neck in contrast to level I and II in ≤4 mm lesions.

DISCUSSION

There are two approaches for the treatment of neck in early (T_1 or T_2) buccal and oral tongue SCCs. One option is elective neck dissection,

Table 2. Clinicopathological characteristics of T_1 buccal and oral tongue squamous-cell carcinomas

	Total (n=19)		Buccal (n=10)		Oral tongue (n=9)		
	n	%	n	%	n	%	*p*
Age (year)							0.550
≤40	5	26.3	2	20	3	33.3	
41-60	11	57.9	7	70	4	44.4	
>60	3	15.8	1	10	2	22.2	
Gender							0.303
Male	15	78.9	9	90	6	66.7	
Female	4	21.1	1	10	3	33.3	
Side							0.370
Right	11	57.9	7	70	4	44.4	
Left	8	42.1	3	30	5	55.6	
Grade							1.000
Well differentiated	1	5.3	1	10	0	0	
Moderately differentiated	15	78.9	8	80	7	77.8	
Poorly differentiated	3	15.8	1	10	2	22.2	
Perineural invasion							1.000
Yes	2	10.5	1	10	1	11.1	
No	17	89.5	9	90	8	88.9	
Extracapsular spread							0.474
Yes	2	10.5	2	20	0	0	
No	17	89.5	8	80	9	100	
Tumor thickness (mm)							0.077
≤4 mm	9	47.4	7	70	2	22.2	
5-10 mm	8	42.1	2	20	6	66.7	
>10 mm	2	10.5	1	10	1	11.1	

Chi-Square Applied; * P value ≤0.05 considered as significant.

which allows correct TNM staging, but on other side, it may result in unnecessary operation. The second option is close observation, which prevents morbidity related to neck dissection, but carries the risk of later recurrence in the neck. One of the main factors in deciding whether to address neck electively is the tumor thickness, as the risk of occult neck node rises as the thickness extends. In this retrospective study, we investigated early lesions of buccal and oral tongue SCCs, two of the most common sites of malignancy in oral cavity, and analyzed which site had more probability of occult neck nodes and what the cut-off tumor thickness for occult cervical metastasis in both sites.

In our study, the majority of cases in both group had a tumor thickness between 5 and 10 mm comparable to analysis done by O'Brien et al.,[6] as most of their cases of early oral cancer lesions were less than 10 mm in thickness. The incidence of occult lymph nodes in our series was 35% which was higher than study from Japan.[7] Tongue lesions had more occult neck disease, compared to buccal similar to Hiratsuka et al.[7] This increased rate of occult lymph nodes in tongue malignancy was due to large lymphatic drainage of the site. Tai et al.[8] and Urist et al.[9] reported early buccal SCCs with >6 mm thickness had a higher risk of neck disease. In contrast, our study showed that buccal tumors with more than 5 mm thickness were associated with a higher rate of occult neck nodes. We found T_1 and T_2 tongue tumors had more occult neck nodes, when the thickness reached >4 mm and this finding was consistent with Lim et al.[10] and Kurokawa et al.[11] The study conducted by Sheahan et al.[12] and Kane et al.,[13] who included both cases of Stage I and II buccal

Table 3. Clinicopathological characteristics of T_2 buccal and oral tongue squamous-cell carcinomas

	Total (n=58)		Buccal (n=34)		Oral tongue (n=24)		
	n	%	n	%	n	%	*p*
Age (year)							
≤40	18	31	10	29.4	8	33.3	
41-60	31	53.4	18	52.9	13	54.2	
>60	9	15.5	6	17.6	3	12.5	
Gender							
Male	43	74.1	27	79.4	16	66.7	
Female	15	25.9	7	20.6	8	33.3	
Side							
Right	26	44.8	17	50	9	37.5	
Left	32	55.2	17	50	15	62.5	
Grade							
Well differentiated	7	12.1	6	17.6	1	4.2	
Moderately differentiated	44	75.9	24	70.6	20	83.3	
Poorly differentiated	7	12.1	4	11.8	3	12.5	
Perineural invasion							
Yes	9	15.5	5	14.7	4	16.7	
No	49	84.5	29	85.3	20	83.3	
Extracapsular spread							
Yes	13	22.4	8	23.5	5	20.8	
No	45	77.6	26	76.5	19	79.2	
Tumor thickness (mm)							
≤4 mm	8	13.8	7	20.6	1	4.2	
5-10 mm	27	46.6	18	52.9	9	37.5	
>10 mm	23	39.7	9	26.5	14	58.3	

Chi-Square Applied; * P value ≤0.05 considered as significant.

and tongue lesions showed a tumor thickness of 5 mm or more had increased chances of occult neck node, results similar in our study with both favoring elective neck dissection. Occult nodes were found up to level III of neck in both groups when minimum tumor thickness of 5 mm

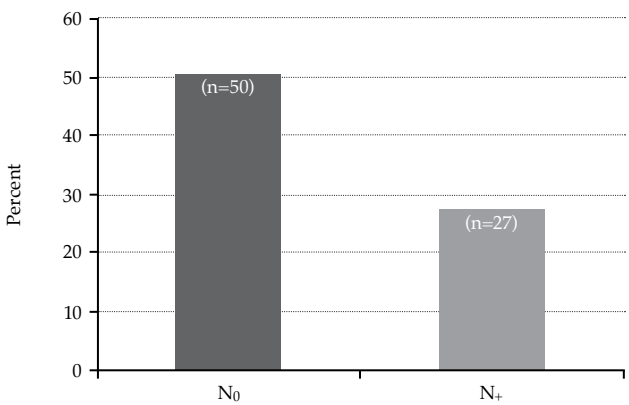

Figure 1. *Pie chart showing patients with and without occult neck node.* N_0*: Occult neck node absent,* N_+*: Occult neck node present.*

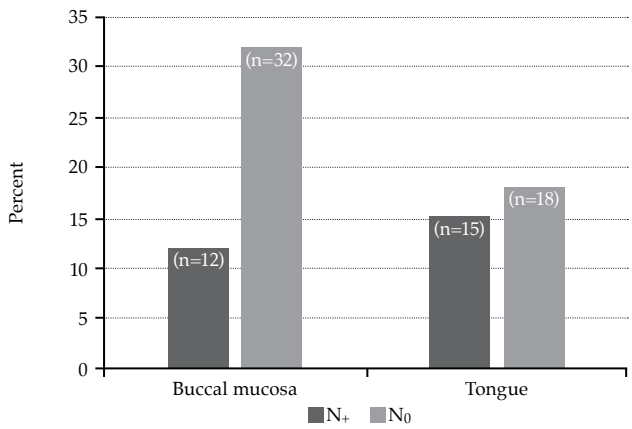

Figure 2. *Bar chart showing distribution of early buccal and oral tongue squamous-cell carcinomas patients with and without occult neck node.* N_0*: Occult neck node absent;* N_+*: Occult neck node present.*

Table 4. Correlation between tumor thickness with occult neck nodes in early buccal and oral tongue squamous cell carcinomas

	Thickness						
	≤4 mm		5-10 mm		>10 mm		
	n	%	n	%	n	%	*p*
Buccal	2	14.3	7	35	3	30	0.401
Oral tongue	0	0	7	46-7	8	53.3	0.309
Overall	2	11.8	14	40	11	44	0.055

Chi-Square Applied; * P value ≤0.05 considered as significant.

reached, findings consistent with work done by Yuen et al.[14] and Kumar et al.[15]

In the future, we are planning to follow these patients for longer duration to see and compare differences in the locoregional recurrence, distant metastasis, and survival rates between these two sub-sites. Further studies are required to clarify the importance of tumor thickness which is an important prognostic parameter in early oral SCCs.

In conclusion, our results demonstrate that tumor thickness of ≥5 mm is significantly associated with occult neck nodes in both early buccal and oral tongue SCCs. Tongue lesions have more risk of occult neck disease, compared to buccal lesions. Elective neck dissection should be done in both having thickness of 5 mm or above.

Declaration of conflicting interests

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