RESEARCH ARTICLE

The frequency of occult cervical metastasis in oral squamous cell carcinoma patients - A cross sectional study

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Abstract

Objective: To determine the frequency of occult cervical metastasis in oral squamous cell carcinoma patients.

Methods: This cross sectional study was conducted in the department of maxillofacial surgery, Mayo Hospital, Lahore from July 31st, 2015 to January 31st, 2016 on 100 patients of oral Squamous Cell Carcinoma (SCC) having clinically and radiologically negative nodes. Prophylactic functional neck dissection was done in each patient and was sent to the pathology lab for evaluation of any occult metastasis.

Results: Overall frequency of occult cervical metastasis was found to be 27%. In 41(41 %) specimens of SCC of tongue, 13(31.7%) had occult metastasis. In Alveolar mucosa occult metastasis was found in 4(20 %) out of 20(20 %) patients. In SCC of buccal mucosa occult metastasis was found in 10(29.4%) out of 34(34 %) patients. In SCC of lip no occult metastasis was detected.

Conclusion: Within the boundaries of the present study, it is concluded that occult cervical metastasis was most frequent in cases of SCC tongue, whereas no occult cervical metastasis detected in SCC of lip.

Keywords: Squamous cell carcinoma, cervical lymph nodes, prophylactic neck dissection, occult cervical metastasis.

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Introduction

Among all cancers, representation of oral cancers in men and women is 5% and 2% respectively.[1] Incidence of oral cancer varies with geographic distribution. An overall prevalence of 9% of oral cancers were found in Pakistan.[2] Among the oral cancer cases diagnosed globally, more than half of them are found in Asia where 168,850 new cases were diagnosed in this geographical region alone.[3] Out of all different types of oral cancers,90% were squamous cell carcinomas.[4] In Pakistan Oral squamous cell carcinoma is a major public health problem due to its poor survival rates and high morbidity.[5] The most common sites of the oral cavity involved by SCC are tongue and floor of the mouth. There is an increased incidence of occult cervical metastasis in lesions involving floor of the mouth and tongue, even in earlier stages of the disease.[2]

Squamous cell carcinoma has a very unique biological behaviour. Many advanced tumours may metastasize slowly and patients remain disease free for a longer period of time after surgery. On the other hand, many early stage tumours behave aggressively and show early cervical lymph node metastasis and poor survival rate after surgery. Tumours of tongue and floor of the mouth which are crossing midline usually metastasize to cervical lymph nodes in their earlier stage and involve the neck bilaterally, which ultimately requires bilateral neck dissection resulting in greater post-operative morbidity and mortality. In a study conducted on patients with oral cancers, the five-year overall survival and the five-year disease-specific survival was 68% and 78% respectively.[6] Cervical lymph node involvement is the single most important prognostic factor, which results in a reduction of survival by 50%.[7]

Head and neck area is rich in blood supply and lymphatic drainage, therefore chances of cervical lymph node metastasis in oral cavity squamous cell carcinomas is very high. Dias et al[8] described that in patients with squamous cell carcinoma of the tongue and floor of the mouth, the overall incidence rate of cervical node metastasis was 41.3%. The incidence of cervical metastasis in T1 lesions was 27.8%, in T2 and T3 it was 48.2% and around 60% respectively. The rate of occult cervical metastasis was 24.1%. About 30–50% of OSCC patients have metastatic lymph nodes (LN) during clinical examination which is associated with poor outcome.[9]

The experience gained by meticulous research work done by surgeons have led us to an understanding that the pattern of metastatic involvement of cervical lymph nodes depends on the topography of head and neck lymphatic system.[10] Prediction of levels of cervical lymph node involvement in SCC of different oral sub sites has become somewhat predictable due to enhanced knowledge of

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lymphatic drainage system of the head and neck region. For example, the tip of the tongue is drained by sub mental lymph nodes while rest of the body of the tongue is drained by sub mandibular lymph nodes. Deep cervical chain directly drains from the floor of the mouth area. Therefore in SCC of tongue and floor of mouth level I and II are at greatest risk of involvement by cervical lymph node metastasis while level IV and level V are rarely involved.[11]

Percentage of involvement of cervical lymph node metastasis in oral squamous cell carcinoma is as follows; level I, 46.9%, level II, 75.3%, level III, and level IV, 6.5% and in level V, it is 2%.[8]

Whatever be the size of the primary tumour, involvement of either ipsilateral or contralateral cervical nodes reduces the 5 year survival rate of patients by 50%.[12]

Whenever there is a suspicion of metastatic disease in the neck, proper clinical and radiological evaluation must be done to detect any cervical metastasis. Neck can be evaluated pre-operatively through various ways that include; physical examination, contrast enhanced CT scan, magnetic resonance imaging and ultrasonography.

Different modalities are currently used to detect metastatic disease, which include clinical palpation, CT scans, MRI, positron emission tomography scan and ultra-sonography. CT scan and MR imaging are helpful to determine the architecture, size, extra capsular extension, shape and vascular features associated with lymph node metastasis; however, their diagnostic accuracy is limited.[13] Therefore elective treatment of the neck is recommended whenever the risk of occult cervical metastasis is estimated to be 15-20%.[14]

This study aimed to determine the frequency of occult cervical metastasis in OSCC of different sub sites.

Methods

This was a cross sectional study conducted in the department of oral and maxillofacial surgery, Mayo Hospital, a tertiary care institution, allied with King Edward Medical University Lahore. The study period extended from July 31st, 2015 to January 31st, 2016. Sampling technique involved was non probability consecutive sampling.

Sample size was calculated with 95% confidence level, taking 10% margin of error in consideration and expecting the occult cervical metastasis in 60 % cases.[15] The number of cases calculated to 100.

Following inclusion and exclusion criteria were used for this study. Included were patients of age 20-75 years with squamous cell carcinoma of oral cavity with clinically negative palpable necks as well as negative CT scan and/or MRI. The exclusion criteria of the study were, (a) patients medically not fit for surgery (b) patients previously operated for squamous cell carcinoma (c) patients with distant metastasis and (d) patients who had already undergone chemotherapy or radiotherapy.

All patients fulfilling the inclusion criteria were admitted in the ward and were classified according to the American Joint Committee on Cancer TNM classification.[16] They were explained the treatment plan and informed consent was obtained. They were assessed for cervical lymph node involvement with digital palpation and CT scan. All patients underwent ipsilateral and/or contra-lateral supra omohyoid neck dissection. After resection of the tumour with 1-1.5 cm safe margins and excision of lymph nodes, the different levels of lymph nodes marked with suture knots were sent to the pathology laboratory of King Edward Medical University for histological evaluation and detection of any micro metastasis present in the neck specimen. Biopsy results were analyzed for presence of any occult cervical metastasis and the levels of cervical lymph nodes in which metastasis was present were noted.

Statistical analysis was done with statistical package for social sciences (SPSS version 20.0). Descriptive statistics were carried out to record the absolute and relative frequencies. To calculate the association between occult cervical metastasis and OSCC, Chi-squared test was performed. P value ≤0.05 was considered significant.

Result

Total 100 patients presenting to the Department of Oral and Maxillofacial Surgery, KEMU/Mayo Hospital, Lahore with biopsy proven squamous cell carcinoma of different sub sites of the oral cavity were included. There were 60 (60%) males and 40 (40 %) females (Table-1). Male to female ratio was 3:2. Mean age of the patients was 49.43 ±9.08years. Highest frequency (70.37 %) was in the age group of 46-60 years. Primary tumour sub sites included squamous cell carcinoma of tongue, buccal mucosa, alveolus and labial mucosa. Of these, 41 patients had the location of the tumour in the tongue, 20 in alveolus, 34 in buccal mucosa and 5 in labial mucosa (Figure). According

Table-1: Age distribution of male and female patients.

Age (years)	**Gender**		**Total**
	Male n (%)	**Female** n (%)	
20-30	3(5)	2(5)	5
32-45	13(21.67)	10(25)	23
46-60	42(70)	23(57.50)	65
61-75	2(3.33)	5(12.50)	7
Total	60	40	100

to the T staging there was no patient with T1 lesion.

There were 15 patients with T2 lesion, 29 with T3 lesion and the remaining 56 patients had T4 lesion. (Table-2).

Overall frequency of occult cervical metastasis was found to be 27%. In 41 specimens of SCC of tongue,13(31.7%) had occult metastasis. In Alveolar mucosa occult metastasis was found in 4 (20 %) out of 20 patients whereas in SCC of buccal mucosa it was in 10 (29.4%) out of 34 patients. No occult metastasis was observed in the lips. Table-3 shows the stratification of data for occult cervical metastasis according to gender, levels of lymph nodes involved by occult metastasis, age groups and T staging of OSCC respectively.

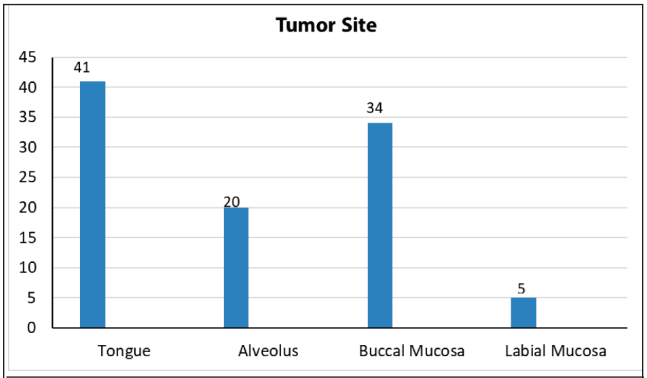

Figure: Tumour site in Patients.

Table-2: Distribution of patients according to T staging of SCC in relation to Tumor site.

T-Stage	Tongue n (%)	Alveolus n (%)`	Buccal Mucosa n (%)	Labial Mucosa n (%)
T1	0(0)	0(0)	0(0)	0(0)
T2	8(19.51)	1(5)	4(11.76)	2(40)
T3	13(31.71)	5(25)	8(23.53)	3(60)
T4	20(48.78)	14(70)	22(64.71)	0(0)
Total	41	20	34	5

Table-3: Occult cervical metastasis found in OSCC.

		Occult cervical metastasis		*p*-value
		Yes (n=27)	**No** (n=73)	
		n (%)	n (%)	
Age(years)	16-30	1(3.70%)	4(5.47%)	0.01*
	32-45	5(18.52%)	18(24.65%)	
	46-60	19(70.37%)	45(61.64%)	
	61-75	2(7.41%)	6(6.84%)	
Gender	Male	16(59.26%)	24(32.87%)	0.01*
	Female	11(40.74%)	49(67.12%)	
Site	Tongue	13(48.15%)	28(38.35%)	0.02*
	Alveolus	10(37.04%)	24(32.87%)	
	Buccal Mucosa	4(14.81%)	16(21.91%)	
	Labial Mucosa	0(0%)	5(6.84%)	
Lymph node Level	IA	3(11.11%)	24(32.87%)	0.09
	IB	13(37.04%)	16(21.91%)	
	II	9(33.33%)	11(15.06%)	
	III	2(7.41%)	22(30.13%)	
T Stage	T1	0(0%)	0(0%)	0.57
	T2	3(11.11%)	12(16.43%)	
	T3	10(37.04%)	19(26.02%)	
	T4	14(51.85%)	42(57.53%)	

*Statistically significant as $p \leq 0.05$

No statistical significant association was observed between lymph nodes level (p= 0.09), tumour stage (p= 0.57) and the presence of occult cervical metastasis in OSCC patients. However, a statistical significant association was observed between age (p= 0.01), gender (p= 0.01), site (p= 0.02) and the presence of occult cervical metastasis.

Discussion

Cervical lymph node metastasis is the most important mechanism in the spread of head and neck squamous cell carcinomas. Involvement of cervical lymph nodes decreases the survival rate of these patients significantly (50%). Squamous cell carcinoma of the oral cavity is a very notorious lesion. Cervical lymph node metastasis is best treated surgically by performing the required type of neck dissection and clearing the neck from metastatic lymph nodes, so that residual disease may not be left and also to decrease the chances of recurrence and improve the survival rate of patients. The questions still remains that what should be done when neck nodes are not involved on clinical evaluation as well as on CT scan and/or MRI scans. Many surgeons prefer to do a supraomohyoid neck dissection on ipsilateral side when no lymph nodes are palpable. Decision of doing a neck dissection must be evidenced based and depends on the frequency of occult cervical metastasis found in the site involved by squamous cell carcinoma. Whenever the risk of occult cervical metastasis is greater than 20% neck dissection must be performed in order to avoid, the left over residual disease, future recurrence, and to improve the survival rate of the patient. Accurate radiologic imaging could potentially allow for a more conservative approach regarding management of the neck, if the risk of occult metastatic disease could be reduced to 20%. Clinical palpation is the first line method in evaluating metastatic cervical lymph node involvement. CT scan and Magnetic resonance imaging is also helpful in detection of cervical lymph node metastasis. Whereas, occult cervical metastasis cannot be detected on clinical palpation as well as on any type of radiological imaging. Therefore, the gold standard for detection of occult cervical metastasis is detailed histopathological evaluation of neck nodes specimen after surgery. On histopathological evaluation, frequency of occult cervical metastasis can be determined for different

sub sites of OSCC. In the sub sites which are notorious for occult cervical metastasis and the risk of occult metastasis is greater than 20%, elective neck dissection must be done. In this study total of 100 neck specimens were examined after surgical removal for occult cervical metastasis. Out of these 100 patients, number of SCC of tongue, alveolus, buccal mucosa and labial mucosa were 41, 20, 34 and 5 respectively. Highest frequency of occult cervical metastasis was found in SCC of tongue i.e. 31.7%. Whereas, in SCC of alveolus, buccal mucosa and labial mucosa, frequency of occult metastasis was found to be 20%, 29.4% and 0%, respectively. Tongue being the most notorious sub site for having occult cervical metastasis. In a study conducted previously, the prevalence of occult cervical metastasis was found to be high in squamous cell carcinomas of floor of the mouth and tongue. Occult cervical metastasis in tongue lesions was found to be 33% in T1 tongue lesions and 37% in T2 tongue lesions, overall frequency was 35% in tongue lesions and 37% in floor of the mouth lesions.[17] Whereas in our study overall frequency of occult cervical metastasis in tongue lesions was 41% and no case of floor of mouth lesion was reported. In another study, tongue lesions have been proven very notorious for having occult cervical metastasis even in very small lesions with a frequency ranging from 23% to 66%.[18] In another local study over all figures of occult cervical metastasis in oral cavity squamous cell carcinoma was found to be 32.4% (5/14 in tongue lesions, 5/18 in alveolar ridge, 2/4 in floor of the mouth lesions and 0/1 in buccal mucosa lesion).[19] In comparison to our study in which occult cervical metastasis was found in 29.4% of buccal mucosa cases, which may be due to greater number of cases of squamous cell carcinoma of buccal mucosa and advanced staged tumours at the time of presentation. These values of occult cervical metastasis help us a lot to devise a proper treatment plan for the patients with OSCC of different sub sites when these patients present with a clinically negative neck. If these necks are not treated surgically, these patients will be prone to recurrence, poor prognosis and decreased survival rates. In OSCC of any sub site, whenever patient presents with a clinically negative neck and no lymph node involvement found on CT and MRI, the cut off value of occult cervical metastasis must be kept in mind i.e. whenever the risk of occult metastasis is 20% or more, prophylactic neck dissection must be done so that no residual disease remains and survival rate and prognosis is improved.[14]

Conclusion

Within the boundaries of the present study, it is concluded that occult cervical metastasis was most frequent in cases of squamous cell carcinoma tongue, whereas no occult cervical metastasis detected in squamous cell carcinoma of lip.

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Conflict of Interest: None.

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