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To Correlate The Depth Of Tumour With Cervical Lymph Node Metastasis In Early Tongue Squamous Cell Carcinoma

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Abstract:
Background*: Oral squamous cell carcinoma is estimated to be the 6th most common cancer that accounts for 0.5 to 5% of all cancers in Europe, United States& Australia, but up to 45% cancers in India[1,2,3,4]. Most common sites being tongue and floor of mouth and most common etiological factors being tobacco and alcohol abuse[5,6].The status of cervical lymph node at presentation is the single most important prognostic factor for patients with oral squamous cell carcinoma and presence of lymph node metastasis decrease survival rate by more than 50%.[1,7,8]Late lymph node metastasis and local recurrence are the major causes of decreased survival in patients with clinical N0 early oral tongue carcinoma. Occult lymph node metastasis are observed in 20-40% cases and their successful control contributes to improved survival [9-15.]Treatment of clinically negative neck nodes in patients with early stage tongue carcinoma remain controversial with different treatment protocols used in different institutes which includes the wait and see policy, sentinel node biopsy and elective neck dissection[.9,10,12,14]So in this proposed study we are trying to correlate the tumour depth with neck nodal metastasis so as to include tumour depth as an important risk factor for assessing neck nodal metastasis.*
Material And Methods: *A cross sectional observational study involving 25 cases was conducted in the department of Otorhinolaryngology and department of General Surgery,MLB Medical College, Jhansi from 1st November 2019 to 31st March 2021.*
Results: *All the thesis work was carried out in the department of otorhinolaryngology and Surgery of MLB Medical College Jhansi from November 2019to march 2021.*
25 cases of histopathologically proven squamous cell carcinoma of tongue meeting inclusion criteria were included. Detailed relevant history, general, physical and otolaryngological examination were carried out.
Conclusion*:.Our study was a cross sectional observational study and 25 patients with early squamous cell carcinoma of oral tongue who met the inclusion and exclusion criteria were taken up for the study.*
Key Word*: Squamous Cell Carcinoma (SCC), HPV, Lymph Nodes, Metastasis, Oral Cavity.*

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I. Introduction

Oral squamous cell carcinoma (SCC) is estimated to be the 6th most common cancer that accounts for 0.6 to 5% of all cancers in Europe, US and Australia, but up to 45% cancers in India. It mostly affects males with incidence of 75% patients over 60yrs old, but its incidence is growing among females[1-4]. Most common sites being tongue and floor of mouth that signifies about 90% of all oral malignancies and most common etiological factor being tobacco and alcohol abuse[1,5-7]. Recently HPV infection is also considered to be a significant risk factor[8]. Betel nut and tobacco chewing are accountable for the high incidence in Indian subcontinent[5]. In tongue the most commonly involved sites are its lateral aspect and the ventral surface, at the junction between tongue and floor of mouth, with the dorsal portion of the tongue being the least involved area[9].

The single most important prognostic factor for patients with squamous cell carcinoma of oral cavity is the status of cervical lymph node at presentation. Presence of lymph node metastasis reduce survival rate by more than 50%[(1,7,10)]. Squamous cell carcinoma of oral tongue has high incidence of nodal metastasis even in early stages perhaps as a result of rich lymphatics of tongue[11,31].

The foremost causes of decreased survival in patients with clinical N0 early oral tongue carcinoma are late lymph node metastasis and local recurrence. Occult lymph node metastasis are observed in 20 to 40 % cases and their effective control contributes to improved survival[12-18].

In the recent literature, an incidence of 27 to 40 % for occult neck metastasis in stage T1 to T2 squamous cell carcinoma have been described. In current clinical practice, elective supraomohyoid neck dissection is executed if the risk of nodal involvement is greater than 15 to 20%[18-21]. This protocol of neck

management authorizes one to identify occult neck metastasis occurring in early stage tumour. However, a considerable percentage of patients undergoing prophylactic neck dissection do not have any cervical lymph node metastasis, thereby over treating such patients. Therefore, there is a need to identify high risk factors that can predict the risk of neck node involvement in early stage oral squamous cell carcinoma of oral cavity.[18]

Moreover, it has been proposed that it is more difficult for tumour emboli to form in the small calibre lymphatics of superficial areas than in the wider lymphatics of deeper tissue[10]. The association of tumour thickness with lymph node metastasis is believed to indicate the aggressiveness of tumour growth and is an unbiased indicator for the proximity of the tumour to lymphovascular structures[17.] Advanced stage tumours with clinical or radiological evidence of neck nodes warrant a definitive neck dissection. It is the early stage tumours without any clinical or radiological evidence whose management remain debatable. They may harbor disease, however doing unnecessary neck dissection can lead to inevitable complications and dreadful outcomes[22]. Several studies have shown that there is a high rate of occult lymph node metastasis (20 to 40%) in squamous cell carcinoma patients with no evidence of regional spread on clinical or radiological assessment.[12]

Tumour infiltration depth has been introduced as a predictor of nodal metastasis and the cut off values recommended for identifying patients needing neck treatment ranges from 1.5 to 10mm[18].Tumour infiltration depth is measured as the infiltrative portion of the tumour that is extended below the surface of the adjacent mucosa[23].

During assessment of cancer patients, TNM classification has traditionally been used as an objective internationally accepted system. However, several studies have shown that many factors other than size, nodal involvement and metastasis have varying degrees of influence on a patient's prognosis. Tumour depth is one such factor. Varying methods have been proposed in different literatures for measuring tumour depth[10,23,24]. In current AJCC TNM classification (8th edition), depth of invasion has been integrated into T staging and has shown to be an important factor in redefining the staging system resulting in up gradation based on depth of invasion cut off 5mm and 10mm.[25]

Treatment of clinically negative neck nodes in patients with early stage tongue carcinoma remains contentious with different treatment protocols that incorporates wait and see policy, sentinel node biopsy and elective neck dissection.[12,13,15,17]

In this proposed study, we have correlated the tumour depth with cervical metastasis considering tumour depth as an important risk factor for assessing neck node metastasis.

AIMS AND OBJECTIVES

To correlate the tumour depth and cervical lymph node metastasis in cases of early tongue Squamous Cell Carcinoma

II. Material And Methods

A cross sectional observational study involving 25 cases was conducted in the department of Otorhinolaryngology and department of General Surgery,MLB Medical College, Jhansi from 1st November 2019 to 31st March 2021.

Study Design: Cross Sectional Observational Study

Study Duration: November 2019 to November 2021

Sample size:25 patients.

Subjects & selection method:

- Cases were drawn from the ENT & General Surgery OPD in MLB Medical College, Jhansi
- Patients were informed about the procedure and written informed consent was obtained.
- Then worked up for surgery under general anaesthesia after routine and specific investigations.
- The study included all cases of histopathologically proven squamous cell carcinoma of tongue who underwent wide local excision with supraomohyoid neck dissection.
- Surgical specimens of tongue and lymph nodes were oriented and labelled by surgeon, put in different containers, fixed in 10% of neutral buffered formalin and then sent for histopathology
- The specimens were then paraffin processed, sections cut at 4 micrometres and stained with haematoxylin and eosin. Tumour depth was measured from the surface of the tumour to the deepest point of the invasive tumour by morphometric software, NIS Elements (Nikon).

Inclusion criteria:
Histopathologically diagnosed cases of cT1T2NoMo squamous cell carcinoma of oral tongue planned for upfront surgery (primary surgical treatment).

Exclusion criteria:
1. Cases of squamous cell carcinoma tongue with neck nodes
2. Previously treated or Recurrent cases of squamous cell Carcinoma tongue.

III. RESULTS

All the thesis work was carried out in the department of otorhinolaryngology and Surgery of MLB Medical College Jhansi from November 2019to march 2021.

25 cases of histopathologically proven squamous cell carcinoma of tongue meeting inclusion criteria were included. Detailed relevant history, general, physical and otolaryngological examination were carried out. The findings thus obtained were entered in the proforma for this study and then analysed
The results are categorised broadly into the following headings:

- Age and Sex
- Socio economic status of patients
- Relation with smoking
- Relation with tobacco chewing
- Preoperative and postoperative degree of differentiation
- Association between tumour depth and nodal status.
- Changes in preoperative and postoperative degree of differentiation.
- Validity of tumour thickness in predicting nodal status.

The observations are as follows:

1. Distribution of Age:
Of the total 25 patients studied, the youngest age of presentation was 29yrs old while the eldest was 68yrs old with the mean age 45.24+/-12.269 years.

Table 1a: Distribution of age

Number of patients	Minimum age	Maximum age	Mean	Standard deviation
25	29	68	45.24	12.269

Of the 25 cases, 15(60%) belonged to age group 31-50 years, 8(32%) belonged to group of 51-70 years and remaining 2 cases (8%) belonged to </= 30yrs age group.

Table 1b: Frequency distribution of age

Age (years)	Frequency	Percentage
</= 30	2	8.00%
31- 50	15	60.00%
51-70	8	32.00%

2. Sex:
Out of 25 patients studied, 16 patients (64%) were males while 9 (36%) were females, thus male to female ratio being 1.78: 1.

Table 2: Distribution of sex

GENDER	NUMBER	PERCENTAGE
FEMALE	9	36.0
MALE	16	64.0
TOTAL	25	100.0

3. Socioeconomic status*:
Of the 25 cases studied, 14 cases (56%) were in lower middle class family, 7(28%) were in upper lower, 3(12%) were in upper middle and 1 (4%) was in upper class. Majority were in lower middle and in upper lower class.
*kuppuswamy scale of socioeconomic status.

Table 3: Frequency distribution of socioeconomic status

SES	NUMBER	PERCENTAGE
UPPER	1	4.0
UPPER MIDDLE	3	12.0
LOWER MIDDLE	14	56.0
UPPER LOWER	7	28.0
TOTAL	25	100.0

4. Relation to history of smoking:
Of the 25 cases, 18 cases (72%) had history of smoking, while 7 cases (28%) did not have.

Table 4: Distribution of patients according to history of smoking

SMOKING	NUMBER	PERCENTAGE
YES	7	28.0
NO	18	72.0
TOTAL	25	100.0

5. Relation to tobacco use:
Of the 25 cases, majority i.e. 22 cases (88%) had history of tobacco chewing while only 3 cases (12%) did not have.

Table 5: Distribution of patients according to history of tobacco chewing

TOBACCO	NUMBER	PERCENTAGE
YES	22	88.0
NO	3	12.0
TOTAL	25	100.0

6. Duration of symptoms:
Of the 25cases studied, all patients presented with ulcerative lesions and the minimum duration was 3months and maximum was 60months with a mean duration of 8.14+/- 11.225.

Table 6: Distribution according to duration of symptoms

Variable	No:	minimum	Maximum	mean	SD
Duration of symptoms(months)	25	3	60	8.14	11.225

7.Site of lesion:
Of the 25 cases studied, majority had involvement of lateral border with equal involvement of left and right side i.e. 11patients (44%) had involvement of left lateral border and 11 patients (44%) had their right lateral border involved. Only 3 patients (12%) had their ventral surface of tongue involved with left side (8%) 2 cases and right side (4%) 1 case.

Table 7: Distribution according to site of lesion

SITE	NUMBER	PERCENTAGE
LEFT LATERAL BORDER	11	44.0
LEFT VENTRAL SURFACE	2	8.0
RIGHT LATERAL BORDER	11	44.0
RIGHT VENTRAL SURFACE	1	4.0
TOTAL	25	100.0

8. Size of lesion:
Minimum ulcer size was 1cm and maximum was 4cm, with a mean size of 2.7 80+/-

Table 8: Distribution according to size of lesion

Variable	No	Minimum	Maximum	Mean	SD
Ulcer size (cm)	25	1	4.00	2.780	1.128051

9. Presence of induration:
Of the 25 cases, 22 cases (88%) had induration around the ulcer.

Table 9a: Distribution according to the presence of induration

INDURATION	NUMBER	PERCENTAGE
PRESENT	22	88.0
ABSENT	3	12.0
TOTAL	25	100.0

Table 9b: Distribution according to size of induration

Variable	Number of patients	Minimum size(cm)	Maximum size(cm)	Mean	Standard deviation
Induration size	22	0.50	1.00	0.7045	0.25162

Of the 22 cases with induration, the minimum induration seen was o.5cm and maximum 1cm with a mean induration of 0.7045+/-0.25.

10.Clinical staging:

Of the 25 cases, 15 cases (60%) had T2 lesions and the remaining 10 cases (40%) had T1 lesions.

cTNM	NUMBER	PERCENTAGE
T1N0MX	10	40.0
T2N0MX	15	60.0
TOTAL	25	100.0

Table 10: Distribution according to clinical stage

11.Preoperative degree of differentiation:

Of the 25 cases studied, 19 cases (76%) had well differentiated lesions while 6 cases (24%) had moderate degree of differentiation. None had poorly differentiated lesions.

Table 11: Distribution according to preoperative degree of differentiation

PREOPERATIVE DEGREE OF DIFFERENTIATION	NUMBER	PERCENTAGE
MODERATELY DIFFERENTIATED	6	24.0
WELL DIFFERENTIATED	19	76.0
TOTAL	25	100.0

12. Postoperative degree of differentiation

Post operatively, in 13 patients (52%) histopathological examination showed moderate degree of differentiation while 12 patients (48%) had well differentiated tumours.

Table 12: Distribution according to postoperative degree of differentiation

POSTOPERATIVE HPE DEGREE OF DIFFERENTIATION	NUMBER	PERCENTAGE
MODERATELY DIFFERENTIATED	13	52.0
WELL DIFFERENTIATED	12	48.0
TOTAL	25	100.0

13.Postoperative nodal status:

Of the 25 cases studied, only 4 cases (16%) had histopathologically node positive disease while the remaining 21 cases (84%) were node negative.

Table 13: Distribution of patients according to nodal status

NODAL STATUS	NUMBER	PERCENTAGE
N0	21	84.0
N1	4	16.0
TOTAL	25	100.0

14. Tumour depth

Of the 25 cases studied, minimum tumour depth was 2mm and maximum was 13mm with a mean depth of 7.52mm+/- 3.232.

Table 14: Distribution according to tumour depth

Variable	No :	Minimum	Maximum	Mean	SD
Tumour depth(mm)	25	2	13	7.52	3.232

15. Association between Tumour depth and nodal status:

Of the 4 cases with pathologically positive nodal disease, the mean tumour depth was found to be 12.75+/-0.5 and of the remaining 21 node negative cases, the mean tumour depth was found to be 6.52+/-2.444. By T test, p value was found to be <0.001.

Of the 4 cases with positive neck nodes, 3 had tumour depth of 13mm and 1 had 12mm.

In the 3 patients with 13mm tumour depth, 1 had 2/21, second patient had 1/19 and third had 2/23 tumour positive lymph nodes.

Table 15a: Association between tumour depth and nodal status

NODE	N	MEAN TUMOURDEPTH	STD. DEVIATION	T TEST P VALUE
N0	21	6.52	2.444	<0.001
N1	4	12.75	.500	

Table 15b: Relation of tumour depth and neck node positivity

Positive cases	Tumour depth(mm)	Number of positive lymph nodes
1	13	2/21
2	13	1/19
3	13	2/23
4	12	1/17

Table 15c: Relation between tumour depth and cases with positive neck nodes.

Tumour depth	Number of cases with positive neck nodes
<10mm	0
11mm	0
12mm	1
13mm	3

16. Relation between site of primary and site(level) of neck nodes

Of the 2 patients with lesion involving right lateral border, 1 had metastasis to right level IIa and IIb, while the other had only right IIa involvement. Patient with right ventral surface had metastasis to right level Ib and IIa, and in patient with left ventral surface had metastasis to left Ib.

Table 16: Relation between site and level of lymph nodes

Cases with pathologically positive neck nodes	Tumour site	Level of lymph node
1	Right lateral border	Right level IIa, IIb
2	Right lateral border	Right level IIa
3	Right ventral surface	Right level Ib, IIa
4	Left ventral surface	Left level Ib

16. Changes in the degree of differentiation preoperative to postoperative.

The 6 cases with preoperative moderately differentiated tumours continued to remain moderately differentiated postoperatively. Of the 19 well differentiated cases,11 (57.9%) remained the same while 8 reported moderate degree of differentiation postoperatively. By chi square test, p value was 0.013.

Table 16: tabulation showing association between preoperative and postoperative degree of differentiation

Preoperative Degree Of Differentiation	Post Operative Degree Of Differentiation		Total	Chi Square Test P Value
	Well Differentiated	Moderately Differentiated		
Well Differentiated, N=19	11	8	19	0.013
Moderately Differentiated, N=6	0	6	6	
Total N=25	11	14	25	

17. Validity of Tumour depth in predicting nodal status.

At a tumour depth of > / = 11 mm, the sensitivity, specificity, positive predictive value and negative predictive value were found to be 100 and also the p value was <0.001 that is significant. Thus as per our study, 11mm is taken as the optimal cut off at or above which neck dissection is substantial.

Table 17: Assessing the validity of tumour depth in predicting nodal status

Tumour Depth Cut Off Values	Sensitivity	Specificity	Ppv	Npv	P Value
>= 3 Mm	100	4.8	16.7	100	0.656
>= 4 Mm	100	9.5	17.4	100	0.520
>= 5 Mm	100	28.6	21.1	100	0.220
>= 6 Mm	100	38.1	23.5	100	0.134
>= 7 Mm	100	52.4	28.6	100	0.053
>= 8 Mm	100	57.1	30.8	100	0.036
>= 9 Mm	100	76.2	44.4	100	0.004
>= 10 Mm	100	85.7	57.1	100	<0.001
>= 11 Mm	**100**	**100**	**100**	**100**	**<0.001**

IV. DISCUSSION

The unpredictable behavior of squamous cell carcinoma of the head and neck has led several investigators to search for variables that may be useful as indicators of cervical metastasis and prognosis. An important aspect of this study was to demonstrate that depth of tumour invasion was an appropriate factor to predict cervical metastasis of early squamous cell carcinoma of oral tongue and, furthermore, to determine the optimal tumour depth cut off point for prompting a prophylactic neck management.

In our study, 25 cases of early oral tongue carcinoma were included. All the inclusion and exclusion criteria were kept in mind while selecting the cases.

Demographics and clinical details:

Oral squamous cell carcinoma generally occurs in elderly men during the fifth to eighth decades of life. The incidence of oral squamous cell carcinoma in young adults accounts for about 0.4 to 3.6% of all cases of this disease.[40]

Out of 25 cases studied, the youngest age of presentation was 29 and the maximum age was 68, and the mean age of study population was 45.24+/-12.269. Of the 25 cases, 15(60%) belonged to age group 31-50 years, 8(32%) belonged to 51-70 years age group and remaining 2 cases (8%) belonged to </= 30yrs age group. Majority were in the middle age group.

In a study conducted by Balasubramanian et al,[28] the median age was of 60 yrs, that ranges from 22-97yrs. Where as in another study conducted by fukano et al,[32] the ages varied between 22 and 79yrs with an average of 48.2 yrs. In the study by O-charoenrat,[31] 52% patients were below 60yrs age and remaining 48% belonged to above 60yrs, ranges from 29 to 80 yrs.

Majority in our study population were males (64%). In the study by fukano et al,[32] the sex ratio was 1:1. Where as in the study by O-charoenrat,[31] 62% were males. When the socio economic status of the study population were analyzed, majority belonged to lower middle (56%) and upper lower (28%).

Smoking and tobacco chewing are well known risk factors for oral carcinomas. In our study,72% of the study population had associated history of smoking and 88% had associated history of tobacco chewing. In a study conducted in china by Zheng T et al to investigate risk factors for tongue cancer, a total of 111 cases and 111 controls were included and the results showed that risk of tongue cancer is significantly elevated among ex-smokers and current smokers. The risk increases with increasing tobacco consumption. Quitting smoking was associated with a reduction of the risk of tongue cancer. Alcohol drinking was not found to be significantly associated with the risk of tongue cancer in the study. [41] In our study population also, tobacco chewing showed more relation than smoking.

All the 25 cases presented with ulcerative lesions. As per literatures and previous studies, in the tongue most common sites of involvement are posterolateral and ventral surfaces.[42]

In our study, Majority i.e. 22 cases (88%) had lesions involving the lateral border of mid third tongue with equal frequency of right (44%) and left side (44%) involvement. 2cases (8%) had left ventral surface involvement and remaining 1 (4%) had right ventral surface involvement. Almost all cases had associated pain while chewing. In a study by O-charoenrat,44% patients had right lateral involvement, 40% had left lateral involvement and 12% had dorsal and 4% had ventral surface involvement.[31]

In our study population, the minimum size was 1cm and maximum was 4 cm. The mean tumour size was 2.780+/-1.128051. 22 cases (88%) had associated induration around the tumour that ranged from 0.5 to 1cm with a mean induration of 0.7045+/-0.25162.

In our study we have included only early stage oral tongue squamous cell carcinoma. Of the 25 cases,60% (15 cases) were in T2N0Mx and remaining 40% (10 cases) were in T1N0Mx stage. In the study by O-charoenrat,[31] 74% were having T2 lesions and remaining were having T1 lesions.

Preoperative histopathological examination of these ulcerative lesions were reported as well differentiated SCC in 19 cases(76%) and as moderately differentiated SCC in 6 cases(24%) . In the study by O-charoenrat,[31] 72% were having moderately differentiated lesions and 22% were having poorly differentiated and only 6% were having well differentiated lesions.

These patients had undergone wide local excision of the tumour lesion with 1cm margin and supraomohyoid neck dissection and specimens were sent for histopathological examination

Of the 25 cases analyzed, 13 specimens (52%) were reported as moderately differentiated and 12 cases (48%) were reported as well differentiated squamous cell carcinoma.

Grade of differentiation was divided into well, moderate and poor as described by Martinez- Gimeno et al[45.]Tumours were considered to be well differentiated when there was good stratification , clear formation of keratin with abundant dense eosinophilic cytoplasm, presence of intercellular bridges, regular nuclei ,minimal mitosis(<10 mitosis per 10 high power fields) and poorly differentiated when the latter criteria were absent and were with an undifferentiated cell pattern, high cellular pleomorphism, marked nuclear atypia, absence of

keratinization and high rate of mitosis(> 20 mitosis per 10 high power fields). Tumours were considered to be moderately differentiated when criteria lay between both good and poor differentiation. (ref pic 3)

The changes in the degree of differentiation from preoperative to postoperative were cross tabulated. The 6 cases that were reported moderately differentiated preoperatively, remained same post operatively also. But of the 19 cases that were reported well differentiated preoperatively, 8 cases were reported to be moderately differentiated postoperatively. By chi square test, the p value was calculated as 0.013 that is significant. This might be due to presence of multiple degrees of differentiation in a single specimen, thus causing observer variation in preoperative and postoperative specimens.

The dissected neck specimens were sent for histopathological examination. of the 25 cases studied, 4 patients (16%) had pathologically positive nodes.

Tumour depth were assessed in 25 patients histopathologically. Of the 25 cases, the minimum tumour depth reported was 2mm and maximum was 13 mm, with a mean tumour depth of 7.52+/- 3.232mm.

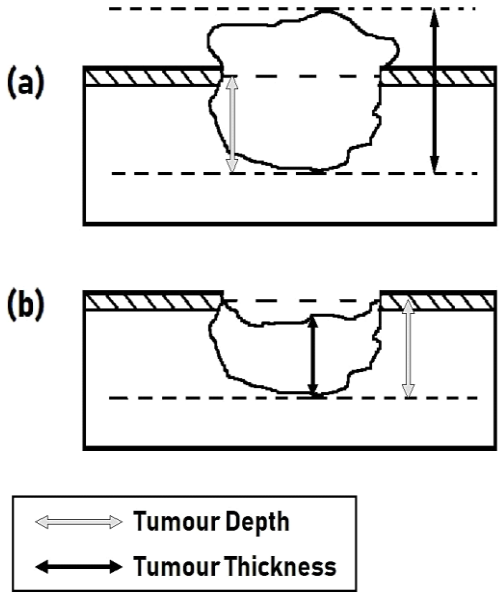
The association between tumour depth and nodal status were studied. Of the 4 cases with pathologically positive nodes, the mean tumour depth was 12.75+/-0.500mm. for the remaining 21 cases with negative nodes, the mean tumour depth was 6.52+/- 2.444mm. By t test, p value was calculated as <0.001, that shows there is a significant association between tumour depth and nodal status.

Of the 4 cases with positive neck nodes, 3 had tumour depth of 13mm and 1 had 12mm. 2 patients with 13mm depth had 2 positive nodes and 1 positive node in 3rd patient. In those 4 cases, 2 had lesion involving right lateral border, 1 had right ventral surface and 1 had left ventral surface. Of the 2 with right lateral border involvement, one had 2 positive nodes involving right level IIa and IIb; the other had 1 positive node in right level IIa. One with right ventral surface had 2 positive nodes involving right level Ib and IIa.; the other with left ventral surface involvement had 1 positive node involving left level Ib.

However, the depth that is suggested as cut off for deciding to treat the neck varies greatly (1.5 to 10mm) in literature.[10] There are several explanations for this variation. First, the different definitions of tumour depth are used, either measuring the distance from the deepest level of invasion to the tumour surface (tumour thickness) or measuring from the deepest level of invasion to the reconstructed mucosal surface (tumour depth). in many studies it is not clear which definition was applied. Second, the studies suffer from the use of small groups (n</= 50) [22,31.] Finally, cut off depths are frequently selected subjectively [22,31,39] or analysis is done on categorical rather than on continuous measurement data.[43,44]

According to Kane SV et al,[22] microscopic tumour thickness was defined as the maximum tumour thickness excluding the keratin coat, taking the vertical extent of the tumour from the surface to its deepest extent in a perpendicular fashion. Microscopic tumour depth was taken as the infiltrative portion of the tumour which extended below the surface of the adjacent mucosa. Where the epithelium was destroyed (since majority of the tumours show ulceration), it was measured after reconstructing a virtual surface. In both the cases, the points of maximum vertical outward extent and the deepest extent of the tumour were marked using a marker pen under the 4x objective. A perpendicular was drawn on the surface line from the deepest point and this distance was then measured, in millimeters, below the reconstructed line, on a scale with a least count of 1mm.

Graphical representation of tumour thickness and depth: (a) exophytic and (b) endophytic tumour.



The lack of standard sampling, measurement techniques and cut off values makes it quite impossible to compare the studies found in the literature.

In a study conducted by Zhang et al, found that the tumour depth had a significant relation to the presence of neck metastasis and a 3mm cut-off point provided a better predictive value and concluded that elective neck dissection should be considered for patients with cT1N0 oral tongue carcinoma with a biopsy depth of 3mm or greater[25]. But in our study, when the tumour depth of > /= 3mm was considered, though t

he sensitivity and NPV seemed to be 100, the specificity and PPV was only 4.8 and 16.7 respectively. More over the p value was 0.656 that is insignificant.

In various studies conducted by Asakage et al [26],kurokowa et al [27],Balasubramanian et al [28], Alkureishi et al [29], Fakih et al [30] they have concluded the optimal cut off of tumour depth for predicting neck node metastasis was >4mm. but in our study, for 4mm tumour depth the specificity and PPV were only 9.5 and 17.4 respectively and the p value was 0.520, that again was insignificant.

Melcher's et al in 2011 conducted a study to explore the infiltration depth as predictor for the nodal status and to recommend a cut-off depth for performing a neck dissection. Infiltration depth was measured in 212 cases. Neck status was determined by histopathological examination of the dissection specimen or by at least 2yrs of follow up. Mean infiltration depth was 5.49mm in N0 and 8.4mm in the N+ group. Clinical nodal status, lymphovascular invasion and infiltration depth were the only independent predictors for nodal status in multiple logistic regression. ROC analysis in pT1cN0 tumours resulted in an optimal cut-off for the prediction of nodal status at a depth of 4.59mm. They concluded that tumour infiltration depth is an important predictor for nodal status in pT1-2 oral squamous cell carcinoma and a cut-off at 4.59mm results in the best predictive value [21]. In various studies conducted by O-Charoenrat et al [31], Fukano et al [32], Borges et al [33], Kane et al [22], and Faiza et al [34] the cut off concluded was 5mm. In our study, at 5mm specificity and PPV were 28.6 and 21.1; p value was 0.22, that is not significant.

At 7mm cut off, the specificity and PPV were 52.4 and 28.6 respectively; p value was 0.053 that is weakly significant. At 9mm cut off, the specificity and PPV reaches 76.2 and 44.4 respectively; p value was 0.004 that is moderately significant.

At 10mm cut off, the specificity and PPV again improves to 85.7 and 57.1; the p value was <0.001 that is strongly significant.

At 11mm cut off, the specificity and PPV reaches 100, more over the p value was <0.001 that is strongly significant. So the optimal cut off for predicting lymph node metastasis as per our study is >/=11mm.

Inability for long term follow up is the limitation met in our study because of the limited study period. Smaller sample size is another limitation.

V. SUMMARY AND CONCLUSION

Our study was a cross sectional observational study and 25 patients with early squamous cell carcinoma of oral tongue who met the inclusion and exclusion criteria were taken up for the study.

- The mean age in our study population was 45.24+/-12.269. 64% (16 cases) were males.
- Majority belongs to lower middle class (56%) and upper lower class (28%).
- 72% of the study population had associated history of smoking
- 88% of the study population had associated history of tobacco chewing
- 88% had tumour lesion in the lateral border of mid third of tongue and 12% had involvement of ventral surface.
- 88% had induration around the lesion
- The mean tumour size was 2.7280+/- 1.22458
- 60% had cT2N0Mx and 40% had cT1N0Mx
- On pre-operative histopathological examination, 76% had well differentiated and24% had moderately differentiated squamous cell carcinoma
- On postoperative histopathological examination, 56% had moderately differentiated and 44% had well differentiated squamous cell carcinoma
- 6 patients with moderately differentiated carcinoma preoperatively, remain moderately differentiated post operatively also. Of the 19 cases of well differentiated carcinoma preoperatively, 8 cases reported as moderately differentiated carcinoma postoperatively.
- 16% had pathologically tumour positive neck nodes.
- In our study, none of the patients with tumour depth less than 11mm had neck metastasis, where as all patients with depth more than 11mm had positive neck nodes.
- The correlation between tumour depth and neck nodal status was studied. The optimal cut off for predicting neck nodal status as per our study is calculated as 11mm, at or above which elective neck dissection to be considered.

- The mean tumour depth was 12.75+/- 0.500 in patients with pathologically tumour positive neck nodes. The p value was <0.001 which shows that there is a significant association between tumour depth and neck nodal status.

Tongue cancers have a relatively high propensity for nodal metastasis. Neck dissection has been the modality of choice for treating nodal disease in head and neck squamous cell carcinomas, however management of the clinically and radiologically negative neck continues to be debated. A wait and watch approach had previously been used; however, poorer survival as a result of nodal involvement and unsatisfactory results of salvage surgery mean that this is not universally recommended. Conversely, the morbidity associated with elective neck dissection prevents its use for all patients. Majority do not harbour occult nodal metastasis and would be over treated by neck dissection. So it is important to find out the factors that can predict cervical nodal metastasis in early squamous cell carcinoma of oral tongue. Tumour depth is one such independent prognostic parameter. Growing evidence in the literature shows that tumour depth is a reliable parameter for predicting lymph node metastasis in oral tongue early squamous cell carcinoma. It has been concluded in our study that there is a significant correlation between the tumour depth and lymph node metastasis in early squamous cell carcinoma of oral tongue. A significant cut off value of >/= 11mm has been determined for considering elective neck dissection. Despite of the best efforts, relatively small number of patients and very short follow up remain as the main limitations in our study.

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