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Original Research Article

A study of incidence and propensity of locoregional lymph nodes in clinically N0 cases of carcinoma of tongue

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ABSTRACT

Background: Oral cavity cancer is the sixth most common cancer worldwide with a high prevalence in South Asia. Among the populations where tobacco chewing is not endemic, tongue is the most frequent subsite for intraoral cancer.
Methods: The prospective observational study was done at our tertiary care centre on 50 patients. CECT neck was done in all the clinically N0 (zero) cases to know the extent of tumour and neck metastasis. Wide local excision with elective neck dissection (END) was done for all clinically N0 cases with 1 year follow-up.
Results: Clinical examination had high false negatives, sensitivity of CT scan imaging=18/20×100=90%, positive predictive value of CT scan imaging=18/26×100=69.23% and diagnostic accuracy=40 (18+22)/50=80%. Significant association was found between neck lymph node metastasis and tumor thickness. No significant association was found between grade of tumor and metastasis.
Conclusions: CECT neck help to delineate the extent of END in carcinoma of tongue. In early-stage squamous cell carcinomas of the tongue (T1 and T2), a tumour thickness >5 mm should be taken as an indicator for prophylactic neck dissection as it is significantly associated with subclinical metastasis. Hemiglossectomy should be preferred over partial glossectomy to achieve better locoregional clearance and in turn to reduce rate of local recurrence. Hemiglossectomy with prophylactic END followed by appropriate chemoradiotherapy reduces locoregional recurrences and improved overall survival rate in early stage I and II of oral tongue squamous cell carcinoma (OTSCC).

Keywords: Oral cavity cancer, OTSCC, END

INTRODUCTION

Oral cancer is major public health problem in the Indian subcontinent.[1] The low-income groups in India are affected most due to a wide exposure to risk factors such as tobacco chewing and insufficient exposure to newly diagnostic aids, resulting in a delay in reporting of oral cancer.[2]

The elective management of the clinically node-negative (cN0) neck in early stage T1-T2 OTSCC has been the subject of much debate. Some clinicians are of the opinion that care for patients with cT1T2N0 (ZERO) OTSCC should be managed conservatively and kept on a close follow-up regimen and should the patient return with clinical neck involvement, a therapeutic treatment would be implemented. This traditional "wait and see" policy brings the potential of allowing a potentially undetected metastasis to remain present within the neck and the risk of a more extensive salvage therapy in the future.

The rationale behind elective treatment of the N0 (zero) neck is based on the assumption that occult neck disease will eventually unequivocally become clinically evident disease, which will require treatment anyway, and

possibly more extensive and morbid treatment. The second assumption is that the untreated undetected disease in the neck will increase the risk of distant metastasis, possibly developing the latter while the neck disease is growing into a clinically detectable entity.[3]

Dissection of levels I to III has become commonplace for the N0 neck in oral cancer, controversy remains about level IV. In cases of cancers of the oral tongue, due to the higher incidence of neck metastasis, in particular the higher incidence of "skip" metastasis, authors have sometimes advocated dissection including level IV, or the "extended" supra-omohyoid neck dissection.

Aims and objectives

Primary objective

Primary objective was to know the presence of neck lymph nodes in CT/MRI scan, intraoperative observation and histopathological confirmation of locoregional metastasis in clinically N 0 cases of carcinoma of tongue.

Secondary objective

Secondary objective was to assess the pathways for locoregional spread in relation to site and extent of the primary tumor. To determine the extent of dissection in END.

METHODS

The hospital based observational study was done at our tertiary care centre on 50 patients to study of incidence and propensity of locoregional lymph nodes in clinically N0 (zero) cases of carcinoma of tongue for period of 24 months (from October 2020 to September 2022). Approval from ethical committee of the institute was taken.

Sample size was calculated using the formula:

$N=[Z^2p(1-p)]/d^2$

Where: Z=table value of alpha error from standard normal distribution table (0.95)

Power (p)=80%, precision error of estimation (d)=5.5%.

n=[0.95×0.95×0.8 (0.2)]/0.055×0.055=47.7

Hence a sample size of 50 patients was considered adequate for our study.

Inclusion criteria

All cases of clinically N0 (zero) carcinoma of tongue with any T stage, all age group patients coming to OPD in our institute and patients willing to be a part of the study were included in the study.

Exclusion criteria

Patients not willing to be a part of the study, patients with clinically palpable neck lymph nodes and patients with uncontrolled systemic illness unfit for surgery.

Clinical examination of neck was negative (N0) in all 50 (100%) cases. The most common site was the lateral border of the tongue (56%) followed by the ventral surface of the tongue (32%). CECT neck was done all the clinically N0 (zero) cases to know the extent of tumour and neck metastasis. CT scan was negative in 24 cases (48%) and positive in 26 cases (52%).

Group A-Type level I-III positive, SOHND (supra-omohyoid neck dissection) was preferred over MRND (modified radical neck dissection) to reduce post-op morbidity; Group B-Type levels II and V positive, MRND was preferred for thorough clearance of locoregional disease; Group C-Type levels II-IV positive, anterolateral dissection preferred over SOHND. Overlapping groups are made only for convenience considering the tendency of the disease to involve nodes so that surgical planning can be done accordingly. Resection of the primary tumour was employed with dissection and removal of the lymphatic chain. All patients underwent primary tumor excision with a minimum margin of 1 cm, the muscle of the mouth floor was preserved in the highest measure and then dissected for any possible lymph nodes. Reconstruction of the defect was not required in our study group as primary closure after neck dissection was possible.

Tumor thickness of 5mm was used as a reference according to AJCC staging guidelines. Significant association was found between neck lymph node metastasis and tumor thickness. Hemiglossectomy was done in 36 patients and partial glossectomy was done in 14 patients. Selective neck dissection was done in 32 patients and MRND was done in 18 patients. Hemiglossectomy was preferred over partial glossectomy to achieve better locoregional clearance and in turn to reduce the rate of local recurrence. Postoperative chemoradiotherapy was given according to standard guidelines. Histopathology report of lymph nodes was negative in cases 60% and positive in 20 cases 40%. All patients were followed up for a duration of one year in the postoperative period to detect local as well as nodal recurrences.

Statistical analysis

Quantitative data is presented with the help of mean and standard deviation. Comparison among the study groups is done with the help of unpaired t test as per results of normality test. Qualitative data is presented with the help of frequency and percentage table. Association among the study groups is assessed with the help of Fisher test, student 't' test and Chi-Square test. 'p' value less than 0.05 is taken as significant**.**

Pearson's chi-squared test

$$X^2 = \sum_{i=1}^{n} (O_i - E_i)^2 / E_i$$

Where X^2=Pearson's cumulative test statistic.

O_i=an observed frequency;

E_i=an expected frequency, asserted by null hypothesis;

n= number of cells in table.

Appropriate statistical software, including but not restricted to MS Excel, SPSS ver. 20 will was used for statistical analysis.

RESULTS

Clinical examination had high false negatives. Our study included total 50 clinically N0 cases, stage I (30), stage II (17), stage III (3) and stage IV (0). Sensitivity of CT scan imaging=18/20×100=90%, Positive predictive value of CT scan imaging=18/26×100=69.23% and diagnostic accuracy=40 (18+22)/50=80%. (Table 1). Histopathological report of tumor revealed moderately differentiated (24/50=48%), well-differentiated (14/50=28%) and poorly differentiated (12/50=24%). No significant association was found between grade of tumor and metastasis (Table 2).

In T1 stage, 13 cases had more than 5 mm tumor thickness, while 17 cases had less than or equal to 5 mm tumor thickness (8/30 N positive i.e., 26.67%). In T2 stage, 4 cases had more than 5 mm tumor thickness, while 13 cases had less than or equal to 5 mm tumor thickness (10/17 N+ i.e., 58.82%), 5mm thickness was used as reference according to AJCC staging guidelines. There are a higher number (58.82%) of neck nodal metastases in T2 tumours, further emphasizing the importance of elective neck treatment in advanced-stage tongue squamous cell carcinomas. Our results showed a high chance of cervical node metastasis with an increase in T-stage (Table 3). Significant association was found between the tumour thickness on histopathology (HPE) and neck node metastasis (Table 4).

There are a higher number (58.82%) of neck nodal metastases in T2 tumours compared to T1 tumours (26.67%) further emphasizing the importance of elective neck treatment in advanced-stage tongue squamous cell carcinomas. Our results showed a high chance of cervical node metastasis with an increase in T-stage.18% recurrence (9 cases) was observed local recurrences which can be due to field cancerization effect (Table 5). END for all cases, post-operative chemoradiotherapy for clearance of residual micrometastasis. Thus, for early carcinomas hemiglossectomy with END provides significant cure rates with less chance of recurrence. Complications were seen in 24% cases, wound infections were observed in 8 cases, bleeding in 2 cases, seroma and fistula in one case each.

Table 1: Diagnostic test results of the study group.

Diagnostic test CT verses HPE	Disease present (Metastatic node on HP)	Disease Absent (Normal Node on HP)	Total
Metastatic node on CT	True positive (a)-18	False positive (b)-8	a+b (Total Positive on CT)-26
Normal node on CT	False negative (c)-2	True negative (d)-22	c+d (Total negative on CT)-24
Total	Diseased (a+c)-20	Non-diseased (b+d)-30	Total Sample size (a+b+c+d)-50

Table 2: Association of grade of tumor with neck lymph node metastasis.

Grade of tumor	Neck lymph node metastasis, n (%)		Chi square, p value
	Yes	No	
Well-differentiated (14)	3 (6)	11 (22)	3.72, 0.155
Moderately differentiated (24)	10 (20)	14 (28)	
Poorly differentiated (12)	7 (14)	5 (10)	
Total	20 (40)	30 (60)	

Table 3: Distribution according to tumor thickness on histopathology (HPE).

Tumor thickness (mm)	N	Percent (%)	T1 stage (%)	T2 stage (%)	Node positive T1 lesion (%), n=8/30 patients	Node positive T2 lesion (%), n=10/17 patients
Less than or equal to 5	31	62	17 (56.6)	13 (76.4)	2	3
More than 5	19	38	13 (43.4)	4 (23.6)	6	7

Table 4: Association of neck lymph node metastasis with tumor thickness.

Tumor thickness (mm)	Neck lymph node metastasis, n (%)		Chi square, p value
	Yes	No	
Less than or equal to 5	5 (10.3)	26 (54.2)	23.486, 0.00001
More than 5	15 (31.3)	2 (4.2)	
Total	20 (41.6)	28 (58.4)	

Table 5: Distribution according to recurrence in different stages.

Stage of disease	Total	Local recurrence	Node metastasis
Early stage stage I / II	47	7	00
Advanced stage stage III/IV	3	2	01

DISCUSSION

In the present study, the number of males (84%) were more than females (16%). This is similar to the studies of Selvamani et al, Kshirsagar et al and Ahmad et al.[4-6] Higher incidence of carcinoma in males can be attributed to the earlier starting of consumption of alcohol and tobacco in the male population compared to the female population.

In our study, addiction history was present in 90% cases. The rest 10% had no addiction history. Symptoms of pain over the tongue was found in 5 cases, ulceration in 19, swelling over the tongue in 17 cases, dysphagia in 6 while fixation of the tongue in 3 cases. The most common site was lateral border of the tongue (56%) followed by ventral surface of tongue (32%). This is comparable to the studies of Selvamani et al and Albuquerque et al.[4,7]

There were no significant differences between the primary site of tongue carcinoma in this study and existing data in the literature.[8,9] The lateral border of the tongue was the main location in both genders. Nevertheless, the ventral surface was more common amongst men compared to women, this may be explained by the tobacco consumption in the first group. According to Schmidt et al and Keller et al the use of tobacco products has been associated with an increase of carcinoma incidence in the floor of the mouth and in the ventral surface of the tongue.[8,9] This may be explained by the absence of keratin in this location combined with the tobacco-related carcinogenic interaction with saliva.

In the present study, 5 mm tumor thickness was used as reference according to AJCC staging guidelines. In our study, tumor thickness was used for correlation and a significant association was found between neck lymph node metastasis and tumor thickness. This is concordant with the study of Moore et al and Ahmad et al.[6,10] In the group in which tumor depth was equal or <5 mm, the metastatic rate was 16.12% (5/31). The incidence of cervical metastasis increased markedly when the tumor thickness was over 5 mm, and it was a statistically significant (p<0001) association.

T-staging also showed that there was a high number (58.82%) of neck nodal metastases in T2 tumours, further emphasizing the importance of elective neck treatment in advanced-stage tongue squamous cell carcinomas. Our results correspond to those of similar studies[11,12], which showed a high chance of cervical node metastasis with an increase in T-stage. In the present study, neck lymph node metastasis was seen in 40% cases on HPE. In the present study, no significant association was found between grade of tumor and metastasis. Similar observations were noted in the study of Ahmad et al.[6]

Incidence of node as well as local recurrence in our study was low as compared with the other studies and a possible explanation is the majority of patients included in the study had early-stage tongue cancer (T1- T2, N0), END was performed in all cases, hemiglossectomy was preferred over partial glossectomy for locoregional disease clearance and post-op chemoradiation.

In our study, selective ND was done in 32 patients and MRND was done in 18 patients. Hemiglossectomy was preferred over partial glossectomy to achieve better locoregional clearance and in turn to reduce the rate of local recurrence. The surgeon's ability to achieve clear resection margins may be restricted by accessibility to the tumour's primary site which can increase the need for adjuvant therapy postoperatively. In the present study, selective ND either supra-omohyoid or anterolateral type was done in 32 patients. MRND was done in 18 patients, based on intra-op positivity on frozen sections in few and CT positivity in some cases. Overall, locoregional disease clearance in our study is better in the hemiglossectomy + END group when compared to the “partial glossectomy + END” group. Higher survival rates were observed in END group in the study by Fakih et al.[13]

Metastatic disease in the contralateral neck after ipsilateral neck is a significant problem**.** It is encountered equally frequently in patients with histologically proved negative and positive nodes. In marked contrast, we did not encounter a single instance in patients who underwent a subsequent therapeutic neck dissection due to contralateral neck involvement. It is more likely that cancer cells destined to the ipsilateral neck were trapped in the contralateral lymph nodes after the lymphatics of the ipsilateral neck had been removed by prophylactic neck dissection. So, selective neck dissection was preferred over MRND in our study group. In MRND group, we encountered one case of ipsilateral nodal recurrence which was managed with chemoradiotherapy.

END (upto level-III) is routinely performed for early T1, T2 tongue SCC patients in our cancer center. Indications for adjuvant treatment included perineural invasion, lymphovascular invasion, positive margin, and cervical lymph node metastasis.

In the present study, local recurrence can be attributed to the field cancerization effect. END for all and post op CT/RT for clearance of residual micro-metastasis. Thus, for early carcinomas, hemiglossectomy with END provides significant cure rates with less chance of recurrence.

CONCLUSION

Our present study concludes that CECT can be effectively used to delineate the extent of END in carcinoma of tongue in institutes where facilities like MRI imaging are lacking. In early-stage squamous cell carcinomas of the tongue (T1 and T2), a tumour thickness >5 mm should be taken as an indicator for prophylactic neck dissection as it is significantly associated with subclinical metastasis. Hemiglossectomy when combined with prophylactic END can reduce locoregional recurrences in early stage I and II of OTSCC.

In our present study, due to small sample size and selective patient group, our results could not be generalized to the whole population. Further research studies can be conducted as to broaden this area of research.

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